DISTRIBUTION SOLUTIONS

NAL/NALF

MV indoor switch-disconnector and switch-fuse combination

NAL/NALF medium voltage indoor switch-disconnector that is well known around the globe, and more than 800,000 switches have been produced so far.
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 ABB type CEF current limiting fuses, NALF switch-fuse combination ensures control over the full range of overload and short-circuit current. NAL/NALF switch-disconnector can be used in all medium voltage primary and secondary distribution systems like industrial workshops, factories, prefabricated substations, CSS, solar and wind grid connection stations.

Table of contents

NAL/NALF: its strengths, your benefits

Productivity

Reliability

Efficiency

Productivity
Maximizing your output

Continuous operation
Reduced spares and maintenance
- 1,000 mechanical close-open operations assured (M1 class)
- Long electrical life (up to E3 class)
- 15 years maintenance intervals

Services and training
Technical cooperation/license based on a modular concept allowing the OEM to choose in a flexible way the level of added value which more suits its individual needs

Easy to install
Satisfy different customer needs in a simple fast way
- Modular design minimizes installation time – Full range of plug and play accessories – Same accessories available for all the switch-disconnector series
- Have flexibility and the easiest connection and interface with the panel

Reliability
Protecting your assets

Safety and protection
Proven reliability –
- High number of operations and long electrical and mechanical life (up to E3 and M1 class)
- Visible open insulation gap

Global availability
ABB by your side – Count on a worldwide presence for any support you may need

Reliable in extreme conditions
Good performance in harsh environment – Wide operating temperatures within -40/+55 Celsius degrees (higher values available based on agreement with manufacturer)
- Insulators have longer creepage distance and they are made of materials more resistant against water condensation conditions (refers to H versions).

Efficiency
Optimizing your investments

Affordable Range
Capacitor switch version
- Have a competitive solution in C2 class (for 12 kV).

- Switching currents similar to MV circuit breakers,
- NALF switch-fuse combination with CEF family fuses, is an economical solution for breaking of short-circuit currents.

1. Description

General

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01 Indoor switch-disconnector type NAL with earthing switch type E
1 – switch disconnector
2 – opening side
3 – closed position
4 – open position
5 – pivot side
6 – closed position
7 – earthing switch
8 – open position

