



Medium voltage products

Air insulated switch disconnectors type NAL, NALF, VersaRupter

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Indoor switch disconnecter type NAL with earthing switch type E

NAL switch disconnector production line



Foreword

NAL-type switch disconnectors are based on a modular principle, which gives it a wide range of functionality. With a unique design that extinguishes electric arcs and enables high switching capacity, they represent an attractive solution as a key breaking element for applications in enclosed switchgear and transformer compact substations. In combination with type CEF current limiting fuses, NALF fuse switch disconnectors ensure control over the full range of overload and short-circuit currents.

The main areas of application of NAL/NALF switch disconnectors are as:

- Line switch disconnectors in medium-voltage networks,
- Switch disconnectors with fuses for the switching and protection of:
 - Distribution transformers
 - Motors
 - Capacitor banks

NAL/NALF switch disconnectors are manufactured according to global quality and environmental standards and confirmed by ISO 9001 and ISO 14001 certificates. In addition, they are 98.64 percent recyclable.

The NAL/NALF brand is well known around the world, and more than 600,000 switches have been produced so far. It has been undergoing continuous development to satisfy users' demands.

1. Introduction

The switch disconnector system NAL/NALF is based on a modular principle. The basic unit consists of a frame with insulators and current carrying parts. Two different types of operating mecha-

nisms, snap action mechanism type K or stored spring energy mechanism type A, can be mounted on the frame. Fuse bases type F, with or without fuse tripping mechanism, and an earthing switch type E/EB, suitable for both direct mounting and free standing components, complete the basic equipment of a switch disconnector. These modules can be easily configured according to customer expectations.

Accessories, such as shunt trip, under-voltage release, auxiliary switches, motor operation and various systems for manual operation can easily be added.

2. Main product features

A NAL disconnector (which interrupts load currents up to 1,250 A) and a small fault-current circuit combined with a fuse base (F) and current limiting fuses (which break large short-circuit currents) create a NALF-type disconnector that provides protection against a majority of fault types in a modern electric network. Both NAL/NALF are designed in accordance with the requirements of the following standards: 60129, 60265, 60694, GOST 1516.3-96, GOST 17717-79, and CSA Standard No. C22.2, No. 193, and IEC 62271-105, all of which consider switches for general use and ensure there is safe switching coordination between a switch disconnector and a current limiting fuse.

Within the scope of the ANSI standard, NAL is known as VersaRupter and it meets the requirements of ANSI No. C37.20.4. The selected styles of NAL/NALF switch disconnector are listed as certified by the Canadian Standards Association (CSA). Some VersaRupter styles are UL listed prior to their release to comply with the relevant safety requirements required in regions of the United States.



Fig. 1 Switchboard with NAL switch disconnector



Fig. 2 Structure of panel with NAL switch disconnector



Fig. 3 NALF 36/40.5 KV fuse switch disconnector

3. Functional description

To ensure correct operation for all relevant currents, the switch disconnecter system NAL/NALF is equipped with a dual arc extinguishing system. As the current is being interrupted, the arc will be exposed to:

a) A current independent air blast which automatically starts at the correct time during the interrupting process. This is achieved by designing the insulators on the opening side as cylinders with pistons. The pistons are connected to the mechanism in the same way as the moving contacts. The air blast therefore starts simultaneously with the contact movement (autopneumatic air blast).

b) A current dependent gas blast which occurs when the walls of the arcing nozzles are exposed to the hot arc. During this process, large volumes of gas are released and the arc is effectively cooled. The concentration of the developed gas increases with increasing current. The so-called Hart gas effect is therefore most important at high currents.

A well balanced utilization of these two effects has resulted in an arc extinguishing system with high reliability for all relevant currents. Because of the autopneumatic air blast it will only be necessary to utilize the Hart gas effect for high currents. This gives an arcing system which can withstand a large number of operations without excessive wear. Consequently the NAL switches comply with the highest electrical performance classes E3 of IEC 60265-1 (for selected nominal voltages only). In addition, voltage ratings are tested with a hundred operations under a load rated current of 630 A, which is a very important feature of the product, distinguishing it from other apparatus of this type on the market.

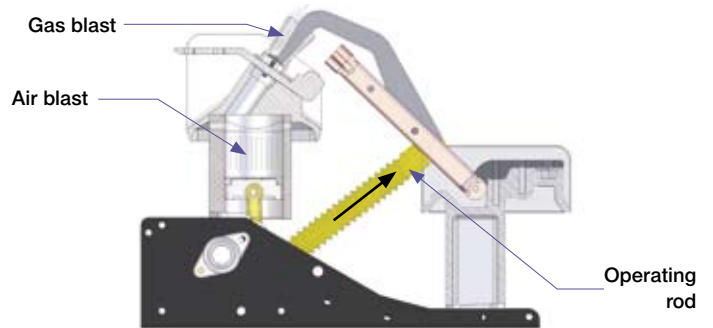


Fig. 4 Interruption

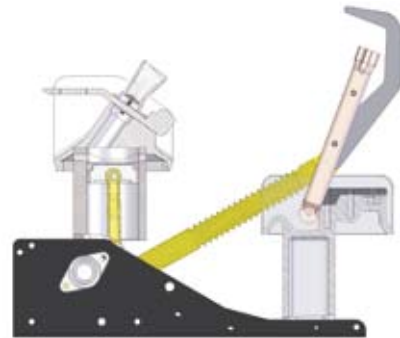


Fig. 5 Switch disconnecter in open position

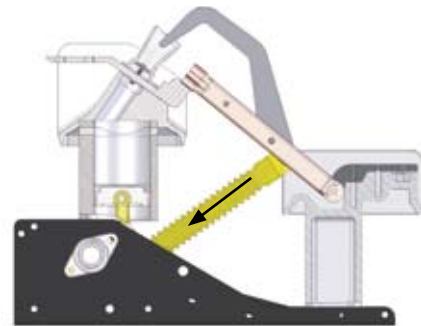


Fig.6 Closing

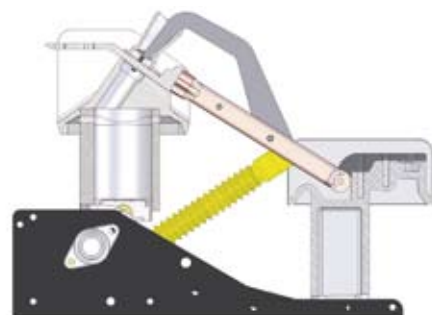
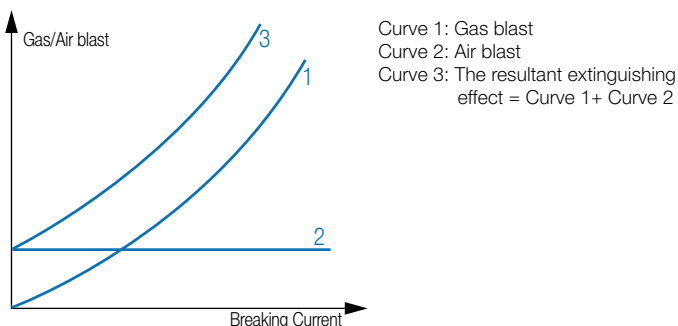


Fig. 7 Switch disconnecter in closed position

Fig. Efficiency of load current interruption in relation to breaking technique



Switches and main parts



Fig. 8 NALF



Fig. 9. Mechanism A



Fig. 10 Mechanism K



Fig. 11 Quick earthing switch type E

4. Basic designs

NAL

The standard feature consists of chassis, insulators and current carrying parts with the following pole distance:

- 12 kV – pole distance 150 mm, 170 mm and 210 mm
- 17.5 kV – pole distance 170 mm and 210 mm
- 24 kV – pole distance 170 mm*, 235 mm and 275 mm
- 36/40.5 kV – pole distance 360 mm

* – with insulating barriers

Rated currents are:

- 400, 630 and 1250 A up to 24 kV
- 630/800/1000 A for 36/40.5 kV

NALF

Is delivered with the same pole distances as the standard feature.

Fuse base type F is delivered for installation on both the opening and pivot sides, with or without automatic tripping.

A fuse base with six insulators can also be delivered separately with some form of signal indication when a fuse blows or for installation on the pivot side of the switch.

5. Mechanisms

Type A with two springs

The opening spring is always charged before the switch can be closed by means of a closing spring. This means the opening spring is always charged in a closed switch, which in turn can be tripped immediately by hand, electrically or by a fuse-link striker system.

Type K with one spring

Closing or opening the switch is performed by charging the spring past the dead centre.

A and K mechanisms may cooperate with motor drives.

6. Earthing switch

Quick earthing switch type E

This type of earthing switch is equipped with a quick spring mechanism. It can be mounted on the pivot side of the switch disconnecter or on the fuse base when the latter is on the pivot side of the switch.

Quick earthing switch type EB

Designed to be an independent assembly for both sides of the disconnecter.

Earthing switch type LCES

This type of switch is not equipped with a quick spring mechanism. It can be mounted on on the pivot side of the switch disconnecter or on the fuse base when the latter is on the pivot side of the switch.

Mechanical interlocking between the switch disconnecter and earthing switch is installed directly on apparatus' shafts. The left hand shaft extension is required for mechanical interlock installation.

7. Fuse bases and recommended current limiting fuses

Fuse base type F

Variable with or without automatic tripping of the switch by the fuse-link striker system. The fuse base can be mounted on both sides (i.e. opening side or pivot side of the switch).

Recommended current limiting fuses for switch disconnecter type NALF and fuse base with fuse tripping system

ABB fuse types CEF and CEF-S are recommended for use with the NALF switch disconnecter with fuse tripping system. These fuses are reference fuses as defined in IEC 62271-105. The selection of fuses to protect distribution transformers with appropriate assumptions about the working conditions and manner of selection are shown in the following tables.

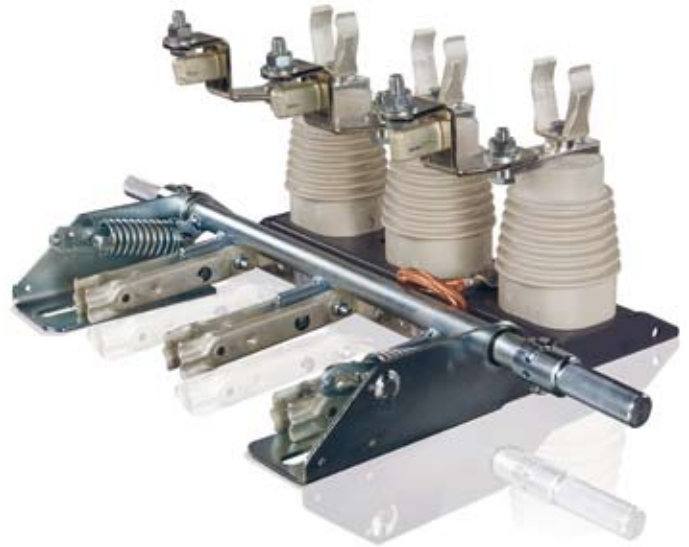


Fig. 12 Quick type earthing switch type E mounted on fuse base

Transformer rated voltage [kV]	Transformer rated output (kVA)																Fuse rated voltage [kV]	
	25	50	75	100	125	160	200	250	315	400	500	630	800	1000	1250	1600		2000
	CEF Fuse-link In [A]																	
3	16	25	25	40	40	50	63	80	100	125								3.6/7.2
5	10	16	25	25	25	40	40	50	63	80	100	125						
6	6	16	16	25	25	25	40	40	50	63	80	100	125					
10	6	10	16	16	16	20	20	25	31.5	40	50	63	80	100	125			12
12	6	6	10	16	16	16	20	20	25	40	40	50	63	80	100	125		
15	6	6	10	10	16	16	16	20	20	25	40	40	50	63	80	100	125	17.5
20	6	6	6	10	10	16	16	16	20	20	25	31.5	40	50	63	80		
24	6	6	6	6	10	10	16	16	16	20	20	25	40	40	50	63	80	24
30	6	6	6	6	6	10	10	16	16	16	25	25	25	40	40			36
36	6	6	6	6	6	10	10	16	16	16	25	25	25	40	40			

Transformer rated voltage [kV]	Transformer rated output (kVA)												Fuse rated voltage [kV]
	25	50	75	100	125	160	200	250	315	400	500	630	
	CEF-S Fuse-link In [A]												
3	16	25	40	50									
5	10	16	25	40	40	50							
6	10	16	20	25	40	40	50						12
10	10	10	16	20	20	20	40	40	50				
12	10	10	16	16	20	20	20	40	40	50			
15	10	10	10	16	16	16	20	25	40	40			
20	10	10	10	10	16	16	16	20	25	40	40		24
24	10	10	10	10	16	16	16	20	20	25	40	40	

The table was calculated according to standards IEC 60787 and IEC 62271-105 (for operating voltages up to 24 kV) and IEC 420 1990-11 for 36 kV. The following transformer work conditions were assumed:

- Maximum long-lasting overload – 150%
- Magnetizing inrush current – $12 \times I_n$ during 100 ms
- Transformer short-circuit voltage according to IEC 60076-5
- Standard ambient working conditions of fuses

The table above details the rated current of a particular fuse link for a given line voltage and transformer rating. For different criteria, the fuse selection must be recalculated..

The given limits of the rated current of fuse are not mandatory for use with NAL/NALF switch disconnecter without fuse tripping system. Rated current values of the corresponding fuses for these applications are given in the ABB catalogue titled "Fuses."

8. Types Designation

NAL							Switch disconnecter
	F						with integrated fuse base ¹⁾
		12					Rated voltage 12 kV
		17					Rated voltage 17.5 kV
		24					Rated voltage 24 kV
		36					Rated voltage 36 kV
		40.5					Rated voltage 40.5 kV
			4 ³⁾				Rated current 400 A
			6				Rated current 630 A
			8 ²⁾				Rated current 800 A
			10 ²⁾				Rated current 1000 A
			12 ³⁾				Rated current 1250 A
							without mechanism
				K			Snap action mechanism
				A			Stored spring energy mechanism
					150		Pole distance 12 kV
					170		Pole distance 12; 17.5 i 24 ⁴⁾ kV
					210		Pole distance 12 i 17.5 kV
					235		Pole distance 24 kV
					275		Pole distance 24 kV
					360		Pole distance 36 i 40.5 kV
						R	Right hand side operation
						L	Left hand side operation ⁵⁾
						E	Quick-make earthing switch ⁶⁾
						LCS	Earthing switch
						L	For 24 kV with insulating barriers – left-hand operation only

¹⁾ additional information needed when placing the order:

- the length of fuse link
- mounting side - pivot or opening
- with or without fuse tripping

²⁾ for 36/40.5 kV only

³⁾ up to 24 kV only

⁴⁾ for 24 kV insulation barriers are used

⁵⁾ for left hand operation shaft extension must be used

⁶⁾ the earthing switch is normally delivered without mechanical interlocking, which must be specified separately. For 36/40.5 kV, earthing switch is provided as self standing only type EB.

General remarks for orders

- Normally, the switch disconnecter is delivered with a fuse base for pivot side mounting. A fuse base for opening side mounting must be specified in the order.
- Closing or opening of the switch disconnecter must be carried out by an operating coil. The coil must be ordered separately.
- For left-hand operation, a shaft extension must be used. The extension must be ordered separately.
- The earthing switch is normally delivered without mechanical interlocking. There is an additional charge for interlocking.
- The switch disconnecter type NALF / NAL can be ordered at the same time, together with ABB current limiting fuse types CEF and CEF-S. Adequate ordering numbers for fuse links are available in the "Fuses" catalogue.

Ordering examples

– NAL 17-12K170LE

Switch disconnecter for 17.5 kV /1250 A with latched snap action mechanism, pole distance 170 mm. The switch disconnecter is left-hand operated and equipped with a quick-make earthing switch.

– NALF 24-6A235R

Switch disconnecter for 24 kV/630 A with stored spring energy mechanism type A, equipped with fuse base on the pivot side, with fuse-tripping device, pole distance 235 mm, right-hand operated.

9. Technical specification

Switch disconnecter type NAL

The switch disconnecter complies with IEC standards 60129, 60254 and 60694 concerning general purpose switches and IEC Standards 420 and 62271-105 regarding correct co-operation between switch disconnecter and fuse.

TABLE I. Main data

Rated voltage	Un	kV	12			17.5			24			36		40.5			
Rated current	In	A	400	630	1250	400	630	1250	400	630	1250	630	800	800	630	800	800
Max. rated current	I	A	400	630	1150	400	630	1150	400	630	1150	630	800	1000	630	800	1000
Short circuit making capacity	I _{ma}	kA peak	67	67	67	50	50	50	50	50	50	50	50	50	50 ⁵⁾	50 ⁵⁾	50 ⁵⁾
Peak withstand current	I _{dyn}	kA peak	82	82	82	82	82	82	82	82	82	66	66	66	66	66	66
Short time current 1 sec.			31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5						
2 sec.	I _{th}	kA eff.	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
3 sec.			20	20	20				16	16	16						
Mainly active load breaking capacity ¹⁾ (test duty 1 and 2, IEC 60265-1 (IEC 265))	I	A	400	630	1250	400	630	1250	400	630	1250	630	800	800	630 ⁵⁾	800 ⁵⁾	800 ⁵⁾
Mainly capacitive breaking capacity (test duty 4, IEC 60265-1 (IEC 265))	I	A	150	150	150	45	45	45	80	80	80	50	50	50	50 ⁵⁾	50 ⁵⁾	50 ⁵⁾
Mainly inductive breaking capacity cos φ = 0,15		A	16	16	16	16	16	16	16	16	16	16 ³⁾	16 ³⁾	16 ³⁾	16 ⁵⁾	16 ⁵⁾	16 ⁵⁾
Rated earth fault breaking capacity IEC 60265-1 (IEC 265)																	
Earth fault breaking capacity, fig. 6	I	A	150	150	150	70	70	70	75	75	75						
Capacitive breaking capacity, fig. 7	I	A	90	90	90	40	40	40	31.5	31.5	31.5	50	50	50	50 ⁵⁾	50 ⁵⁾	50 ⁵⁾
Max. breaking capacity in co-operation with fuses IEC 62271-105 (IEC 420 1990-11)		A	1600	1600		1600	1600		900	900	300		300*			300* ⁵⁾	
Max. fuse size ²⁾	In	A	125	125		125	125		80	80		40	40		40 ⁵⁾	40 ⁵⁾	
Power frequency withstand voltage 50 Hz 1 min.:																	
– to earth and between poles		kV		42			45			55			80			95	
– across isolating distance		kV		42			60			70			88			120	
Impulse withstand voltage 1.2/50 μs:																	
– to earth and between poles		kV		75			95			125			170			190	
– across isolating distance		kV		85			110			145			195			220	
Pole distance		mm	150, 170, 210			170, 210			170 ⁴⁾ , 235, 275			360					
Max. operating torque at:																	
– closing K/A mech.		Nm				115–120 Nm						80–100 Nm					
– opening K/A mech.		Nm				K mech. 120 Nm/A mech. 3 Nm						K mech. 80–100 Nm/ A mech. 3 Nm					
Operating angle on the shaft		degrees				130						120					
Arc time		ms				40 – 60						60					

* – IEC 420 1990-11

¹⁾ At In = 630 A, 100 x CO. At In = 1250 A, 20 x CO

²⁾ Max. fuse size is ref. to time current characteristics for CEF

³⁾ Power factor = 0,1

⁴⁾ With insulating barriers

⁵⁾ Values from 36 kV type tests

Earthing switch type E for NAL/NALF and type EB

Rated voltage	Un	kV	12	17.5	24	36	
Peak withstand current ¹⁾	I _{dyn}	kA peak.	62/82		40/82	38/82	66
Short-circuit current 1 sec.			31.5		31.5	31.5	
2 sec.	I _{th}	kA eff.	25		20	20	25
3 sec.			20		16	16	
Short-circuit making capacity	I _{ma}	kA eff.	62/67		40/62.5	38/50	50
Power frequency withstand voltage 50 Hz 1 min.		kV	42		45	50	80
Impulse withstand voltage 1.2/50 μs		kV	75		95	125	170
Pole distance		mm	150, 170, 210		170, 210	170, 235, 275	360

¹⁾ When fed from switch disconnecter/earthing switch side.