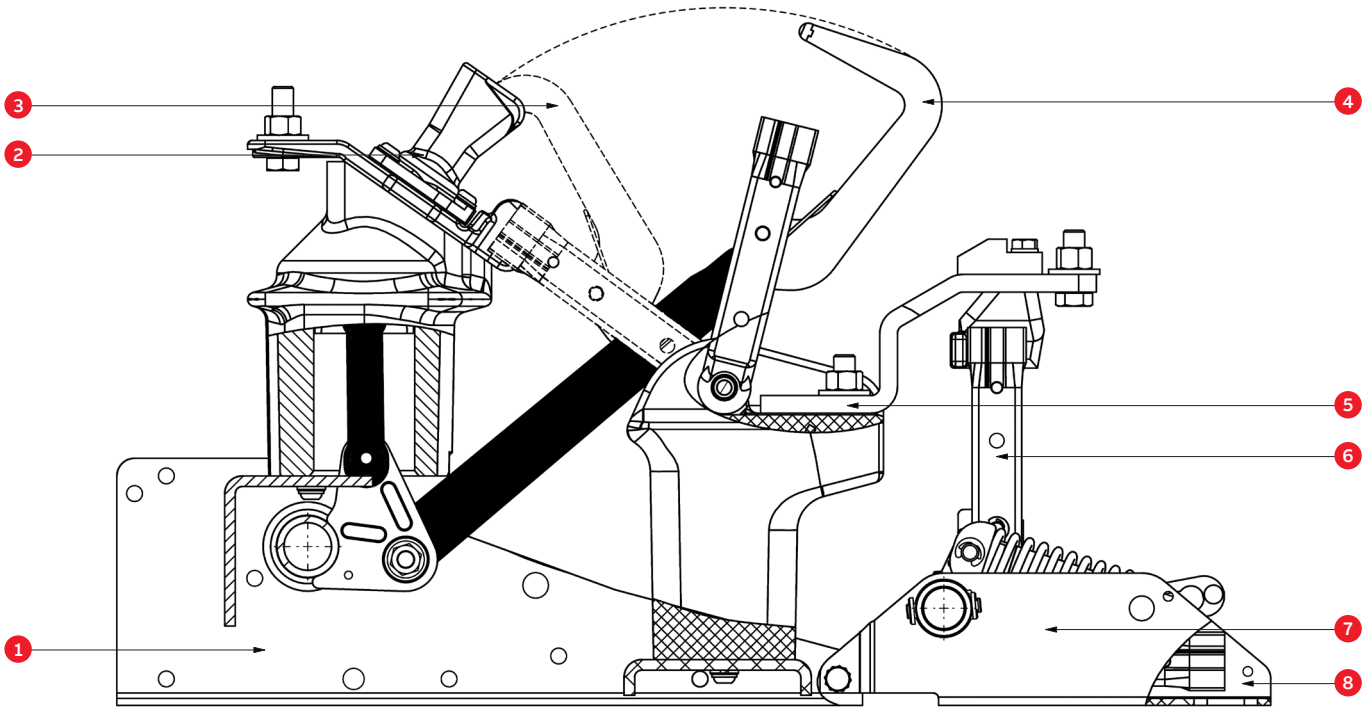
NAL-type switch-disconnectors are based on a modular principle, which gives it a wide range of functionality. With a unique design that extinguishes electric arcs and enables high switching capacity, they represent an attractive solution as a key breaking element for applications in enclosed switchgear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

The following versions are available:

- NAL – IEC standard line switch-disconnector
- NALF – IEC standard switch-fuse combination
- NALFO – IEC standard switch-fuse combination with opening site fuse-base
- NAL-H – IEC standard line switch-disconnector in harsh operating conditions.
- NALF-H – IEC standard switch-fuse combination for harsh operating conditions.
- NALFO-H – IEC standard switch-fuse combination for harsh operating condition with opening site fuse-base



Main product features

A NAL switch-disconnector (which interrupts load currents up to 1250 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 switch-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: IEC 62271-1: 2017-07, IEC 62271-102: 2018-05, IEC 62271-103:2021-05, IEC 62271-105:2021-06, all of which consider switches for general use and ensure there is safe switching coordination between a switch-disconnector and a current limiting fuse.

NAL fulfil requirements of IEC/TS 62271-304:2008-05 degree 0: C_oP_L, (C_o: Condensation does not normally occur not more than twice a year, P_L: Light pollution) which correspond to normal indoor service condition as described in IEC 62271-1: 2017-07 p. 4.1.2. Whereas NAL- H version meets requirement of Design Class 2 for severe operating conditions according to IEC/TS 62271-304: 2008-05.

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 mechanisms, 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.

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02 Example of switch arrangement

1 – **Auxiliary switch**
Shows position of switch-disconnector (open/close)