LCES earthing switch type E for NAL/NALF and type EB

Rated voltage	Un	kV	12	17.5	24	36
Peak withstand current ¹⁾	I _{dyn}	kA peak	50	50	50	50
Short time current 1 sec. 3 sec.	I _{th}	kA eff.	20	20	20	20
			16	16		16
Power frequency withstand voltage 50 Hz 1 min.		kV	28	38	50	70
Impulse withstand voltage 1.2/50 μs		kV	75	95	125	170
Pole distance		mm	150, 210	170, 210	235, 275	360

¹⁾ When fed from switch disconnect/earthing switch side.

TABLE II. Technical data according to CSA C22.2 (NAL)

Type name		NAL12	NAL17	NAL24	NAL36
Rated voltage	kV	4.16	13.8	27.6	34.5
Rated maximum voltage	kV	4.76	15	29.6	38
Rated current	A	600/1200	600/1200	600/1200	600/800
Impulse test voltage	kV	60	95	125	150
Power frequency withstand voltage	kV	28	38	60	70
Pole spacing	mm/inch	150/5.9	170/6.69	235/9.25*	
		210/8.25	210/8.25	275/10.8	360/14.1
Momentary rating asymmetrical	kA eff.	40	40	40	40
Fault-closing rated current asymmetrical	kA eff.	40	40	40	30
Short time current symmetrical	kA eff./sec.	25/3	25/3	25/3	25/2

* Short time current symmetrical 25/2 sec.

TABLE III. Technical data according to ANSI C 37.20.4 (VersaRupter)

Type name		VR8.25	VR15	VR15 (61 kA)	VR17	VR27	VR38
Rated voltage	kV	4.73	12-13.8	13.8	12-16.5	23.9-24.9	34.5
Rated maximum voltage	kV	8.25	15	15	17	27	38
Rated current	A	200/600/1200	200/600/1200	600/1200	200/600/1200	200/600/1200	600/800
Impulse test voltage	kV	75	95	95	110	125	150
Power frequency withstand voltage	kV	26	36	36	50	60	80
Pole spacing	mm/inch	210/8.25	170/6.69	235/9.25	235/9.25	275/10.8	360/14.1
Momentary rating asymmetrical	kA eff.	40	40	61	40	40	40
Fault-closing rated current asymmetrical	kA eff.	40	40	61	40	40	30
Short time current symmetrical	kA eff./sec.	25/3	25/3	40/3	25/2	25/3	25/2

TABLE IV. VersaRupter styles UL listed

Type name		VR8.25	VR15	VR15	VR15 (61 kA)
Rated voltage	kV	4.73	13.8	13.8	13.8
Rated maximum voltage	kV	8.25	15	15	15
Rated current	A	200/600	200/600	200/600	600/1200
Impulse test voltage	kV	75	95	95	95
Power frequency withstand voltage	kV	26	36	36	36
Pole spacing	mm/inch	150/5.9	170/6.69	235/9.25	235/9.25
Momentary rating asymmetrical	kA eff.	40	40	40	61
Fault-closing rated current asymmetrical	kA eff.	40	40	40	61
Short time current symmetrical	kA eff./sec.	25/3	25/3	25/3	40/3

Accessories

10. Additional equipment for NAL/NALF switch disconnectors

Fig. 13

Auxiliary switch for blown fuse



Fig. 14

Shaft extension with joint link, 380/470 mm consists of:

- a) Support bearing
- b) Connecting tube
- c) Extension bar
- d) Conneting kit

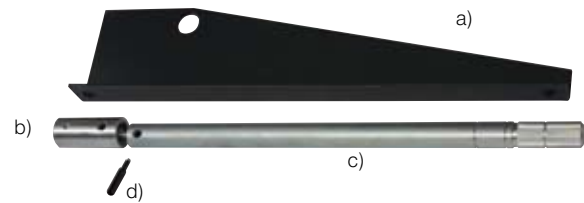


Fig. 15

Shaft extension for left-hand operation of switch.



Fig. 16

Insulated operating levers for switch operation.



Fig. 17

Test fuse link – adjustable.



Fig. 18

Manual operation of HE consists of:

- a) lower part
- b) upper part
- c) connection rod

Please observe!

The mechanism shaft does not pass through the switch from the mechanism on the right-hand side to the left side. Instead a special extension shaft is needed for operation of the mechanism from the left-hand side.

d) lower part for HE can be equipped with blocking coil for all standard voltages

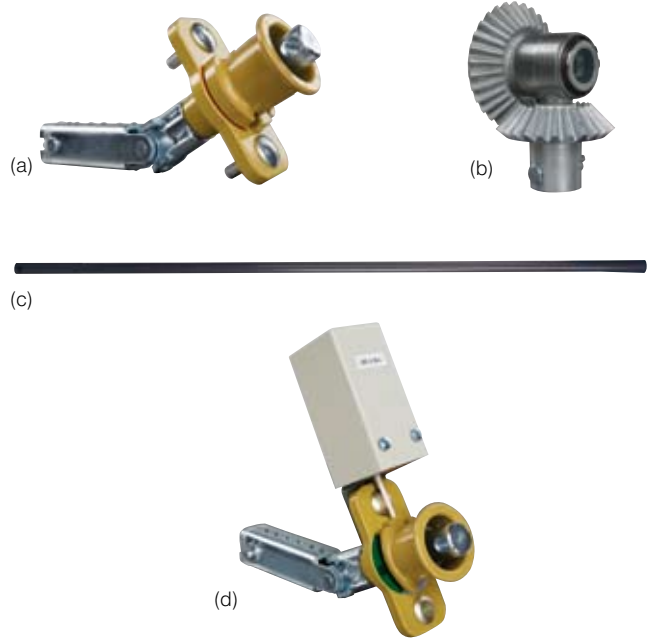


Fig. 19

Shunt trip coil can be mounted on all A-mechanisms. This coil is available for the following voltages: 24, 48, 110, 220 V DC and 110, 220 V AC. It shall always be connected in series with an auxiliary switch, which disconnects the shunt trip coil when the switch is open.



Fig. 20

Mechanical interlocking between switch disconnecter and earthing switch. At the earthing switch on the fuse base, the interlocking type (length) depends on the length of the fuse. Therefore, the fuse size must be stated.

Mechanical interlocking can also be used for switch disconnecter and EB earthing switch.



Fig. 21

Auxiliary switch can be mounted on all switch disconnectors, max. 8NO and 8NC and on all earthing switches except LCES, max. 4NO + 4NC + connection kit for assembling.



11. Example of switch arrangement

Auxiliary contact

Shows position of switch disconnector (open/close)

Motor drive NM

For automatic charge and operating switch disconnector

Spring mechanism

For operating switch disconnector

Shunt trip

Release charged spring mechanism, opens the switch disconnector

Mechanical interlocking

Interlocks switch disconnector when cooperating with earthing

Earthing switch shaft

For operating earthing switch or for mechanical interlocking

Quick earthing switch type E

Earth main circuit of switch disconnector



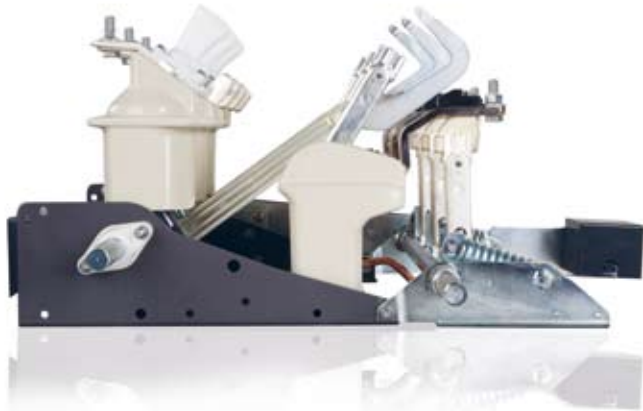


Fig. 22 VersaRupter switch disconnecter for 8.25 kV



Fig. 23 VersaRupter switch disconnecter VR15 (61 kA)

12. Ordering information

Switch disconnecter without operating mechanism

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
NAL12-4	12	400	150	1YMX054150M0001	25
NAL 12-4	12	400	170	1YMX064170M0001	25
NAL 12-4	12	400	210	1YMX054950M0001	25
NAL 12-6	12	630	150	1YMX054141M0001	25
NAL 12-6	12	630	170	1YMX064170M0002	25
NAL 12-6	12	630	210	1YMX054971M0001	25
NAL 12-12	12	1250	150	1YMX054152M0001	26
NAL 12-12	12	1250	170	1YMX064170M0003	26
NAL 12-12	12	1250	210	1YMX054952M0001	26
NAL 17-4	17.5	400	170	1YMX054153M0001	27
NAL 17-4	17.5	400	210	1YMX064210M0001	27
NAL 17-6	17.5	630	170	1YMX054144M0001	27
NAL 17-6	17.5	630	210	1YMX064210M0002	27
NAL 17-12	17.5	1250	170	1YMX054155M0001	28
NAL 17-12	17.5	1250	210	1YMX064210M0003	28
NAL 24-4	24	400	170	1YMX064171M0001	35
NAL 24-4	24	400	235	1YMX054156M0001	35
NAL 24-4	24	400	275	1YMX054456M0001	35
NAL 24-6	24	630	170	1YMX064171M0002	35
NAL 24-6	24	630	235	1YMX054147M0001	35
NAL 24-6	24	630	275	1YMX054467M0001	35
NAL 24-12	24	1250	170	1YMX064171M0003	36
NAL 24-12	24	1250	235	1YMX054158M0001	36
NAL 24-12	24	1250	275	1YMX054458M0001	36
NAL 36-6	36	630	360	1YMX054310M0001	62
NAL 36-8	36	800	360	1YMX054311M0001	62
NAL 36-10	36	1000	360	1YMX054312M0001	62
NAL 40-6	40.5	630	360	1YMX064310M0001	63
NAL 40-8	40.5	800	360	1YMX064311M0001	63
NAL 40-10	40.5	1000	360	1YMX064312M0001	63

Switch disconnecter with operating mechanism (K)

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
NAL 12-4K150R	12	400	150	1YMX054010M0001	30
NAL 12-4K170R	12	400	170	1YMX065170M0001	30
NAL 12-4K210R	12	400	210	1YMX054910M0001	30
NAL 12-6K150R	12	630	150	1YMX054011M0001	30
NAL 12-6K170R	12	630	170	1YMX065170M0002	30
NAL 12-6K210R	12	630	210	1YMX054911M0001	30
NAL 12-12K150R	12	1250	150	1YMX054012M0001	31
NAL 12-12K170R	12	1250	170	1YMX065170M0003	31
NAL 12-12K210R	12	1250	210	1YMX054912M0001	31
NAL 17-4K170R	17.5	400	170	1YMX054013M0001	32
NAL 17-4K24 170R	17.5	400	170	1YMX054013M0002	32
NAL 17-4K210R	17.5	400	210	1YMX065210M0001	32
NAL 17-4K24 210R	17.5	400	210	1YMX065210M0002	32
NAL 17-6K170R	17.5	630	170	1YMX054014M0001	32
NAL 17-6K24 170R	17.5	630	170	1YMX054014M0002	32
NAL 17-6K210R	17.5	630	210	1YMX065210M0006	32
NAL 17-6K24 210R	17.5	630	210	1YMX065210M0005	32
NAL 17-12K170R	17.5	1250	170	1YMX054015M0001	33
NAL 17-12K24 170R	17.5	1250	170	1YMX054015M0002	33
NAL 17-12K210R	17.5	1250	210	1YMX065210M0003	33
NAL 17-12K24 210R	17.5	1250	210	1YMX065210M0004	33
NAL 24-4K170R	24	400	170	1YMX065171M0001	40
NAL 24-4K235R	24	400	235	1YMX054016M0001	40
NAL 24-4K275R	24	400	275	1YMX054410M0001	40
NAL 24-6K170R	24	630	170	1YMX065171M0002	40
NAL 24-6K235R	24	630	235	1YMX054017M0001	40
NAL 24-6K275R	24	630	275	1YMX054411M0001	40
NAL 24-12K170R	24	1250	170	1YMX065171M0003	41
NAL 24-12K235R	24	1250	235	1YMX054018M0001	41
NAL 24-12K275R	24	1250	275	1YMX054412M0001	41
NAL 36-6K360R	36	630	360	1YMX054313M0001	67
NAL 36-8K360R	36	800	360	1YMX054314M0001	67
NAL 36-10K360R	36	1000	360	1YMX054315M0001	67
NAL 40-6K360R	40.5	630	360	1YMX065403M0001	68
NAL 40-8K360R	40.5	800	360	1YMX065314M0001	68
NAL 40-10K360R	40.5	1000	360	1YMX065315M0001	68



Fig. 24 NALF 12-6 12 kV fuse switch disconnector with mechanism A



Fig. 25 NAL 12-6 12 kV switch disconnector with mechanism K

Switch disconnector with operating mechanism (A)

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
NAL 12-4A150R	12	400	150	1YMX054040M0001	32
NAL 12-4A170R	12	400	170	1YMX067170M0001	32
NAL 12-4A210R	12	400	210	1YMX054920M0001	32
NAL 12-6A150R	12	630	150	1YMX054041M0001	32
NAL 12-6A170R	12	630	170	1YMX067170M0002	32
NAL 12-6A210R	12	630	210	1YMX054921M0001	32
NAL 12-12A150R	12	1250	150	1YMX054042M0001	33
NAL 12-12A170R	12	1250	170	1YMX067170M0003	33
NAL 12-12A210R	12	1250	210	1YMX054922M0001	33
NAL 17-4A170R	17.5	400	170	1YMX054043M0001	34
NAL 17-4A24 170R	17.5	400	170	1YMX054043M0002	34
NAL 17-4A210R	17.5	400	210	1YMX067210M0001	34
NAL 17-4A24 210R	17.5	400	210	1YMX067210M0002	34
NAL 17-6A170R	17.5	630	170	1YMX054044M0001	34
NAL 17-6A24 170R	17.5	630	170	1YMX054044M0002	34
NAL 17-6A210R	17.5	630	210	1YMX067210M0006	34
NAL 17-6A24 210R	17.5	630	210	1YMX067210M0005	34
NAL 17-12A170R	17.5	1250	170	1YMX054045M0001	35
NAL 17-12 A24 170R	17.5	1250	170	1YMX054045M0002	35
NAL 17-12A210R	17.5	1250	210	1YMX067210M0003	35
NAL 17-12A24 210R	17.5	1250	210	1YMX067210M0004	35
NAL 24-4A170R	24	400	170	1YMX067171M0001	42
NAL 24-4A235R	24	400	235	1YMX054046M0001	42
NAL 24-4A275R	24	400	275	1YMX054420M0001	42
NAL 24-6A170R	24	630	170	1YMX067171M0002	42
NAL 24-6A235R	24	630	235	1YMX054047M0001	42
NAL 24-6A275R	24	630	275	1YMX054421M0001	42
NAL 24-12A170R	24	1250	170	1YMX067171M0003	43
NAL 24-12A235R	24	1250	235	1YMX054048M0001	43
NAL 24-12A275R	24	1250	275	1YMX054422M0001	43
NAL 36-6A360R	36	630	360	1YMX054319M0001	68
NAL 36-8A360R	36	800	360	1YMX054320M0001	68
NAL 36-10A360R	36	1000	360	1YMX054321M0001	68
NAL 40-6A360R	40.5	630	360	1YMX067319M0001	69
NAL 40-8A360R	40.5	800	360	1YMX067320M0001	69
NAL 40-10A360R	40.5	1000	360	1YMX067321M0001	69

Switch disconnector with fuse base on pivot side, operating mechanism K, without fuse tripping

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
NALF 12-4K150R	12	400	150	1YMX054070M0001	39
NALF 12-4K170R	12	400	170	1YMX068170M0001	39
NALF 12-4K210R	12	400	210	1YMX054925M0001	39
NALF 12-6K150R	12	630	150	1YMX054071M0001	39
NALF 12-6K170R	12	630	170	1YMX068170M0002	39
NALF 12-6K210R	12	630	210	1YMX054926M0001	39
NALF 17-4K170R	17.5	400	170	1YMX054072M0001	42
NALF 17-4K24 170R	17.5	400	170	1YMX054072M0002	42
NALF 17-4K210R	17.5	400	210	1YMX068210M0001	42
NALF 17-4K24 210R	17.5	400	210	1YMX068210M0003	42
NALF 17-6K170R	17.5	630	170	1YMX054073M0001	42
NALF 17-6K24 170R	17.5	630	170	1YMX054073M0002	42
NALF 17-6K210R	17.5	630	210	1YMX068210M0002	42
NALF 17-6K24 210R	17.5	630	210	1YMX068210M0004	42
NALF 24-4K170R	24	400	170	1YMX068171M0001	51
NALF 24-4K235R	24	400	235	1YMX054074M0001	51
NALF 24-4K275R	24	400	275	1YMX054425M0001	51
NALF 24-6K170R	24	630	170	1YMX068171M0002	51
NALF 24-6K235R	24	630	235	1YMX054075M0001	51
NALF 24-6K275R	24	630	275	1YMX054426M0001	51
NALF 36-6K360R	36	630	360	1YMX054322M0001	68
NALF 36-8K360R	36	800	360	1YMX054323M0001	68
NALF 36-10K360R	36	1000	360	1YMX054324M0001	68
NALF 40-6K360R	40.5	630	360	1YMX068322M0001	69
NALF 40-8K360R	40.5	800	360	1YMX068323M0001	69
NALF 40-10K360R	40.5	1000	360	1YMX068324M0001	69