2 – **Mechanism**
For operating switch-disconnector

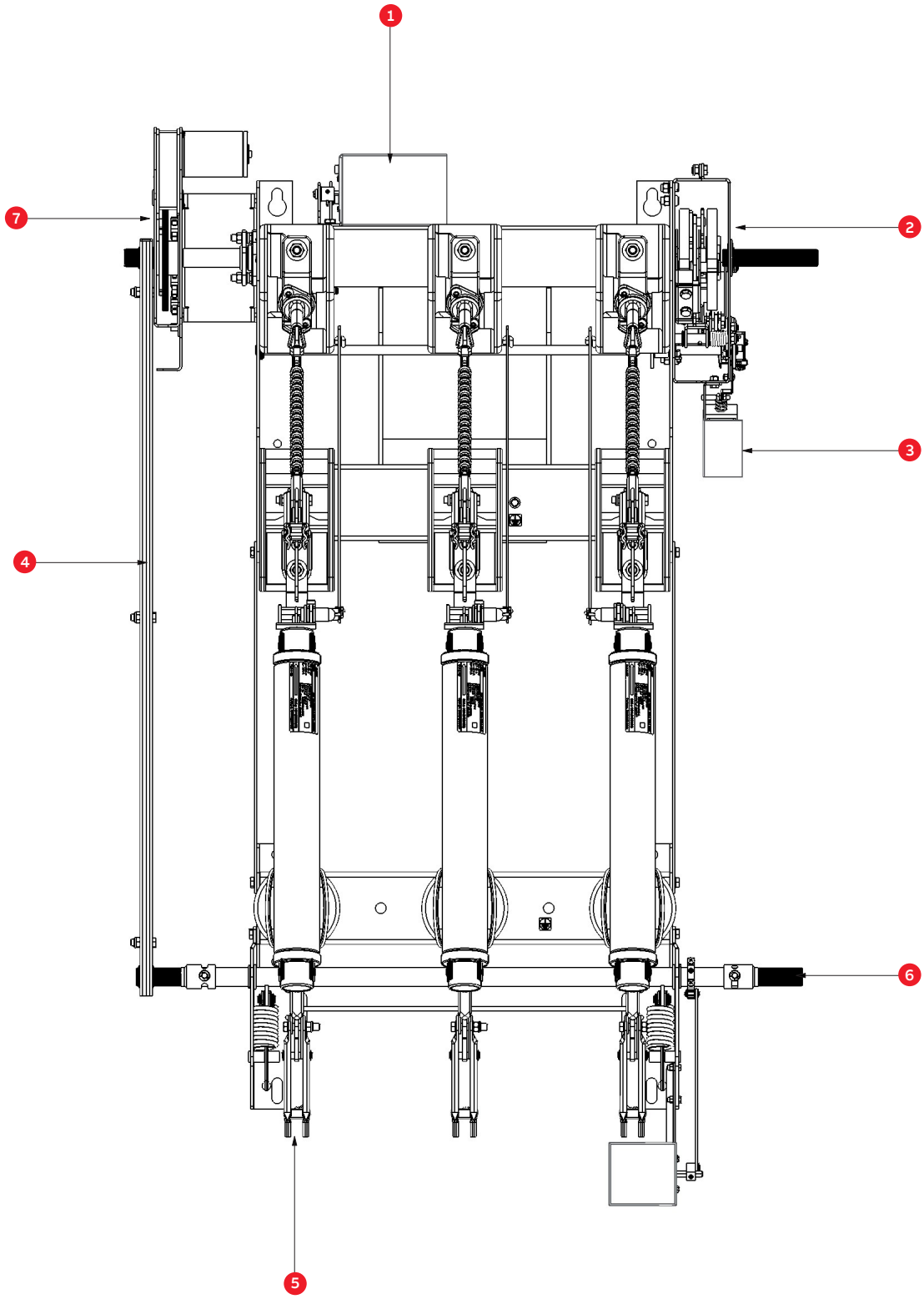
3 – **Shunt trip**
Release charged spring mechanism, opens the switch-disconnector

4 – **Mechanical interlock**
Interlocks switch-disconnector when cooperating with earthing switch

5 – **Quick earthing switch**
Earth main circuit of switch-disconnector

6 – **Earthing switch shaft**
For operating earthing switch or for mechanical interlocking

7 – **Motor drive**
For automatic charge and operating switch-disconnector



Functional description

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

- 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).
- 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 62271-103:2021-05 (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.