Switch disconnecter with fuse base on opening side, operating mechanism K, without fuse tripping

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
NALF 12-4K150R	12	400	150	1YMX354070M0001	39
NALF 12-4K170R	12	400	170	1YMX368170M0001	39
NALF 12-4K210R	12	400	210	1YMX354925M0001	39
NALF 12-6K150R	12	630	150	1YMX354071M0001	39
NALF 12-6K170R	12	630	170	1YMX368170M0002	39
NALF 12-6K210R	12	630	210	1YMX354926M0001	39
NALF 17-4K170R	17.5	400	170	1YMX354072M0001	42
NALF 17-4K24 170R	17.5	400	170	1YMX354072M0002	42
NALF 17-4K210R	17.5	400	210	1YMX368210M0001	42
NALF 17-4K24 210R	17.5	400	210	1YMX368210M0003	42
NALF 17-6K170R	17.5	630	170	1YMX354073M0001	42
NALF 17-6K24 170R	17.5	630	170	1YMX354073M0002	42
NALF 17-6K210R	17.5	630	210	1YMX368210M0002	42
NALF 17-6K24 210R	17.5	630	210	1YMX368210M0004	42
NALF 24-4K170R	24	400	170	1YMX368171M0001	51
NALF 24-4K235R	24	400	235	1YMX354074M0001	51
NALF 24-4K275R	24	400	275	1YMX354425M0001	51
NALF 24-6K170R	24	630	170	1YMX368171M0002	51
NALF 24-6K235R	24	630	235	1YMX354075M0001	51
NALF 24-6K275R	24	630	275	1YMX354426M0001	51
NALF 36-6K360R	36	630	360	1YMX354322M0001	68
NALF 36-8K360R	36	800	360	1YMX354323M0001	68

Switch disconnecter with fuse base on pivot side, operating mechanism A, with fuse tripping

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
NALF 12-4A150R	12	400	150	1YMX054090M0001	41
NALF 12-4A170R	12	400	170	1YMX070170M0001	41
NALF 12-4A210R	12	400	210	1YMX054935M0001	41
NALF 12-6A150R	12	630	150	1YMX054091M0001	41
NALF 12-6A170R	12	630	170	1YMX070170M0002	41
NALF 12-6A210R	12	630	210	1YMX054936M0001	41
NALF 17-4A170R	17.5	400	170	1YMX054092M0001	44
NALF 17-4A24 170R	17.5	400	170	1YMX054092M0002	44
NALF 17-4A210R	17.5	400	210	1YMX070210M0001	44
NALF 17-4A24 210R	17.5	400	210	1YMX070210M0003	44
NALF 17-6A170R	17.5	630	170	1YMX054093M0001	44
NALF 17-6A24 170R	17.5	630	170	1YMX054093M0002	44
NALF 17-6A210R	17.5	630	210	1YMX070210M0002	44
NALF 17-6A24 210R	17.5	630	210	1YMX070210M0004	44
NALF 24-4A170R	24	400	170	1YMX070171M0001	53
NALF 24-4A235R	24	400	235	1YMX054094M0001	53
NALF 24-4A275R	24	400	275	1YMX054435M0001	53
NALF 24-6A170R	24	630	170	1YMX070171M0002	53
NALF 24-6A235R	24	630	235	1YMX054095M0001	53
NALF 24-6A275R	24	630	275	1YMX054436M0001	53
NALF 36-6A360R	36	630	360	1YMX054328M0001	70
NALF 36-8A360R	36	800	360	1YMX054329M0001	70
NALF 36-10A360R	36	1000	360	1YMX054330M0001	70
NALF 40-6A360R	40.5	630	360	1YMX070328M0001	71
NALF 40-8A360R	40.5	800	360	1YMX070329M0001	71
NALF 40-10A360R	40.5	1000	360	1YMX070330M0001	71



Fig. 26 NALF 40.5 kV fuse switch disconnecter

Switch disconnecter with fuse base on opening side, operating mechanism A, with fuse tripping

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
NALF 12-4A150R	12	400	150	1YMX354090M0001	41
NALF 12-4A170R	12	400	170	1YMX370170M0001	41
NALF 12-4A210R	12	400	210	1YMX354935M0001	41
NALF 12-6A150R	12	630	150	1YMX354091M0001	41
NALF 12-6A170R	12	630	170	1YMX370170M0002	41
NALF 12-6A210R	12	630	210	1YMX354936M0001	41
NALF 17-4A170R	17.5	400	170	1YMX354092M0001	44
NALF 17-4A24 170R	17.5	400	170	1YMX354092M0002	44
NALF 17-4A210R	17.5	400	210	1YMX370210M0001	44
NALF 17-4A24 210R	17.5	400	210	1YMX370210M0003	44
NALF 17-6A170R	17.5	630	170	1YMX354093M0001	44
NALF 17-6A24 170R	17.5	630	170	1YMX354093M0002	44
NALF 17-6A210R	17.5	630	210	1YMX370210M0002	44
NALF 17-6A24 210R	17.5	630	210	1YMX370210M0004	44
NALF 24-4A170R	24	400	170	1YMX370171M0001	53
NALF 24-4A235R	24	400	235	1YMX354094M0001	53
NALF 24-4A275R	24	400	275	1YMX354435M0001	53
NALF 24-6A170R	24	630	170	1YMX370171M0002	53
NALF 24-6A235R	24	630	235	1YMX354095M0001	53
NALF 24-6A275R	24	630	275	1YMX354436M0001	53
NALF 36-6A360R	36	630	360	1YMX354328M0001	70
NALF 36-8A360R	36	800	360	1YMX354329M0001	70

Switch disconnecter CSA without operating mechanism

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
NAL 12-6 150	4.16	600	150	1YMX084141M0001	25
NAL 12-12 150	4.16	1200	150	1YMX084152M0001	26
NAL 12-6 210	4.16	600	210	1YMX084971M0001	25
NAL 12-12 210	4.16	1200	210	1YMX089952M0001	26
NAL 17-6 170	13.8	600	170	1YMX084144M0001	27
NAL 17-12 170	13.8	1200	170	1YMX084155M0001	28
NAL 17-6 210	13.8	600	210	1YMX084210M0002	27
NAL 17-12 210	13.8	1200	210	1YMX084210M0003	28
NAL 17-6 235	13.8	600	235	1YMX084147M0001	35
NAL 17-12 235	13.8	1200	235	1YMX184158M0001	36
NAL 24-6 235	27.6	600	235	1YMX184147M0001	35
NAL 24-12 235	27.6	1200	235	1YMX084158M0001	36
NAL 24-6 275	27.6	600	275	1YMX084467M0001	35
NAL 24-12 275	27.6	1200	275	1YMX084458M0001	36
NAL 36-6 360	34.5	600	360	1YMX084310M0001	62
NAL 36-8 360	34.5	800	360	1YMX084311M0001	62

Switch disconnecter CSA with operating mechanism K

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
NAL 12-6K 150R	4.16	600	150	1YMX084011M0001	30
NAL 12-12K 150R	4.16	1200	150	1YMX084012M0001	31
NAL 12-6K 210R	4.16	600	210	1YMX084911M0001	30
NAL 12-12K 210R	4.16	1200	210	1YMX084912M0001	31
NAL 17-6K 170R	13.8	600	170	1YMX084014M0001	32
NAL 17-12K 170R	13.8	1200	170	1YMX084015M0001	33
NAL 17-6K24 170R	13.8	600	170	1YMX084014M0002	32
NAL 17-12K24 170R	13.8	1200	170	1YMX084015M0002	33
NAL 17-6K 210R	13.8	600	210	1YMX085210M0002	32
NAL 17-12K 210R	13.8	1200	210	1YMX085210M0003	33
NAL 17-6K24 210R	13.8	600	210	1YMX085210M0004	32
NAL 17-12K24 210R	13.8	1200	210	1YMX085210M0005	33
NAL 17-6K 235R	13.8	600	235	1YMX084017M0001	40
NAL 17-12K 235R	13.8	1200	235	1YMX084018M0001	41
NAL 17-6K24 235R	13.8	600	235	1YMX084017M0002	40
NAL 17-12K24 235R	13.8	1200	235	1YMX084018M0002	41
NAL 24-6K 235R	27.6	600	235	1YMX184017M0001	40
NAL 24-12K 235R	27.6	1200	235	1YMX184018M0001	41
NAL 24-6K 275R	27.6	600	275	1YMX084411M0001	40
NAL 24-12K 275R	27.6	1200	275	1YMX084412M0001	41
NAL 36-6K 360R	34.5	600	360	1YMX084363M0001	62
NAL 36-8K 360R	34.5	800	360	1YMX084314M0001	62

Switch disconnecter CSA with fuse base, operating mechanism K, without fuse tripping

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
NALF 12-6K 150R	4.16	600	150	1YMX084071M0001	39
NALF 12-6K 210R	4.16	600	210	1YMX084926M0001	39
NALF 17-6K 170R	13.8	600	170	1YMX084073M0002	42
NALF 17-6K24 170R	13.8	600	170	1YMX084073M0001	42
NALF 17-6K 210R	13.8	600	210	1YMX088210M0002	42
NALF 17-6K24 210R	13.8	600	210	1YMX088210M0003	42
NALF 17-6K 235R	13.8	600	235	1YMX084075M0001	51
NALF 24-6K 235R	27.6	600	235	1YMX184075M0001	51
NALF 24-6K 275R	27.6	600	275	1YMX084426M0001	51
NALF 36-6K 360R	34.5	600	360	1YMX084322M0001	68
NALF 36-8K 360R	34.5	800	360	1YMX084323M0001	68

Switch disconnecter CSA with operating mechanism A

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
NAL 12-6A 150R	4.16	600	150	1YMX084041M0001	32
NAL 12-12A 150R	4.16	1200	150	1YMX084042M0001	33
NAL 12-6A 210R	4.16	600	210	1YMX084921M0001	32
NAL 12-12A 210R	4.16	1200	210	1YMX084922M0001	33
NAL 17-6A 170R	13.8	600	170	1YMX084404M0001	34
NAL 17-12A 170R	13.8	1200	170	1YMX084045M0001	35
NAL 17-6A24 170R	13.8	600	170	1YMX084404M0002	34
NAL 17-12A24 170R	13.8	1200	170	1YMX084045M0002	35
NAL 17-6A 210AR	13.8	600	210	1YMX087210M0002	34
NAL 17-12A 210AR	13.8	1200	210	1YMX087210M0003	35
NAL 17-6A24 210R	13.8	600	210	1YMX087210M0004	34
NAL 17-12A24 210R	13.8	1200	210	1YMX087210M0005	35
NAL 17-6A 235R	13.8	600	235	1YMX084047M0001	42
NAL 17-12A 235R	13.8	1200	235	1YMX084048M0001	43
NAL 17-6A24 235R	13.8	600	235	1YMX084047M0002	42
NAL 17-12A24 235R	13.8	1200	235	1YMX084048M0002	43
NAL 24-6A24 235R	27.6	600	235	1YMX184047M0001	42
NAL 24-12A24 235R	27.6	1200	235	1YMX184048M0001	43
NAL 24-6A24 275R	27.6	600	275	1YMX084421M0001	42
NAL 24-12A24 275R	27.6	1200	275	1YMX084422M0001	43
NAL 34-6A 360R	34.5	600	360	1YMX084319M0001	62
NAL 34-8A 360R	34.5	800	360	1YMX084320M0001	62

Switch disconnecter CSA with fuse base, operating mechanism A, with fuse tripping

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
NALF 12-6A 150R	4.16	600	150	1YMX084091M0001	41
NALF 12-6A 210R	4.16	600	210	1YMX084936M0001	41
NALF 17-6A 170R	13.8	600	170	1YMX084093M0001	44
NALF 17-6A24 170R	13.8	600	170	1YMX084093M0002	44
NALF 17-6A 210R	13.8	600	210	1YMX080210M0002	44
NALF 17-6A24 210R	13.8	600	210	1YMX080210M0003	44
NALF 17-6A 235R	13.8	600	235	1YMX084095M0001	53
NALF 24-6A24 235R	27.6	600	235	1YMX184095M0001	53
NALF 24-6A24 275R	27.6	600	275	1YMX084436M0001	53
NALF 36-6A 360R	34.5	600	360	1YMX084328M0001	70
NALF 36-8A 360R	34.5	800	360	1YMX084329M0001	70

ANSI style switch disconnecter (VersaRupter) UL listed

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm/inch]	K-mechanism (shaft length) [inch]	Ordering number	Catalogue number according to UL files	Weight [kg]
VR 8.25-2K-150R	8.25	200	150/5.9	3.77	1YMX323024M1503	244-040-512	30
VR 8.25-6K-150R	8.25	600	150/5.9	3.77	1YMX323024M1504	244-040-515	30
VR 15-2K-170R	15	200	170/6.69	3.77	1YMX323025M1503	244-041-512	32
VR 15-6K-170R	15	600	170/6.69	3.77	1YMX323025M1504	244-041-515	32
VR 15-2K-235R	15	200	235/9.25	5.26	1YMX323084M1503	244-042-513	32
VR 15-6K-235R	15	600	235/9.25	5.26	1YMX323084M1504	244-042-514	32
VR 15-6K-235R (61 kA)	15	600	235/9.25	3.77	1YMX888272M0003	245-881-506	44
VR 15-6K-235R (61 kA)	15	600	235/9.25	5.26	1YMX888272M0004	245-881-507	44
VR 15-12K-235R (61 kA)	15	1200	235/9.25	3.77	1YMX888272M0005	245-881-510	44
VR 15-12K-235R (61 kA)	15	1200	235/9.25	5.26	1YMX888272M0006	245-881-511	44

Switch disconnecter ANSI (VersaRupter) with operating mechanism K

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
VR 8.25-2K 150R	8.25	200	150	1YMX244040M1502	30
VR 8.25-6K 150R	8.25	600	150	1YMX244040M1506	30
VR 8.25-12K 150R	8.25	1200	150	1YMX244040M1510	31
VR 15-2K 170R	15	200	170	1YMX244041M1502	32
VR 15-6K 170R	15	600	170	1YMX244041M1506	32
VR 15-12K 170R	15	1200	170	1YMX244041M1510	33
VR 17-2K 235R	17	200	235	1YMX244042M1502	40
VR 17-6K 235R	17	600	235	1YMX244042M1506	40
VR 17-12K 235R	17	1200	235	1YMX244042M1510	41
VR 27-2K 275R	27	200	275	1YMX244043M1502	40
VR 27-6K 275R	27	600	275	1YMX244043M1506	40
VR 27-12K 275R	27	1200	275	1YMX244043M1510	41
VR 38-6K 360R	38	600	360	1YMX244005M1501	62
VR 38-8K 360R	38	800	360	1YMX244005M1502	62
VR 15-6K 235R (61 kA)	15	600	235	1YMX245881M1506	44
VR 15-12K 235R (61 kA)	15	1200	235	1YMX245881M1510	44

Switch disconnecter ANSI (VersaRupter) with operating mechanism A

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
VR 8.25-2A 150R	8.25	200	150	1YMX245864M1501	30
VR 8.25-6A 150R	8.25	600	150	1YMX245864M1502	30
VR 8.25-12A 150R	8.25	1200	150	1YMX245864M1503	31
VR 15-2A 170R	15	200	170	1YMX245864M1504	32
VR 15-6A 170R	15	600	170	1YMX245864M1505	32
VR 15-12A 170R	15	1200	170	1YMX245864M1506	33
VR 17-2A 235R	17	200	235	1YMX245864M1507	40
VR 17-6A 235R	17	600	235	1YMX245864M1508	40
VR 17-12A 235R	17	1200	235	1YMX245864M1511	41
VR 27-2A 275R	27	200	275	1YMX245864M1515	40
VR 27-6A 275R	27	600	275	1YMX245864M1516	40
VR 27-12A 275R	27	1200	275	1YMX245864M1518	41
VR 38-6A 360R	38	600	360	1YMX245864M1519	62
VR 38-8A 360R	38	800	360	1YMX245864M1520	62
VR 15-6A 235R (61 kA)	15	600	235	1YMX245881M1514	44
VR 15-12A 235R (61 kA)	15	1200	235	1YMX245881M1515	44

Fuse base type F for spring mechanism type A with fuse tripping, mounted on pivot side

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
F 12	12	400/630	150	1YMX054195M0001	7
F 12	12	400/630	170	1YMX064195M0001	7
F 12	12	400/630	210	1YMX054976M0001	7
F 17	17	400/630	170	1YMX054196M0001	8
F 17 for LCES	17	400/630	170	1YMX888336M0001	8
F 17	17	400/630	210	1YMX064196M0001	8
F 17 for LCES	17	400/630	170	1YMX888336M0003	8
F 24	24	400/630	170	1YMX064197M0001	15
F 24	24	400/630	235	1YMX054197M0001	13
F 24 for LCES	24	400/630	235	1YMX888338M0001	13
F 24	24	400/630	275	1YMX054476M0001	13
F 24 for LCES	24	400/630	275	1YMX888338M0003	13
F 36	36	630/800	360	1YMX054335M0001	17
F 40	40.5	630/800	360	1YMX064335M0001	17

Fuse base type F for spring mechanism type A with fuse tripping, mounted on opening side

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
F 12	12	400/630	150	1YMX054200M0001	7
F 12	12	400/630	170	1YMX064200M0001	7
F 12	12	400/630	210	1YMX054978M0001	7
F 17	17	400/630	170	1YMX054201M0001	8
F 17	17	400/630	210	1YMX064201M0001	8
F 24	24	400/630	170	1YMX064202M0001	15
F 24	24	400/630	235	1YMX054202M0001	13
F 24	24	400/630	275	1YMX054478M0001	13

Fuse base with six insulators for spring mechanism type A with fuse tripping

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
F6 12	12	400/630/1250	150	1YMX054205M0001	16
F6 12	12	400/630/1250	170	1YMX064205M0001	16.5
F6 12	12	400/630/1250	210	1YMX054974M0001	17
F6 17	17.5	400/630/1250	170	1YMX054206M0001	20
F6 17	17.5	400/630/1250	210	1YMX064206M0001	20
F6 24	24	400/630/1250	170	1YMX064207M0001	22
F6 24	24	400/630/1250	235	1YMX054207M0001	22
F6 24	24	400/630/1250	275	1YMX054474M0001	24

Fuse base with six insulators and double fuses per phase

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
F6 12	12	400/630/1250	150	1YMX343555M0001	18
F6 12	12	400/630/1250	210	1YMX343555M0004	19
F6 17	17.5	400/630/1250	170	1YMX343555M0002	22
F6 24	24	400/630/1250	235	1YMX343555M0003	24
F6 24	24	400/630/1250	275	1YMX343555M0005	26

Fuse base type F for spring mechanism type K/A without fuse tripping, mounted on pivot side