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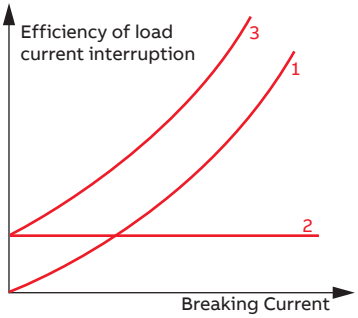

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03 Efficiency of load current interruption in relation to breaking technique
Curve 1: Gas blast
Curve 2: Air blast
Curve 3: The final extinguishing effect = Curve 1+ Curve 2

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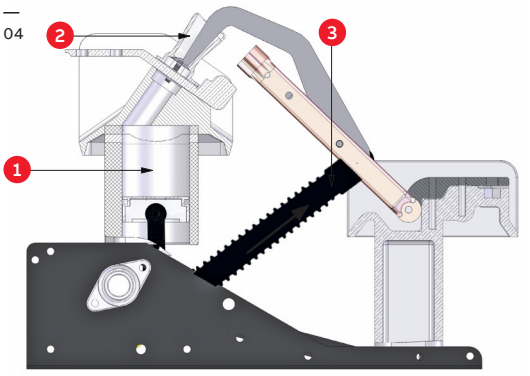
04



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04 Interruption
1 – Air blast
2 – Gas blast
3 – Operating rod

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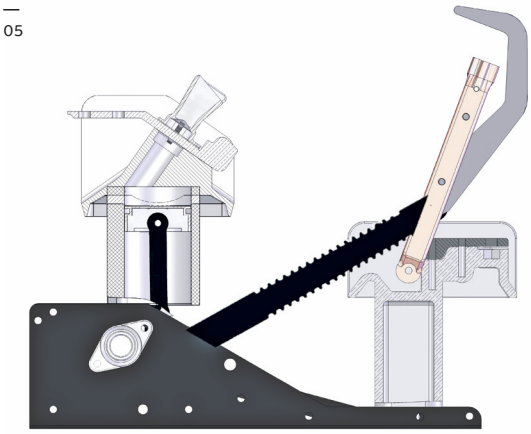

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05 Switch-disconnector in open position

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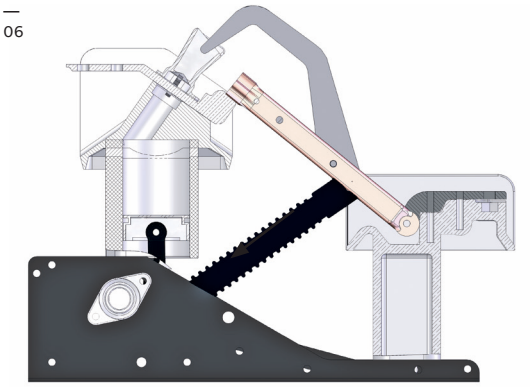

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06 Closing phase

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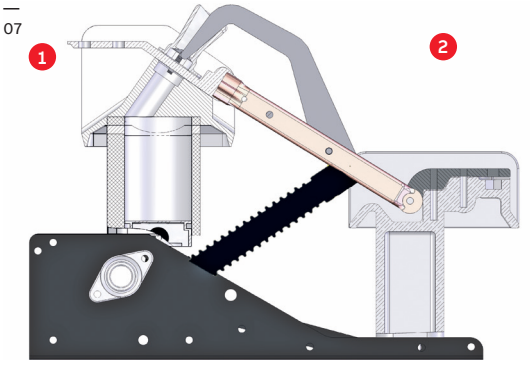

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07 Switch-disconnector in closed position
1 – Opening side
2 – Pivot side

2. Selection and ordering

Types designation

NAL									Switch-disconnector	Type designation
NALF									Switch-fuse combination with integrated fuse-base[1]	
NALFO									Switch-fuse combination with opening side fuse-base[1]	
NAL-H									Switch-disconnector version for severe operating conditions	
NALF-H									Switch-fuse combination with integrated fuse-base[1] version for severe operating conditions	
NALFO-H									Switch-fuse combination with opening side fuse-base[1] version for severe operating conditions	
EB									General marking of free standing earthing switch family[2]	
EB-H									General marking of free standing earthing switch family[8]	
	12								Rated voltage (12 kV for IEC, 4.16 kV for CSA)	
	17								Rated voltage (17.5 kV for IEC, 13.8 kV for CSA)	
	24								Rated voltage (24 kV for IEC, 27.6 kV for CSA)	
	36								Rated voltage (36 kV for IEC, 34.5 kV for CSA)	
		4							Rated current 400 A	Additional parameters
		6							Rated current (630 A for IEC, 600 A for CSA)	
		8[3]							Rated current 800 A	
		10[3]							Rated current 1000 A	
		12[4]							Rated current (1250 A for IEC, 1200 A for CSA)	
			K/K17/K24[9]						Snap action mechanisms	
			A/A17/A24[10]						Stored spring energy mechanisms	
			ASP						Stored spring energy mechanisms for 12 kV with hole for padlock	
				150					Pole distance for voltage 4.16...12 kV	
				170					Pole distance for voltage 4.16...17.5 kV	
				210					Pole distance for voltage 4.16...17.5 kV	
				235					Pole distance for voltage 24...27.6 kV	
				275					Pole distance for voltage 24...27.6 kV	
				360					Pole distance for voltage 34.5...36 kV	
									Without earthing switch	
					E				General marking of quick-make earthing switch family[7] mounted on the switch	
					EB				General marking of free standing earthing switch family for 36 kV For other voltages EB earthing switch is ordered separately	
						R			Right hand side operation	
						L			Left hand side operation[5]	
						RL			Right operating mech with left mechanical interlocking	
						LR			Left operating mech with right mechanical interlocking	
									Without fuse link	
							192		Fuse link 192 mm length	
							292		Fuse link 292 mm length	
							367		Fuse link 367 mm length	
							442		Fuse link 442 mm length	
							537		Fuse link 537 mm length	
									Without fuse-base	
								US	Upper side fuse-base	
								LS	Lower side fuse-base	
								(IEC)	IEC standard (50/60 Hz)	
								(CSA)	CSA standard	

[1] Only for versions with A mechanism and fuse release.
[2] The “EB” type of free standing earthing switch, contains the following free standing earthing switches for 36 kV only: EB (free standing earthing switch for separate installation), EBS (EB 36 on pivot side NAL), EBSU (EB 36 on opening side NAL), EBF (EB 36 on pivot side NAL), EBFU (EB 36 on opening side NALF). EBS, EBSU, EBF, EBFU names are used in product configurator and as configuration description only.
[3] For 36 kV only
[4] For 12 kV only
[5] For left hand side operation shaft extension must be used
[6] The earthing switch is normally delivered without mechanical interlocking, which must be specified separately.
[7] The “E” type of earthing switch, contains the following earthing switches: EF (earthing switch attached to fuse-base) and EI (earthing switch attached to fuse-base and located under fuse-links). EF and EI names are used in product configurator and as configuration description only.
[8] For 12, 17.5 and 24 kV
[9] K for 12&36 kV; K17 for 17.5 kV; K24 for 17.5&24 kV
[10] A for 12&36 kV; A17 for 17.5 kV; A24 for 17.5&24 kV

General remarks for orders

- Normally, the switch-disconnector is delivered with a fuse-base for pivot side mounting. A fuse-base for opening side mounting must be specified in the order.
- 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-disconnector type NALF/NAL can be ordered at the same time, together with ABB current limiting fuse types CEF and CEF-S. The whole range of ordering numbers for ABB fuse-links are available in the ”Fuses” catalogue. The reference fuse-links ordering numbers are listed in the tables below.

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The configuration description for product configuration contains some names used for this purpose only. The product types used on product name plate are according to "Types designation" table on page 10.