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
F 12	12	400/630	150	1YMX054181M0001	7
F 12	12	400/630	170	1YMX064181M0001	7
F 12	12	400/630	210	1YMX054960M0001	7
F 17	17.5	400/630	170	1YMX054182M0001	8
F 17 for LCES	17.5	400/630	170	1YMX888336M0002	8
F 17	17.5	400/630	210	1YMX064182M0001	8
F 17 for LCES	17.5	400/630	210	1YMX888336M0004	8
F 24	24	400/630	170	1YMX064183M0001	13
F 24	24	400/630	235	1YMX054183M0001	13
F 24 for LCES	24	400/630	235	1YMX888338M0002	13
F 24	24	400/630	275	1YMX054460M0001	13
F 24 for LCES	24	400/630	275	1YMX888338M0004	13
F 36	36	630/800	360	1YMX054337M0001	17
F 40	40.5	630/800	360	1YMX064337M0001	17

Fuse base type F for spring mechanism type K/A without fuse tripping, mounted on opening side

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
F 12	12	400/630	150	1YMX054190M0001	7
F 12	12	400/630	170	1YMX064190M0001	7
F 12	12	400/630	210	1YMX054961M0001	7
F 17	17.5	400/630	170	1YMX054191M0001	8
F 17	17.5	400/630	210	1YMX064191M0001	8
F 24	24	400/630	170	1YMX064193M0001	13
F 24	24	400/630	235	1YMX054193M0001	13
F 24	24	400/630	275	1YMX054461M0001	13
F 36	36	630/800	360	1YMX054337M0001	17
F 40	40.5	630/800	360	1YMX064337M0001	17

Fuse base with six insulators for spring mechanism type A without fuse tripping

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
F6 12	12	400/630/1250	150	1YMX054185M0001	15.5
F6 12	12	400/630/1250	170	1YMX064185M0001	16
F6 12	12	400/630/1250	210	1YMX054972M0001	16.5
F6 17	17.5	400/630/1250	170	1YMX054418M0001	19.5
F6 17	17.5	400/630/1250	210	1YMX064418M0001	19.5
F6 24	24	400/630/1250	170	1YMX064187M0001	21.5
F6 24	24	400/630/1250	235	1YMX054187M0001	21.5
F6 24	24	400/630/1250	275	1YMX054472M0001	23.5

**Earthing switch type E for NAL switch disconnector
without mechanical interlocking**

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
E 12	12	400/630	150	1YMX054235M0001	7
E 12	12	400/630	170	1YMX064235M0001	7
E 12	12	400/630	210	1YMX054983M0001	7
E 12	12	1250	150	1YMX054214M0001	7
E 12	12	1250	170	1YMX064235M0002	7
E 12	12	1250	210	1YMX054989M0001	7
E 17	17.5	400/630	170	1YMX054236M0001	8
E 17	17.5	400/630	210	1YMX064236M0001	8
E 17	17.5	1250	170	1YMX054218M0001	8
E 17	17.5	1250	210	1YMX064236M0002	8
E 24	24	400/630	170	1YMX064237M0001	9
E 24	24	400/630	235	1YMX054237M0001	9
E 24	24	400/630	275	1YMX054483M0001	9
E 24	24	1250	170	1YMX064237M0002	9
E 24	24	1250	235	1YMX054219M0001	9
E 24	24	1250	275	1YMX054489M0001	9

**Earthing switch type E for NAL switch disconnector
without mechanical interlocking, mounted on fuse base**

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
E 12	12	400/630	150	1YMX054225M0001	7
E 12	12	400/630	170	1YMX064225M0001	7
E 12	12	400/630	210	1YMX054988M0001	7
E 17	17.5	400/630	170	1YMX054226M0001	8
E 17	17.5	400/630	210	1YMX064226M0001	8
E 24	24	400/630	170	1YMX064227M0001	9
E 24	24	400/630	235	1YMX054227M0001	9
E 24	24	400/630	275	1YMX054488M0001	9

Earthing switch type EB freestanding

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
EB 12	12	1250	150	1YMX054270M0001	17.5
EB 12	12	1250	170	1YMX064270M0001	17.5
EB 12	12	1250	210	1YMX054271M0001	17.5
EB 17	17.5	1250	170	1YMX054272M0001	19
EB 17	17.5	1250	210	1YMX064272M0001	19
EB 24	24	1250	235	1YMX054273M0001	24
EB 24	24	1250	170	1YMX064273M0001	24
EB 24	24	1250	275	1YMX054274M0001	24
EB 36	36	800	360	1YMX054288M0001	30
EB 36 on pivot side NAL	36	630/800	360	1YMX344033M0001	30
EB 36 on opening side NAL	36	630/800	360	1YMX344034M0001	30
EB 36 on pivot side NALF	36	630/800	360	1YMX344035M0001	30
EB 36 on opening side NALF	36	630/800	360	1YMX344036M0001	30

**Earthing switch type LCES for NAL switch disconnector
without mechanical interlocking**

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
LCES E12	12	400/630	150	1YMX888325M0001	7
LCES E12	12	400/630	170	1YMX888325M0002	7
LCES E12	12	400/630	210	1YMX888325M0003	7
LCES E12	12	1250	150	1YMX888325M0011	7
LCES E12	12	1250	170	1YMX888325M0012	7
LCES E12	12	1250	210	1YMX888325M0013	7
LCES E17	17.5	400/630	170	1YMX888325M0004	8
LCES E17	17.5	400/630	210	1YMX888325M0005	8
LCES E17	17.5	1250	170	1YMX888325M0014	8
LCES E17	17.5	1250	210	1YMX888325M0015	8
LCES E24	24	400/630	235	1YMX888325M0006	9
LCES E24	24	400/630	275	1YMX888325M0007	9
LCES E24	24	1250	235	1YMX888325M0016	9
LCES E24	24	1250	275	1YMX888325M0017	9

**Earthing switch type LCES for NAL switch disconnector
without mechanical interlocking, mounted on fuse base**

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
LCES EF12	12	400/630	150	1YMX888325M0021	7
LCES EF12	12	400/630	170	1YMX888325M0022	7
LCES EF12	12	400/630	210	1YMX888325M0023	7
LCES EF17	17	400/630	170	1YMX888325M0024	8
LCES EF17	17	400/630	210	1YMX888325M0025	8
LCES EF24	24	400/630	235	1YMX888325M0026	9
LCES EF24	24	400/630	275	1YMX888325M0027	9

Earthing switch type LCES freestanding

Type	Rated voltage [kV]	Rated current [A]	Pole spacing [mm]	Ordering number	Weight [kg]
LCES EB12	12	1250	150	1YMX888325M0031	17
LCES EB12	12	1250	170	1YMX888325M0032	17
LCES EB12	12	1250	210	1YMX888325M0033	17
LCES EB17	17	1250	170	1YMX888325M0034	19
LCES EB17	17	1250	210	1YMX888325M0035	19
LCES EB24	24	1250	235	1YMX888325M0036	24
LCES EB24	24	1250	275	1YMX888325M0037	24
LCES EB36	36	800	360	1YMX888325M0038	30
LCES EB36 on pivot side NAL	36	800	360	1YMX888325M0039	30
LCES EB36 on pivot side NALF	36	800	360	1YMX888325M0040	30

13. Mechanisms and additional accessories for NAL and VersaRupter switch disconnectors

Description	Type	Ordering number	Weight [kg]
K-mechanism (Fig.10)	K 12	1YMX054165M0001	5
K-mechanism	K 17	1YMX038658M0001	5
K-mechanism	K 24	1YMX054167M0001	5
Mechanism K	K 36	1YMX054340M0001	5
K-mechanism	K 40	1YMX054340M0001	5
A-mechanism (Fig. 9)	A 12	1YMX054173M0001	7
A-mechanism	A-12 special version	1YMX138725M0032	7
A-mechanism	A 17	1YMX054174M0001	7
A-mechanism	A 24	1YMX054175M0001	7
A-mechanism	A 36	1YMX051341M0001	7
A-mechanism	A 40	1YMX051341M0001	7
Plastic cover for A mechanism		1YMX241351M0001	0.2

Hand operating mechanism type HE with accessories

Description/Type	Ordering number	Weight [kg]
Front bearing for HE, with cardanic joint (Fig. 18 a)	1YMX053233M0001	1.4
Front bearing for HE, without cardanic joint	1YMX053233M0002	0.6
Front bearing for HE for motor operation	1YMX042249M0004	1.8
Bevel gear for HE (Fig. 18 b)	1YMX053362M0002	2.1
Operating handle for HE	1YMX053235M0001	2.1
Operating handle for HE armoured	1YMX053235M0004	2.1
Front bearing for HE, with blocking coil, 230 VAC (Fig. 18 d)	1YMX053393M0001	2.1
Front bearing for HE, with blocking coil, 110 VAC	1YMX053394M0001	2.1
Front bearing for HE, with blocking coil, 220 V DC	1YMX053395M0001	2.1
Front bearing for HE, with blocking coil, 110 V DC	1YMX053396M0001	2.1
Front bearing for HE, with blocking coil, 48 V DC	1YMX053397M0001	2.1
Front bearing for HE, with blocking coil, 24 V DC	1YMX053398M0001	2.1
Spare colis for blocking coil, 230 VAC	1YMX018958M0015	0.8
Spare colis blocking coil, 110 VAC	1YMX018958M0014	0.8
Spare colis blocking coil, 220 V DC	1YMX018958M0006	0.8
Spare colis blocking coil, 110 V DC	1YMX018958M0007	0.8
Spare colis blocking coil, 48 V DC	1YMX018958M0016	0.8
Spare colis blocking coil, 24 V DC	1YMX018958M0017	0.8
Shaft extension for left-hand side operation Fig. 15		
– for pole distance 150 mm	1YMX054357M0001	1.9
– for pole distance 210 mm	1YMX054353M0001	2.3
– for pole distance 170 mm (12 kV)	1YMX054358M0002	2.1
– for pole distance 170 mm (17 kV and 24 kV)	1YMX054358M0001	2.1
– for pole distance 235 mm	1YMX054359M0001	2.6
– for pole distance 275 mm	1YMX054355M0001	3.1
– for pole distance 360 mm	1YMX343226M0004	4.0
Connection kit for shaft extension assembling	1YMX000054M0001	0.1
Connecting Rod 3/4" L= 490 mm	1YMX053346M0008	0.8
Connecting Rod 3/4" L= 550 mm	1YMX053346M0009	0.9
Connecting Rod 3/4" L= 570 mm	1YMX053346M0010	1.0
Connecting Rod 3/4" L= 1300 mm (Fig. 18 c)	1YMX053346M0002	1.9
Connecting Rod 3/4" L= 2000 mm	1YMX053347M0001	2.9

Description/Type	Ordering number	Weight [kg]
Connecting Rod 3/4" L= 1300 mm isolated	1YMX000012M0001	2.1
Connecting Rod 3/4" L= 2000 mm isolated	1YMX000012M0002	3.1
Connecting Rod 3/4" L= 1300 mm isolated strength ¹⁾	1YMX000012M0003	2.9
Connecting Rod 3/4" L= 2000 mm isolated strength ¹⁾	1YMX000012M0004	4.2
Connecting Rod 3/4" L= 668 mm isolated CZ ²⁾	1YMX000012M0005	1.2
Connecting Rod 3/4" L= 738 mm isolated CZ ²⁾	1YMX000012M0006	1.3
Connecting Rod 3/4" L= 1300 mm isolated strength CZ ^{1) 2)}	1YMX000012M0007	2.9
Connecting Rod 3/4" L= 2000 mm isolated strength CZ ^{1) 2)}	1YMX000012M0008	4.2
Connecting Rod 3/4" L= 1300 mm strength ¹⁾	1YMX000004M0003	2.7
Connecting Rod 3/4" L= 2000 mm strength ¹⁾	1YMX000004M0004	4.0
Connecting Rod 3/4" L= 1300 mm strength CZ ^{1) 2)}	1YMX000004M0007	2.7
Connecting Rod 3/4" L= 2000 mm strength CZ ^{1) 2)}	1YMX000004M0008	4.0
Crank arm (Fig. 16)	1YMX053225M0001	
Shaft extension 470 mm (Fig.14 c)	1YMX053348M0001	1.7
Shaft extension 380 mm (Fig.14 c)	1YMX053349M0001	1.4
Joint link for shaft extension (Fig.14 b, d)	1YMX053350M0001	0.2
Support bearing Fig. 14 a:		
– for NAL/NALF 12	1YMX053351M0001	1.8
– for NAL/NALF 17/24	1YMX053352M0001	1.9
– for NAL/NALF 36/40	1YMX241415M0001	1.9
– for NAL 12 with E 12	1YMX053353M0001	2.2
– for NAL 17/24 with E 17/24	1YMX053354M0001	2.8
– for F 12 with E 12	1YMX053355M0001	1.3
– for F 17/24 with E 17/24	1YMX053356M0001	1.4
Components for transmission 90° ³⁾ (Fig. 27):		
– bevel gear (Fig. 27 a)	1YMX053393M0002	2.1
– bevel gear support (Fig. 27 b)	1YMX343036M0001	1.2
– rod connector (Fig. 27 c)	1YMX000053M0001	0.7
Transmission 90° complete (Fig. 27 a, b, c) ³⁾	1YMX000129M0006	4.0
Test fuse, adjustable length 3, 6/40 kV with striker pin Fig.17	1YMX300062M0001	1.2

¹⁾ Recommended for motor drive UEMC40A and switch disconnector type NAL/NALF 24 – 40.5 kV

²⁾ Zinc plated

³⁾ For these items use strength connecting rod only

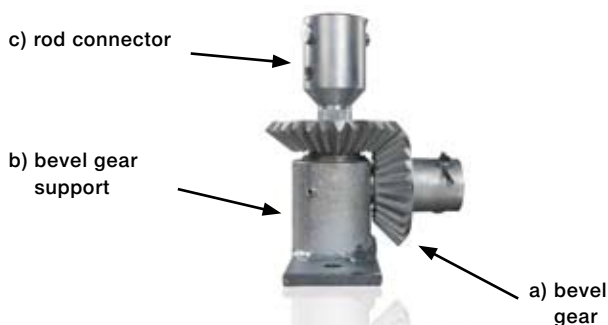


Fig. 27 Transmission 90° complete

Mechanical interlocking for earthing switch¹⁾ (Fig. 20)

Description/Type	Ordering number	Weight [kg]
– on NAL 12	1YMX054275M0001	2.5
– on NAL 17/24	1YMX054276M0001	3.1
– on NALF 12. Fuse e = 292 mm	1YMX054277M0001	5.7
– on NALF 12. Fuse e = 192 mm	1YMX054278M0001	5.0
– on NALF 12. Fuse e = 442 mm	1YMX054279M0001	6.4
– on NALF 12. Fuse e = 464 mm	1YMX054286M0001	6.4
– on NALF 17. Fuse e = 292 mm	1YMX054280M0001	6.3
– on NALF 17. Fuse e = 442 mm	1YMX054281M0001	7.0
– on NALF 24. Fuse e = 442 mm (earthing switch from switch side)	1YMX054282M0001	6.5
– on NALF 24. Fuse e = 537 mm	1YMX054283M0001	7.3
– on NAL 36/40 EB on pivot side	1YMX343986M0002	5.4
– on NAL 36/40 EB on opening side	1YMX343986M0001	3.3
– on NALF 36/40 EB on pivot side	1YMX343986M0003	9.4
– on NALF 36/40 EB on opening side	1YMX343986M0004	7.6

¹⁾ Normally, interlocking is mounted on the left-hand side of the switch and therefore a shaft for left-hand operation is needed.

Aux. Switches for switch disconnectors and earthing switch (Fig. 21)

Description/Type	Ordering number	Weight [kg]
Auxiliary switch:		
– 2NO + 2NC for NAL(F) 12-24	1YMX054713M0001	0.9
– 4NO + 4NC for NAL(F) 12-24	1YMX054714M0002	1.0
– 8NO + 8NC for NAL(F) 12-24	1YMX054715M0001	1.1
– 2NO + 2NC for E/EB 12-24	1YMX054716M0001	0.9
– 2NO + 2NC for E/EB 36/40	1YMX054716M0002	0.9
– 4NO + 4NC for E/EB 12-24	1YMX054717M0001	1.0
– 4NO + 4NC for E/EB 36/40	1YMX054717M0002	1.0
– 2NO + 2NC for NAL(F) 36/40	1YMX240807M0005	0.9
– 4NO + 4NC for NAL(F) 36/40	1YMX240807M0006	1.0
– 8NO + 8NC for NAL(F) 36/40	1YMX054715M0001	1.1
Fixing materials for NAL(F) 36/40	1YMX240807M0004	0.1
Auxiliary contact for fuse interruption (Fig. 13)	1YMX053390M0001	0.1

14. Motor drives

Motor drives enable the remote opening and closing of switch disconnectors while at the same time they are prepared for the possibility of an emergency manual maneuver. A variety of models offers a selection of appropriate drive configurations.

Drives type UEMC40A1 and A2 are designed to be installed on the front wall of the panel (left or right side). They can open and close switch disconnector mechanisms A and K, and are connected to the shaft of the switch disconnector by coupling ties

Shunt trip for A mechanism¹⁾

(including fixing parts) (Fig. 19)

Description/Type	Ordering number	Weight [kg]
Coil 220 VAC without auxiliary switch	1YMX054740M0001	0.6
Coil 110 VAC without auxiliary switch	1YMX054741M0001	0.6
Coil 125 VAC without auxiliary switch	1YMX054741M0002	0.6
Coil 220 VDC without auxiliary switch	1YMX054742M0001	0.6
Coil 110 VDC without auxiliary switch	1YMX054743M0001	0.6
Coil 125 VDC without auxiliary switch	1YMX054743M0002	0.6
Coil 48 VDC without auxiliary switch	1YMX054744M0001	0.6
Coil 24 VDC without auxiliary switch	1YMX054745M0001	0.6

¹⁾ In connection with shunt trip, auxiliary switch that breaks shunt trip circuit, must be used.

Spare coil for shunt trip for A mech

Description/Type	Ordering number	Weight [kg]
Coil 220 VAC	1YMX054740M0001	0.6
Coil 110 VAC	1YMX054741M0001	0.6
Coil 125 VAC	1YMX054741M0002	0.6
Coil 220 VDC	1YMX054742M0001	0.6
Coil 110 VDC	1YMX054743M0001	0.6
Coil 125 VDC	1YMX054743M0002	0.6
Coil 48 VDC	1YMX054744M0001	0.6
Coil 24 VDC	1YMX054745M0001	0.6

and bevel gears. The UEMC40A series is not recommended for NAL 36 – 40 kV with A mechanism.

Drive type NM (Fig. 29) can be mounted directly on the shaft or switch disconnector or on the side wall of the panel. It cooperates with spring mechanisms A and K.

To mount the NM drive on the shaft of the disconnector, suitable supports brackets are needed (Fig. 28). The correct choice of brackets depends on the type of disconnector, drive and motor assembly as is shown in the table below.

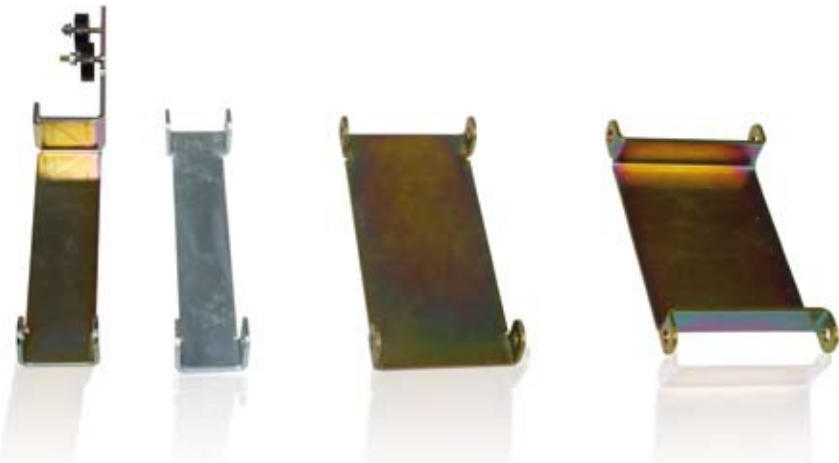


Fig. 28 Space brackets for mounting of NM drive

Spring mech. type A		NAL/NALF							
		12		17.5		24		36	
Mounting side		L	P	L	P	L	P	L	P
Part number	Part name								
1YMX000044M0001	Space bracket 39 mm								
1YMX000044M0002	Space bracket 55 mm	X		X					
1YMX000044M0003	Space bracket 85 mm								
1YMX000044M0004	Space bracket 105 mm						X		
1YMX000044M0005	Space bracket 39 mm	X		X		X			X
1YMX000044M0001+	Space bracket 39+								
1YMX000044M0004	Space bracket 105 mm							X	

Spring mech. type K		NAL/NALF							
		12		17.5		24		36	
Mounting side		L	P	L	P	L	P	L	P
Part number	Part name								
1YMX000044M0001	Space bracket 39 mm					X		X	
1YMX000044M0002	Space bracket 55 mm	X		X					
1YMX000044M0003	Space bracket 85 mm								
1YMX000044M0004	Space bracket 105 mm							X	
1YMX000044M0001+	Space bracket 39+								X
1YMX000044M0004	Space bracket 105 mm								X

The motor unit is mechanically disconnected after each operation, which presents an opportunity to manually operate the switch disconnecter. The drive can be operated locally via the buttons on the control box (Fig. 31) or remotely using radio control. The control unit (Fig. 32) delivered with the motor drive contains the necessary elements such as contactors, connections, etc. and is

also equipped with an automatic fuse. It can be placed in a panel with the switch disconnecter or in a separate box. Connection with the drive is via a plug-ended cable. Instead of the NM motor drive, the UEMC40K3 type can be used (Fig. 30). The control system is then supplied in a separate order.



Fig. 29 NM motor driver



Fig. 30 K3 motor driver



Fig. 31 Operating box



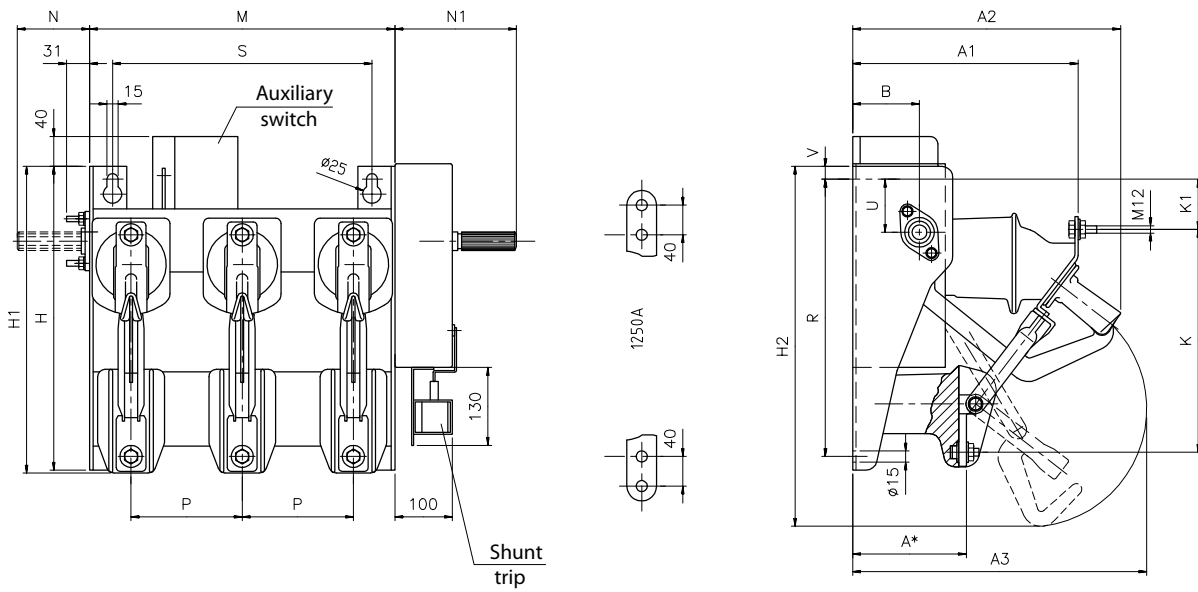
Fig. 32 Control unit

Technical data of NM motor drives

Type		NM 24	NM 48	NM 60	NM 110/125	NM 220
Ordering number		1YMX000042M0001	1YMX000042M0002	1YMX000042M0003	1YMX000042M0004	1YMX000042M0005
Operating voltage, AC	[V]	17-26	34-52	42-66	77-137	154-242
Operating voltage, DC	[V]	22-28	43-57	54-72	99-150	198-264
Nominal current during operation	[A]	3	3	0.8	0.8	0.4
Maximum current during operation	[A]	6	6	4	4	1.2
Power consumption	[W]	70	70	70	70	70
Operating time	[sec.]	~4	~4	~8	~8	~4
Signalling time	[sec.]	0.5-2.0	0.5-2.0	1.0-4.0	0.5-2.0	0.5-2.0
Operating temperature	[°C]	-40...+55	-40...+55	-40...+55	-40...+55	-40...+55
Weight	[kg]	6	6	6	6	6

15. Dimensional drawings

Switch disconnector type NAL12, 17.5 and 24 kV with mechanism

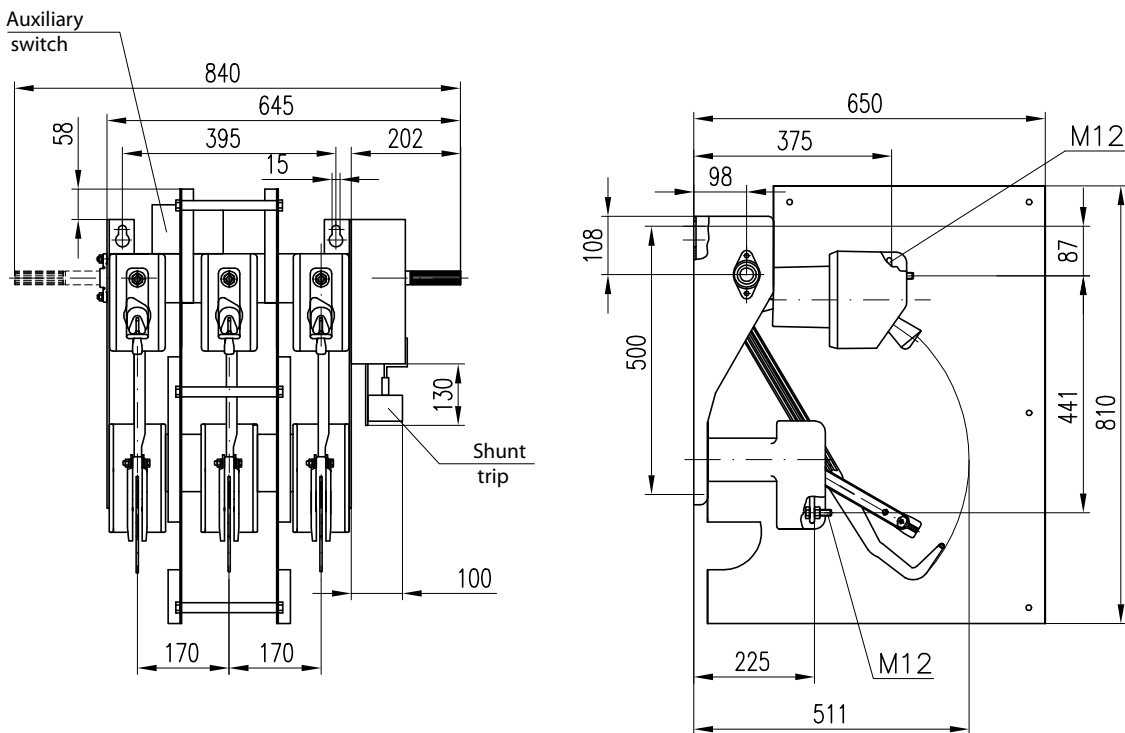


1YMX343070

Type	A	A1	A2	A3	B	H	H1	H2	K	K1	M	N	N1	P	R	S	U	V
NAL 12-A/K P=150	166	320	362	394	90	422	428	510	310	63	412	122	164	150	375	350	75	33
NAL 12-A/K P=170	166	320	362	394	90	422	428	510	310	63	452	122	164	170	375	390	75	33
NAL 12-A/K P=210	166	320	362	394	90	422	428	510	310	63	532	122	164	210	375	470	75	33
NAL 17.5-A/K P=170	225	375	418	511	98	534	577	600	441	87	452	122	164	170	500	395	90	18
NAL 17.5-A/K P=210	225	375	418	511	98	534	577	600	441	87	532	122	164	210	500	475	90	18
NAL 24-A/K P=235	225	375	418	511	98	534	577	600	441	87	582	186	202	235	500	525	90	18
NAL 24-A/K P=275	225	375	418	511	98	534	577	600	441	87	662	186	202	275	500	605	90	18

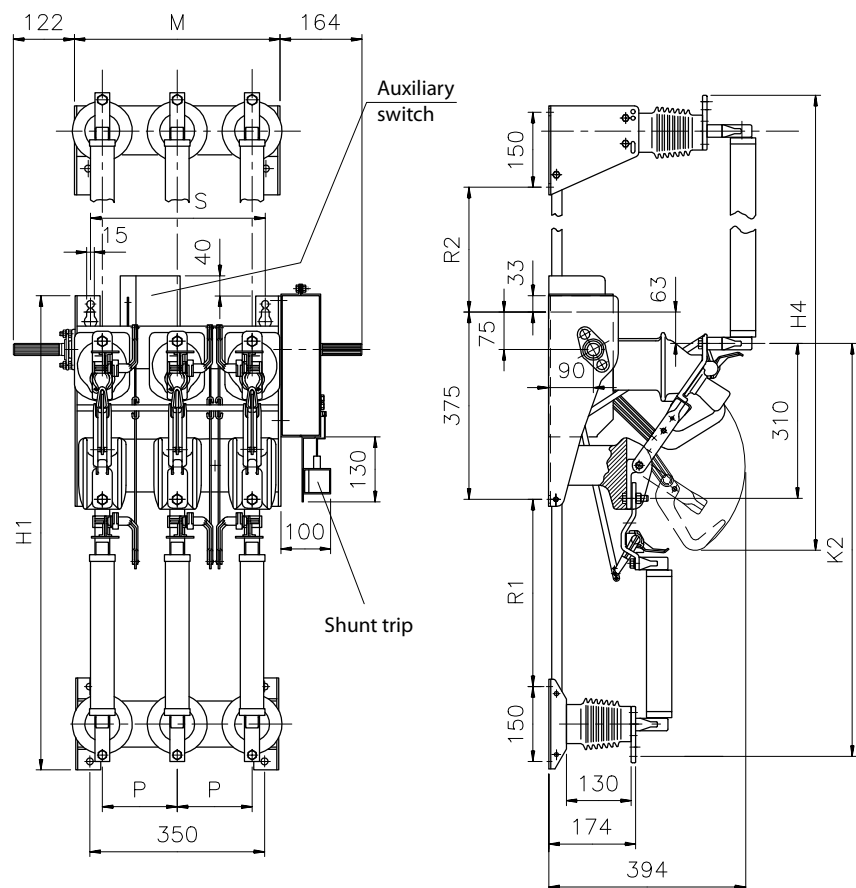
*1250 A: dimension A +2 mm

Switch disconnector type NAL 24 kV with mechanism and insulation barriers



1YMX888372

Fuse switch disconnecter type NALF 12 kV with mechanism

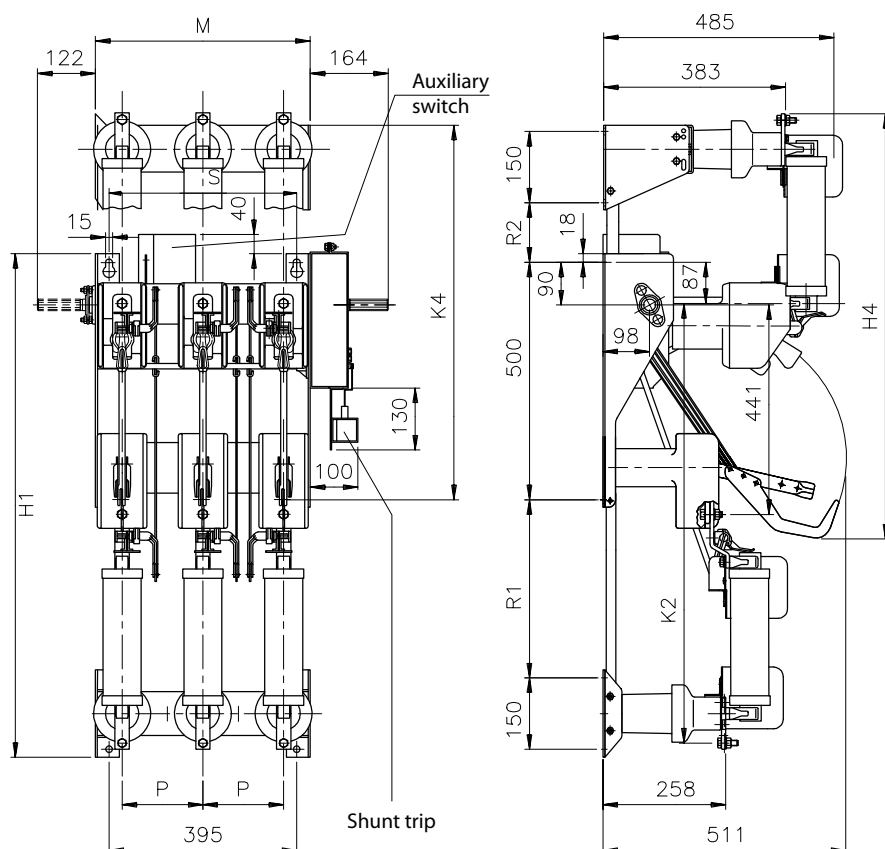


Fuses kV	length	H1	H4	K2	K4	R1	R2
		3.6/7.2	192	848	710	722	598
	292	948	810	822	698	375	150
12	292						
	442	1098	960	972	848	525	300

Type		M	S
NALF 12	P=150	412	350
NALF 12	P=170	452	390
NALF 12	P=210	532	470

1YMX343381

Fuse switch disconnecter type NALF 17.5 kV with mechanism

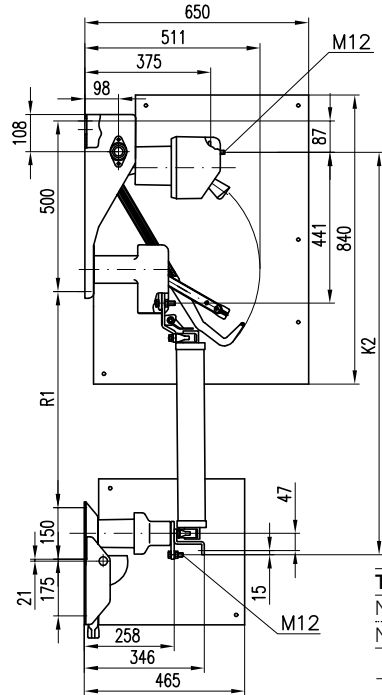
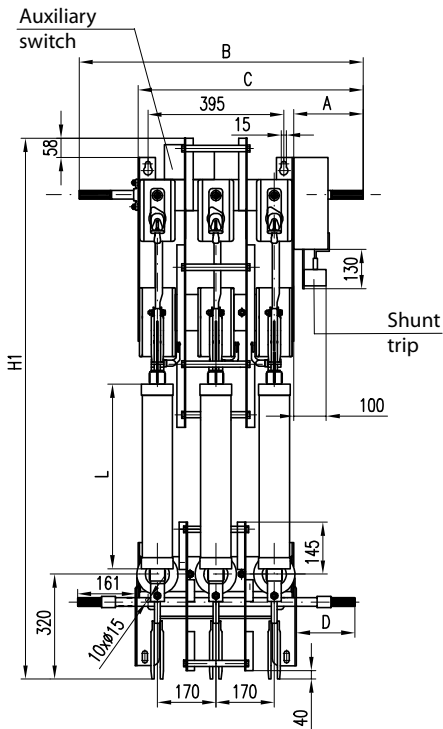


Fuses kV	length	H1	H4	K2	K4	R1	R2
		17.5	292	1060	895	925	828
	442	1210	1045	1075	978	525	275

Type		M	S
NALF 17	P=170	452	395
NALF 17	P=210	532	470

1YMX343375

Fuse switch disconnecter type NALF 24 kV with mechanism and insulation barriers

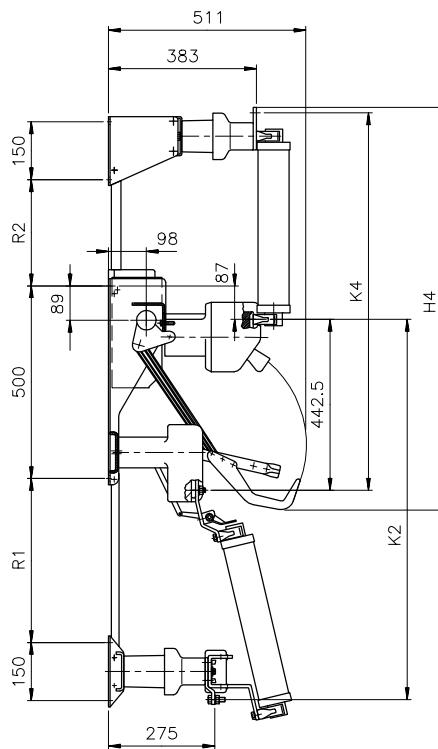
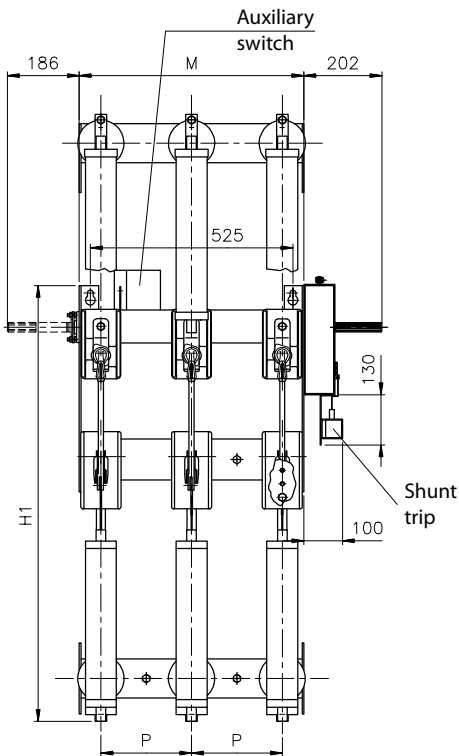


Type	A	B	C	D	E
NALF24-4/6A/K170LE	202	840	654	174	-
NALF24-4/6A/K170LEL	164	802	616	139	-

Fuse style 24kV		Dimensions			
		H1	K2	L	R1
CEF	In [A]				
	6-63	1440	1075	442	525
	80-125	1445	1170	557	620

1YMX888373

Fuse switch disconnecter type NALF 24 kV with mechanism

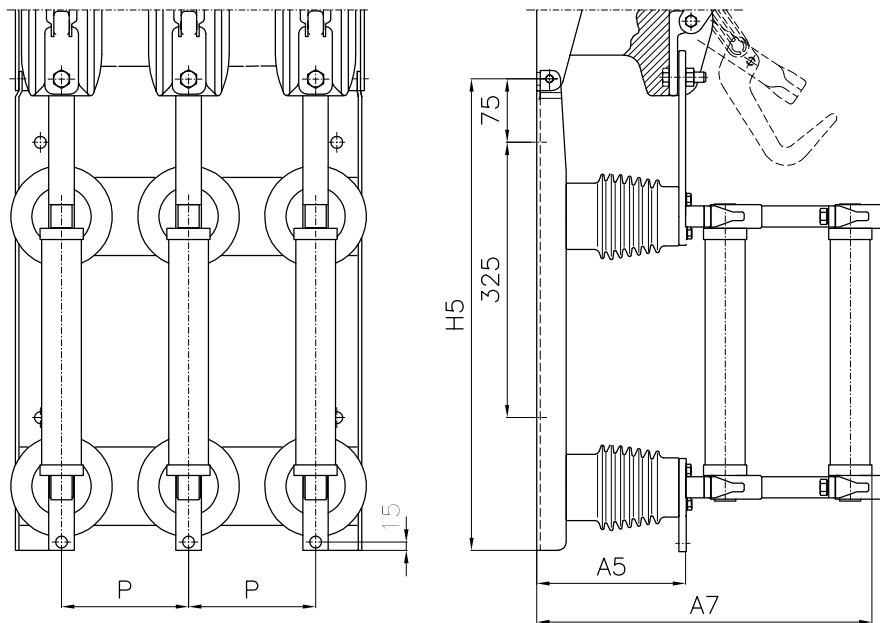


Fuses	H1	H4	K2	K4	R1	R2	
kV	length						
24	442	1084	1045	986	978	425	275
	537	1284	1140	1090	1073	525	370

Type	M	S
NALF 24 P=170	452	395
NALF 24 P=235	582	525
NALF 24 P=275	662	605

1YMX343379

Fuse switch disconnector type NALF 12, 17.5 and 24 kV Fuse base with 6 insulators

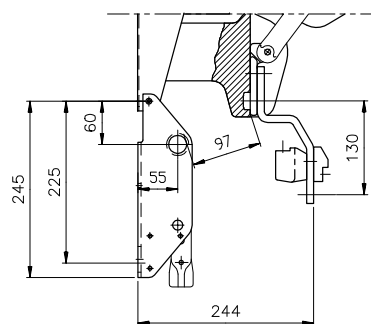
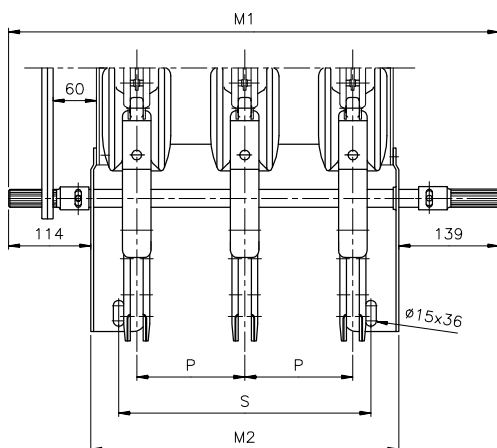


Fuses		
kV	length	H5
3.6/7.2	192	462
	292	562
12	292	562
	442	704
17.5	292	563
	442	706
24	442	706
	537	801

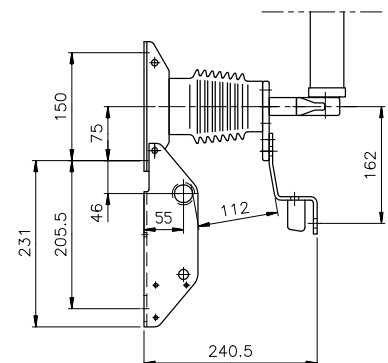
Type	A5	A7	P
NALF 12, P=150	173	430	150
NALF 12, P=170	173	430	170
NALF 12, P=210	173	430	210
NALF 17.5, P=170	243	500	170
NALF 17.5, P=210	243	500	210
NALF 24, P=170	243	500	170
NALF 24, P=235	243	500	235
NALF 24, P=275	243	500	275

1YMX343567

Earthing switch with making capacity type E12



Earthing switch with making capacity type E 12 mounted on NAL12

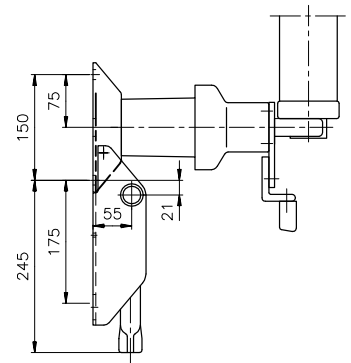
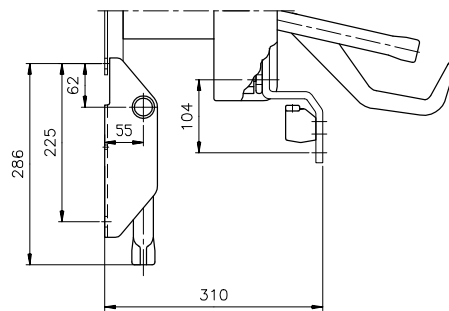
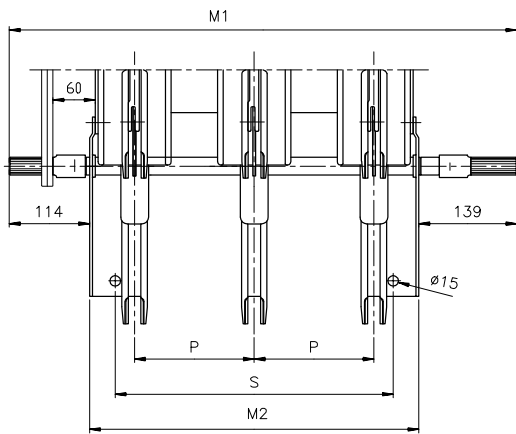


Earthing switch with making capacity type E 12 mounted on fuse base F 12

Type	M1	M2	S
E12 P=150	681	428	350
E12 P=170	721	468	390
E12 P=210	801	548	470

1YMX343600

Earthing switch with making capacity type E17.5



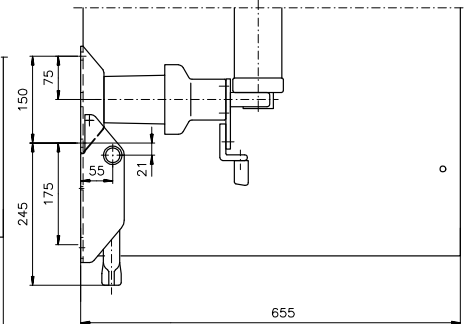
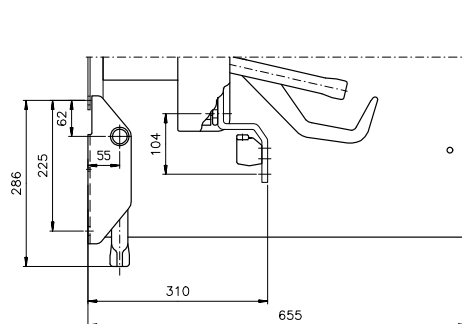
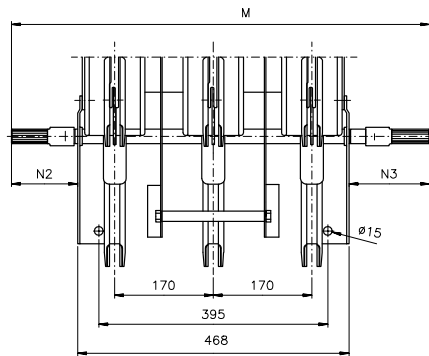
1YMX343601

E 17.5	M1	M2	S
P=170	721	468	395
P=210	801	548	475

Earthing switch with making type E17.5 mounted on NAL 17.5

Earthing switch with making type E17.5 mounted on fuse base F 17.5

Earthing switch with making capacity type E24/EL24 P=170 with insulation barriers



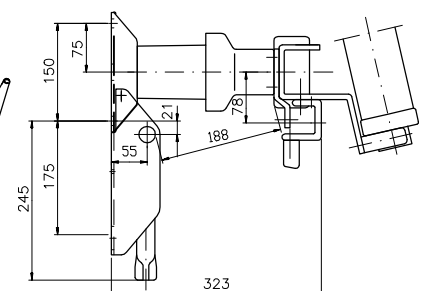
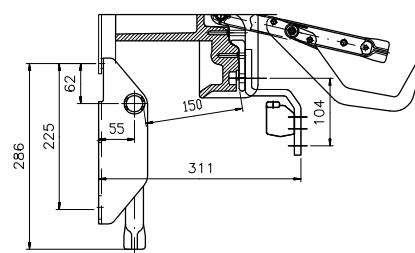
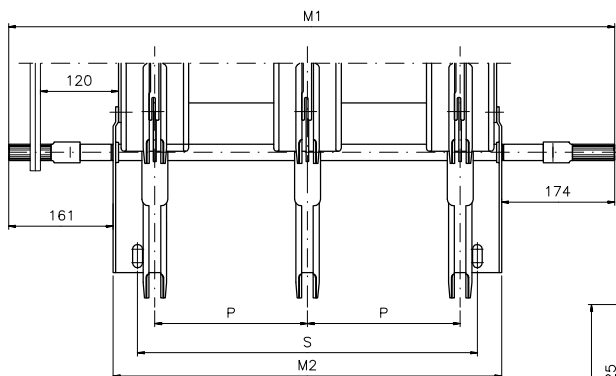
1YMX888374

Type	M	N2	N3
E24 P=170	808	166	174
EL24 P=170	721	114	139

Earthing switch with making type E24/EL24 mounted on NAL24 P=170

Earthing switch with making type E24/EL24 mounted on fuse base F24 P=170

Earthing switch with making capacity type E24



1YMX343602

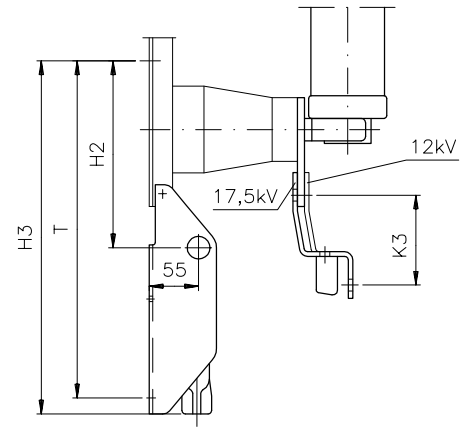
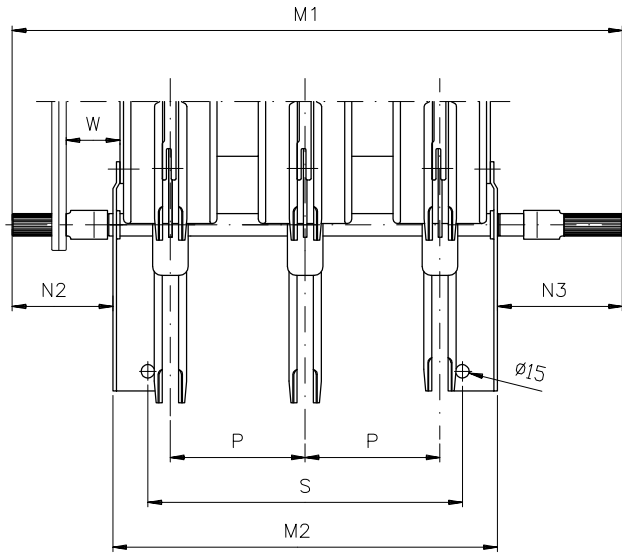
E 24	M1	M2	S
P=235	933	598	525
P=275	1013	678	605

Earthing switch with making capacity type E 24 mounted on NAL 24

Earthing switch with making capacity type E 24 mounted on fuse base F 24

Earthing switch with making capacity type E 12, E 17.5 and E 24 mounted on fuse base with 6 insulators

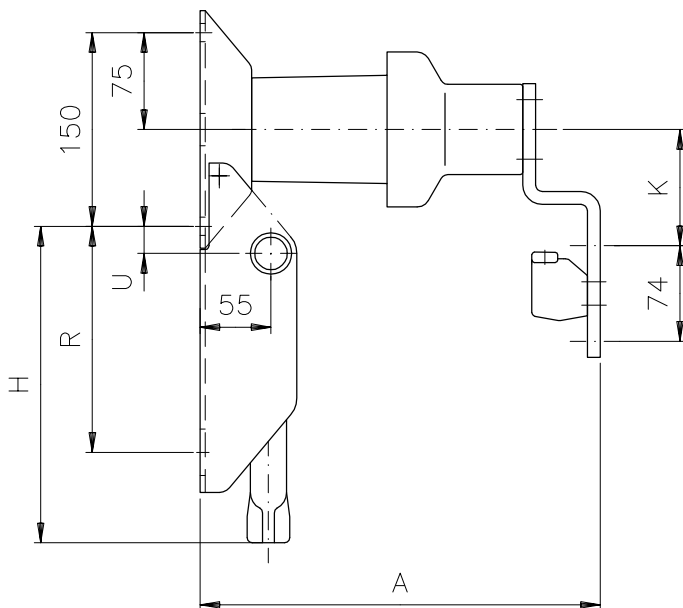
1YMX343538



Type	H2	H3	K3	M1	M2	N2	N3	P	S	I	W
E12 P=150	208	393	100	681	428	112	139	150	350	375	60
E12 P=170	208	393	100	721	468	112	139	170	390	375	60
E12 P=210	208	393	100	801	548	112	139	210	470	375	60
E17.5 P=170	208	432	100	721	468	112	139	170	395	375	60
E17.5 P=210	208	432	100	801	548	112	139	210	395	375	60
E24 P=235	351	575	100	933	598	161	174	235	525	500	120
E24 P=275	351	575	100	1013	678	161	174	275	605	500	120

Separately mounted earthing switch with making capacity type EB

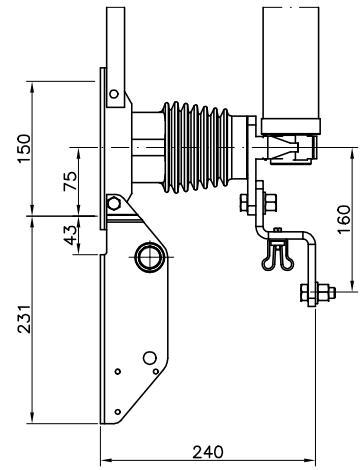
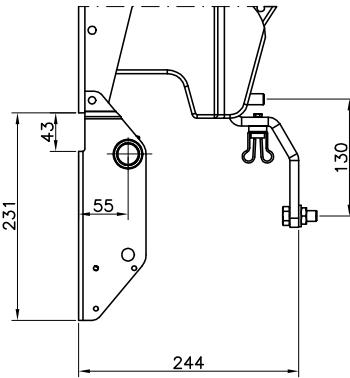
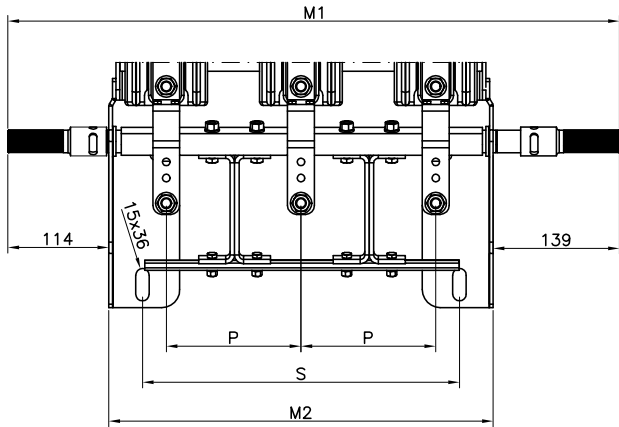
1YMX343611



Type	A	H	K	R	U
EB12	245	231	115	200	46
EB17.5 - 24	310	245	90	175	21

Other measurements see figure 1YMX343538 above

Earthing switch type LCES 12 kV



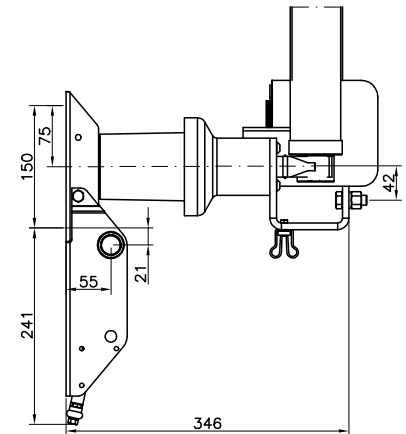
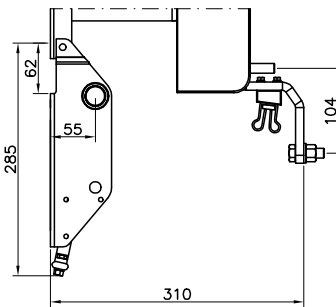
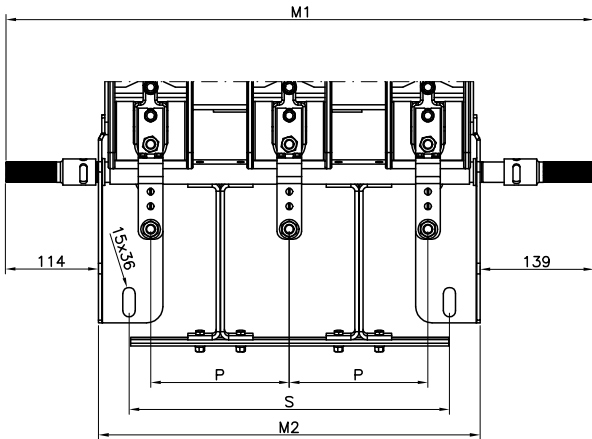
1YMX888347

Type		M1	M2	S
E 12	P=150	681	428	350
E 12	P=170	721	468	390
E 12	P=210	801	548	470

Earthing switch types LCES E12 mounted on NAL 12

Earthing switch types LCES EF12 mounted on fuse base F12

Earthing switch type LCES 17.5 kV



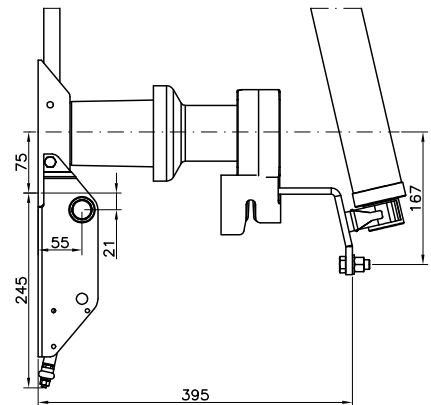
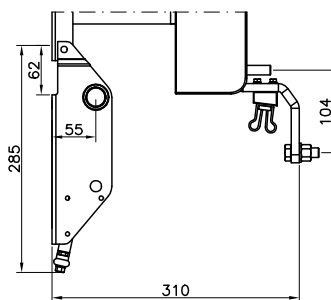
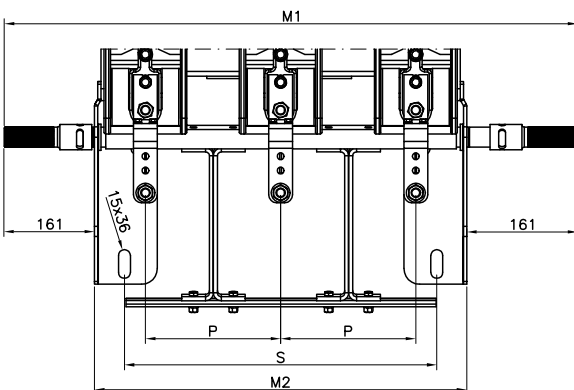
1YMX888348

Type		M1	M2	S
E 17	P=170	721	468	395
E 17	P=210	801	548	475

Earthing switch types LCES E17 mounted on NAL 12

Earthing switch types LCES EF17 mounted on fuse base F17

Earthing switch type LCES 24 kV



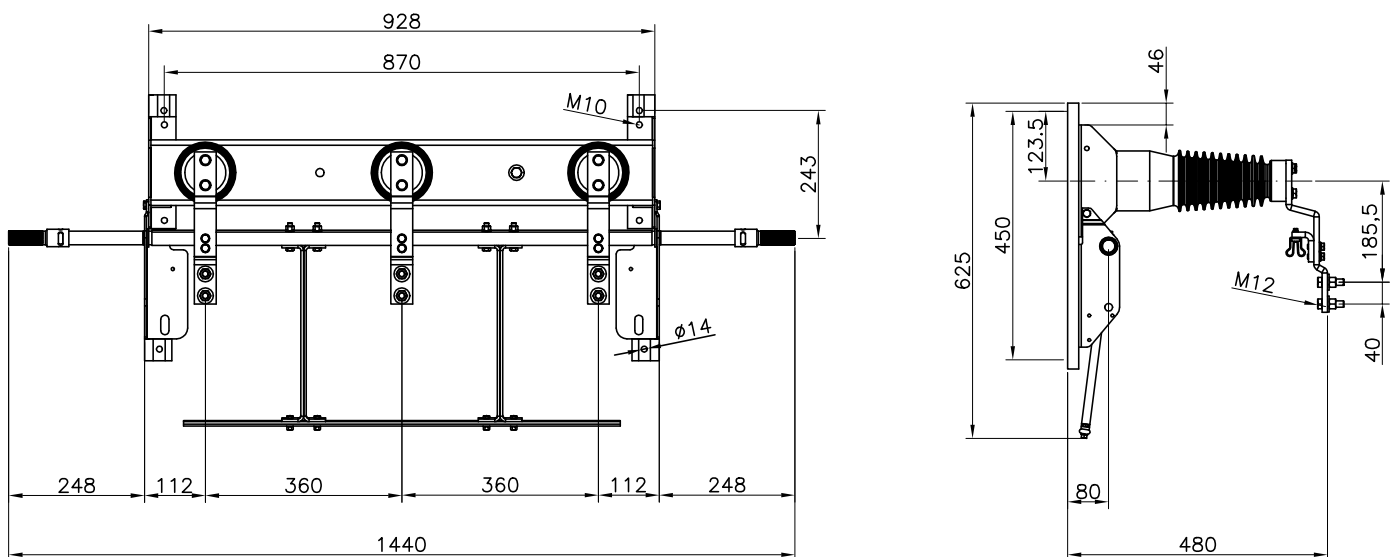
1YMX888349

Type		M1	M2	S
E 24	P=235	933	598	525
E 24	P=275	1013	678	605

Earthing switch types LCES E24 mounted on NAL 24

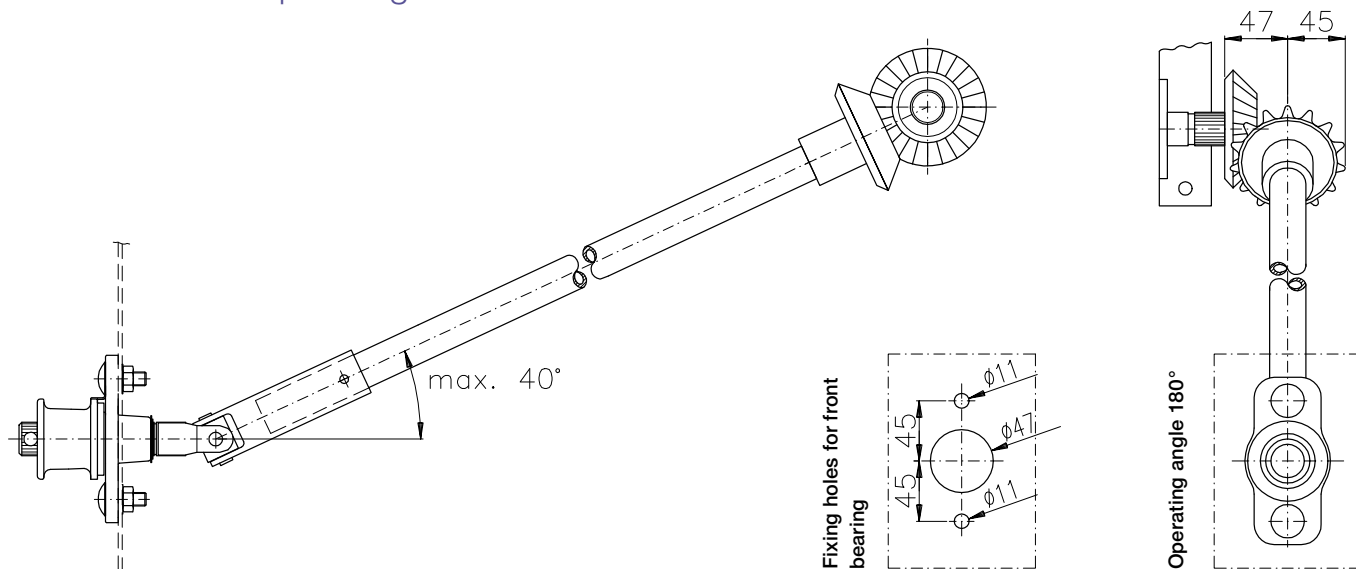
Earthing switch types LCES EF24 mounted on fuse base F24

Separately mounted earthing switch type LCES EB36



1YMX888350

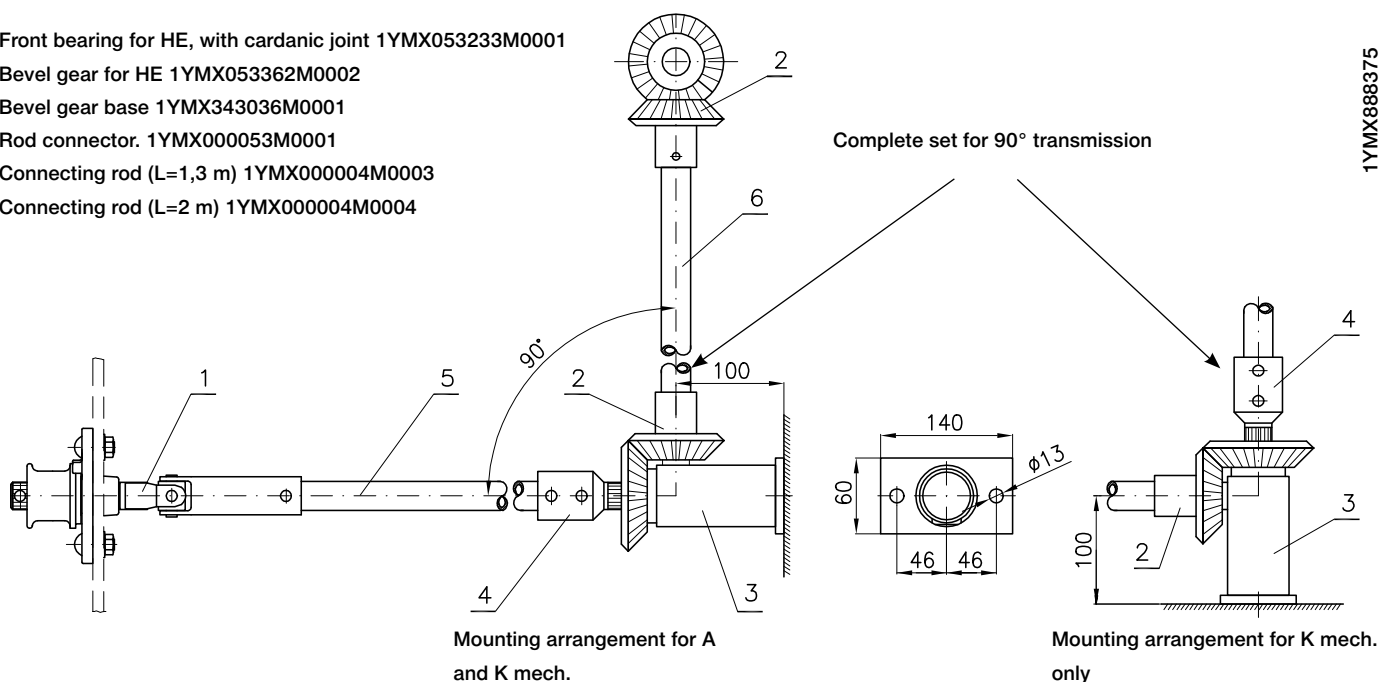
Standard hand operating mechanism HE



1YMX040223

Arrangement of HE with switch disconnecter with 90° angle

1. Front bearing for HE, with cardanic joint 1YMX053233M0001
2. Bevel gear for HE 1YMX053362M0002
3. Bevel gear base 1YMX343036M0001
4. Rod connector. 1YMX000053M0001
5. Connecting rod (L=1,3 m) 1YMX000004M0003
6. Connecting rod (L=2 m) 1YMX000004M0004

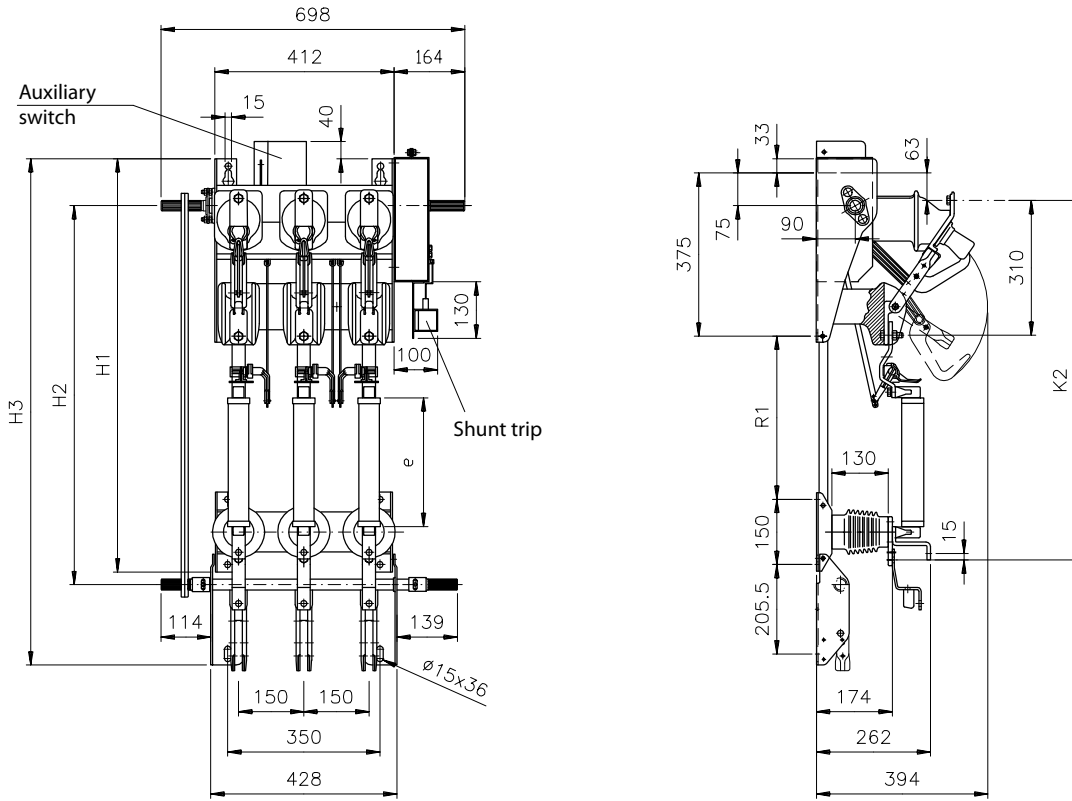


1YMX888375

Fuse switch disconnecter with earthing switch NALF 12 150 RE

– example of arrangement

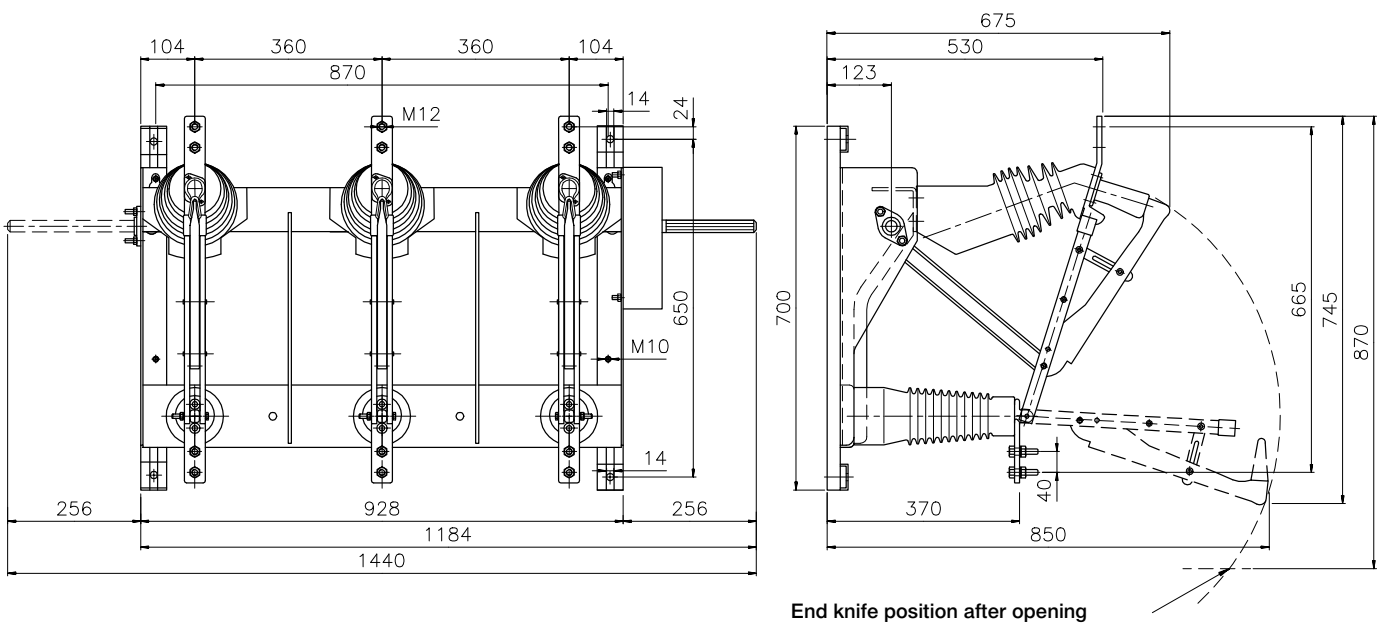
1YMX304063



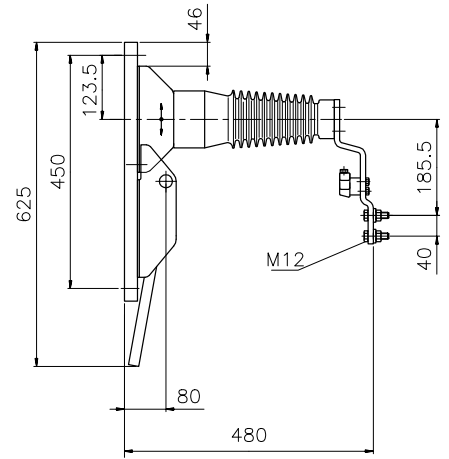
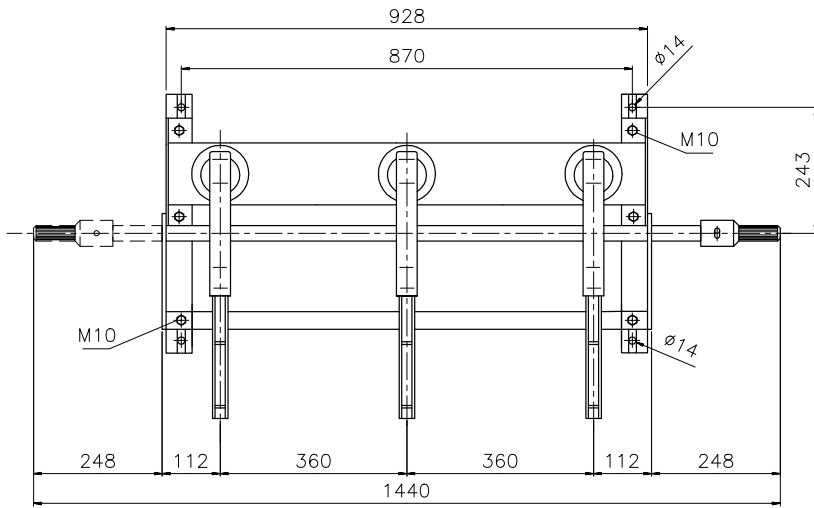
Fuses		A	e	H1	H2	H3	K2	R1
kV								
7.2	4-100	192	848	772	1063	722	275	
	125-200	292	948	872	1163	822	375	
12	4-100	292	948	872	1163	822	375	
	125-200	442	1098	1022	1313	972	525	

NAL 36 and 40.5 kV

1YMX241285

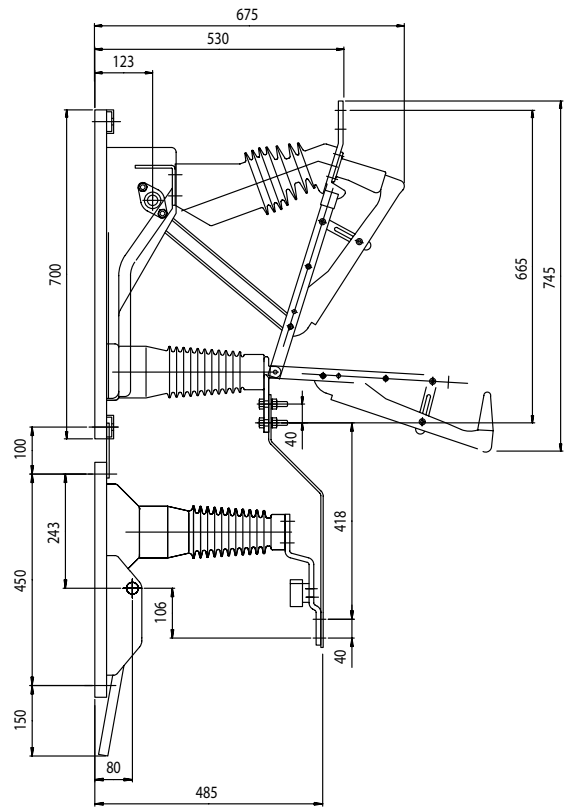
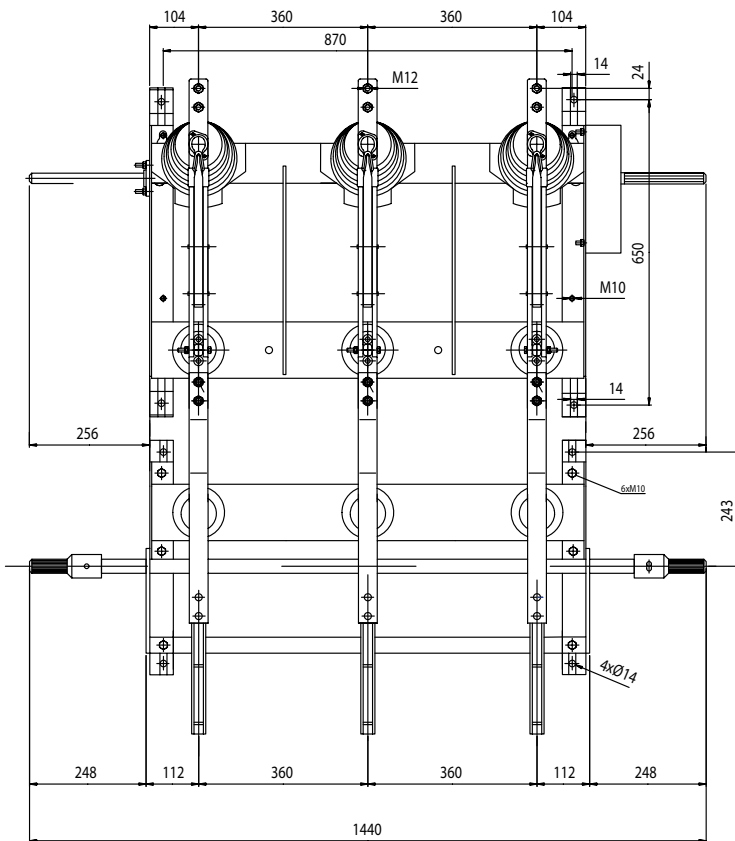


EB 36



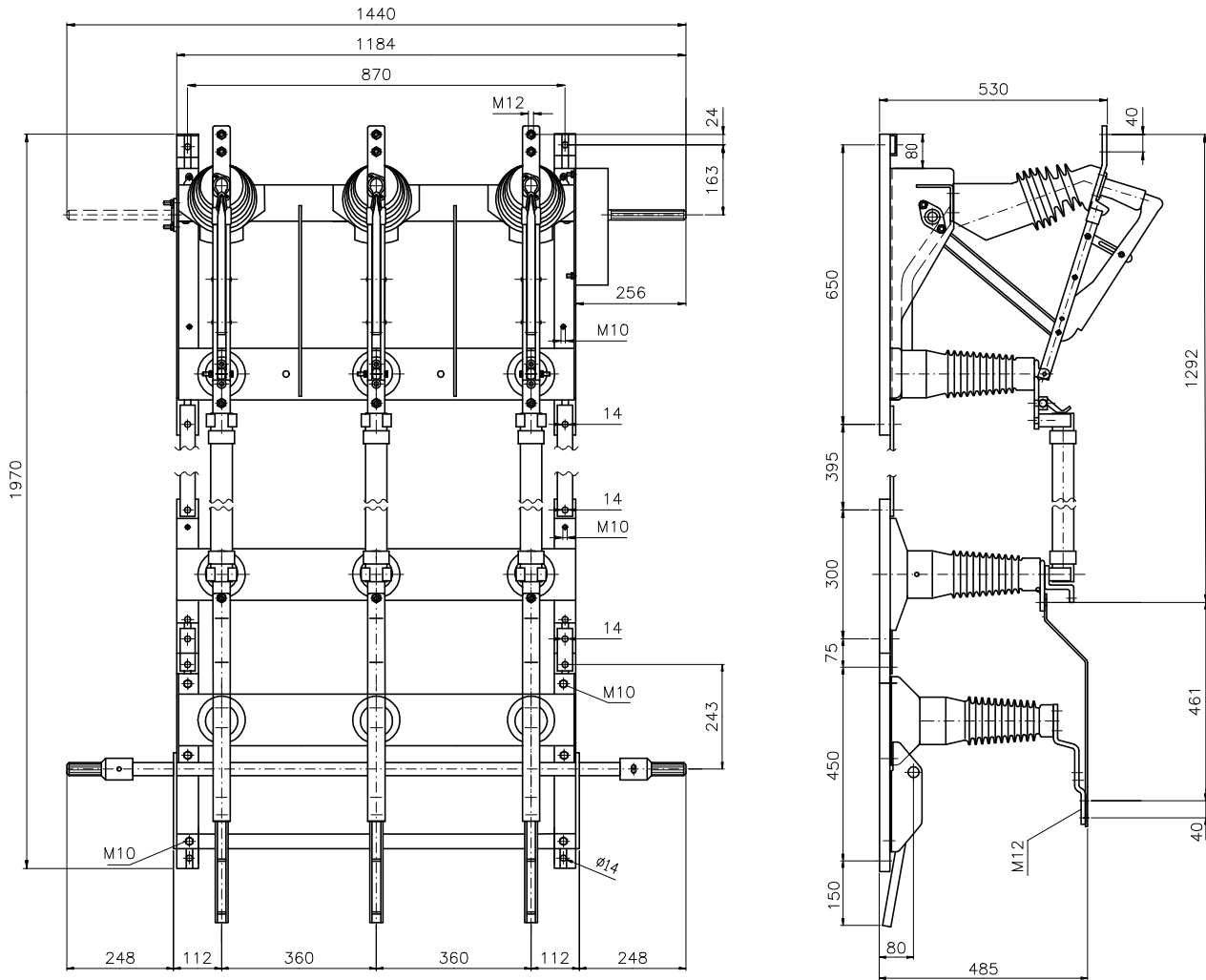
1YMX241288

NAL 36 + EB 36



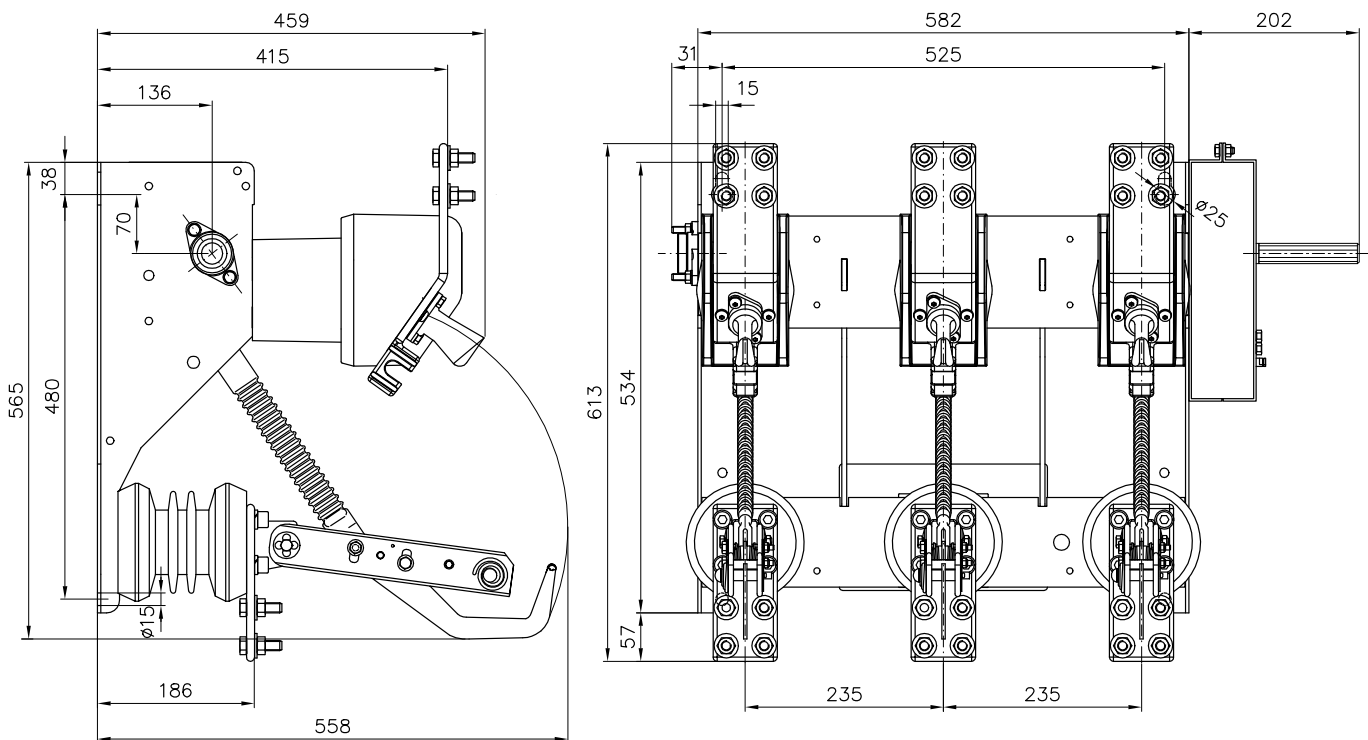
1YMX888395

NALF 36 + EB on pivot side



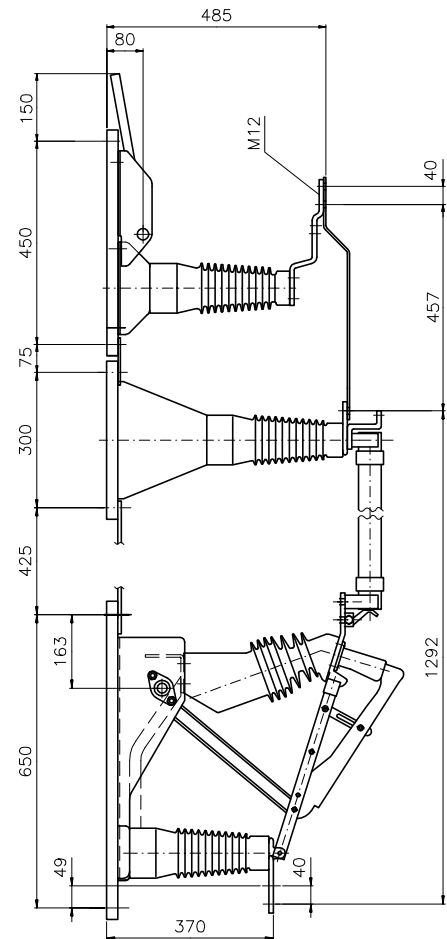
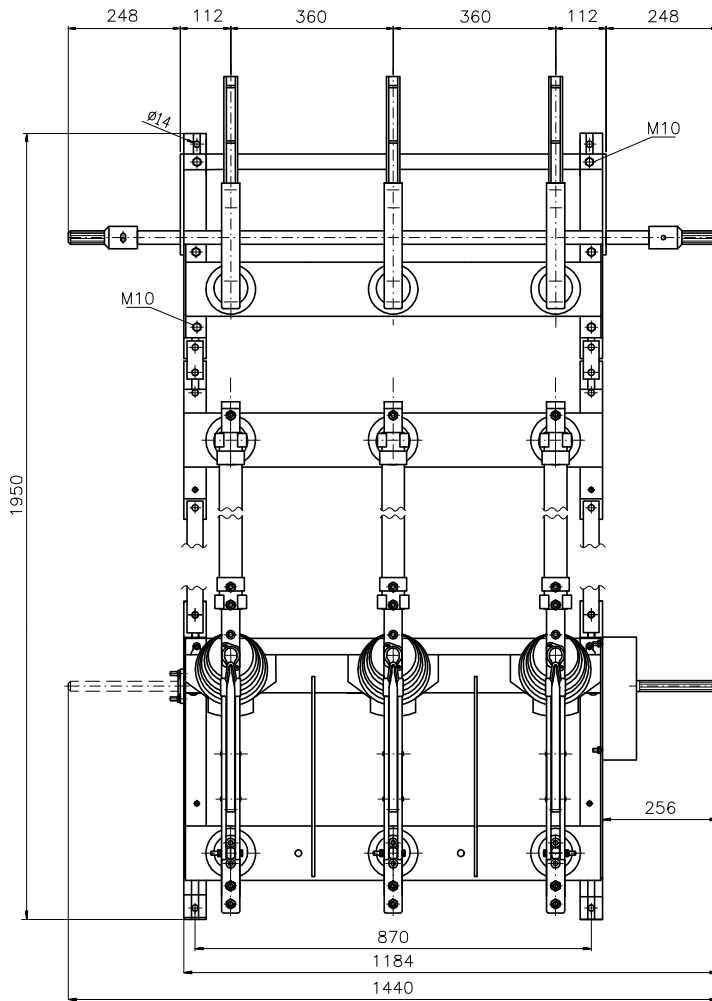
1YMX888351

Switch disconnecter type VersaRupter 61 kA



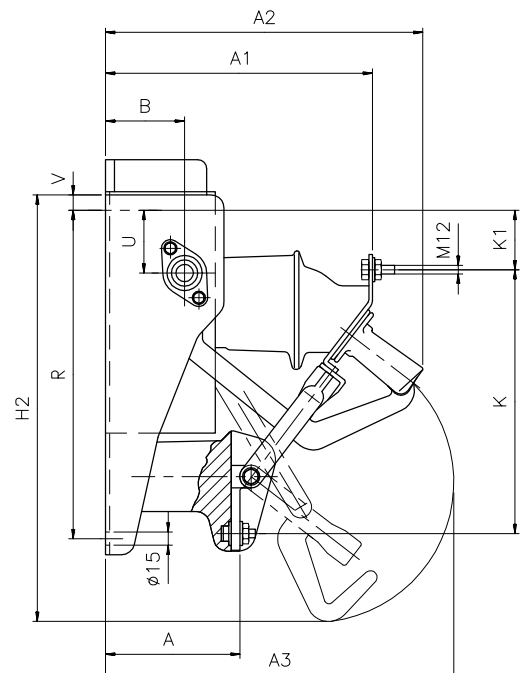
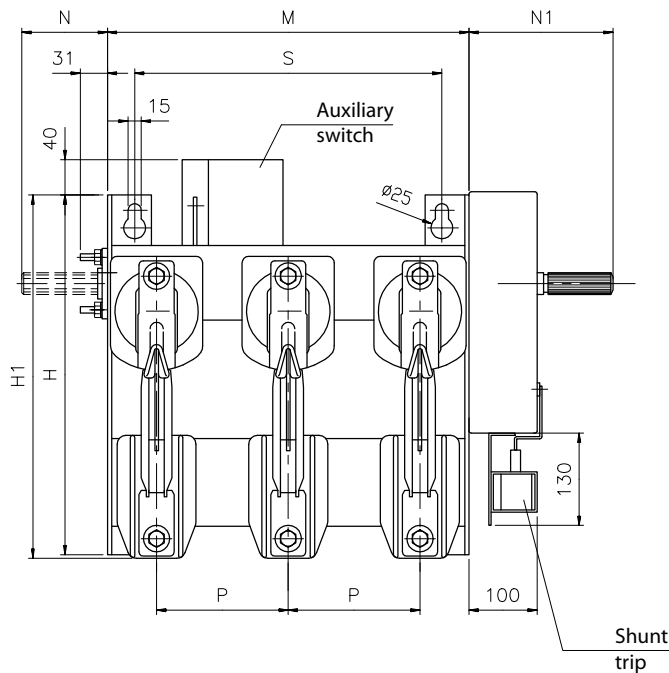
1YMX888272

NALF 36 + EB on opening side



1YMX888352

Switch disconnector type VersaRupter with mechanism



1YMX888353

Type	A	A1	A2	A3	B	H	H1	H2	K	K1	M	N	N1	P mm/inch	R	S	U	V
4.73 kV 200/600/1200 A	166	320	362	394	90	422	428	510	310	63	532	122	164	210/8.25	375	470	75	33
12-13.8 kV 200/600/1200 A	225	375	418	511	98	534	577	600	441	87	452	122	164	170/6.69	500	395	75	33
12-16.8 kV 200/600/1200 A	225	375	418	511	98	534	577	600	441	87	582	186	202	235/9.25	500	525	90	18
22.9-24.9 kV 600/800 A	225	375	418	511	98	534	577	600	441	87	622	186	202	275/10.8	500	605	90	18
34.5 kV 200/600/1200 A	370	530	675	850	123	700	-	870	665	-	928	265	265	360/14.1	650	870	-	-

*1250 A: dimension A+2 mm

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