Configuration name and description	Type designation	Rated voltage	Rated current	Mechanisms type	Pole distance [mm]	Earthing switch location	Operation/ mechanical interlocking side	Fuse link length [mm]	Fuse-base	Standard
NAL 12-12 A 150 R (CSA)										
Switch-disconnector	NAL 12	12 kV	1200 A	Stored spring energy	150	-	Right hand side operation	-	-	CSA
NAL 12-6 K 150 EF RL 442US (IEC)										
Switch-disconnector with fuse-base without fuse tripping mechanism and with earthing switch	NAL 12 E 12	12 kV	see reference list	Snap action	150	Attached to fuse-base	Right operating mech with left mechanical interlocking	442	Opening (upper) side	IEC
NALF-H 24-6 A24 275 EI RL 442LS (IEC)										
Switch-fuse combination with integrated fuse-base version for severe operating conditions	NALF-H 24 E-H 24	24 kV	see reference list	Stored spring energy	275	Attached to fuse-base from switch disconnector side	Right operating mech with left mechanical interlocking	442	Pivot (lower) side	IEC
NALF 36-6 A 360 EBSU RL 537LS (IEC)										
Switch-fuse combination with integrated fuse-base version with earthing switch	NALF 36 EB 36	36 kV	see reference list	Stored spring energy	360	Free standing earthing switch EBSU (EB 36 on opening side NAL)	Right operating mech with left mechanical interlocking	537	Pivot (lower) side	IEC
NALFO 12-4 A 150 L 292US (IEC)										
Switch-fuse combination with opening side fuse-base version	NALFO 12	12 kV	see reference list	Stored spring energy	150	-	Left hand side operation	292	Opening (upper) side	IEC

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Reference list for ABB CEF/CEF-VT fuse-link selection for transformer protection with load 100% and 120% (valid for 50 and 60 Hz).

Transformer					Fuse-link					
Rated system voltage [kV]	Rated power S_R [kVA]	Relative impedance voltage u_k [%]	Rated current I_R [A] 100%	Rated current I_R [A] 120 %	Type	Rated voltage U_R [kV]	Rated current I_R [A]	Length e [mm]	Catalogue number	Switch-fuse combination dedicated type
6 - 7.2	50	4	4.8	6.1	CEF	3/7.2	10	192 292	1YMB710716M1512 1YMB710716M2512	NALF 12 NALF-H 12 NALFO 12 NALFO-H 12
	75	4	7.2	9.1	CEF		16	192 292	1YMB710718M1512 1YMB710718M2512	
	100	4	9.6	12.1	CEF		20	192 292	1YMB710719M1512 1YMB710719M2512	
	125	4	12.0	15.2	CEF		20	192 292	1YMB710719M1512 1YMB710719M2512	
	160	4	15.4	19.4	CEF		25	192 292	1YMB710721M1512 1YMB710721M2512	
	200	4	19.2	24.9	CEF		31.5	192 292	1YMB710724M1512 1YMB710724M2512	
	250	4	24.1	30.3	CEF		40	192 292	1YMB710725M1512 1YMB710725M2512	
	315	4	30.3	38.2	CEF		50	192 292	1YMB710727M1512 1YMB710727M2512	
	400	4	38.5	48.5	CEF		50	192 292	1YMB710727M1512 1YMB710727M2512	
	500	4	48.1	60.6	CEF		63	192 292	1YMB710729M1612 1YMB710729M2612	
	630	4	60.6	76.4	CEF		100	192 292	1YMB710733M1612 1YMB710733M2612	
	800	5	77.0	97.0	CEF		100	192 292	1YMB710733M1612 1YMB710733M2612	
	1000	5	96.2	121.2	CEF		125	192[2] 292	1YMB710735M1812[2] 1YMB710735M2812	
10 – 12	50	4	2.9	3.6	CEF	6/12	10	292 442	1YMB711216M2512 1YMB711216M4512	NALF 12 NALF-H 12 NALFO 12 NALFO-H 12
	75	4	4.3	5.5	CEF		10	292 442	1YMB711216M2512 1YMB711216M4512	
	100	4	5.8	7.3	CEF		16	292 442	1YMB711218M2512 1YMB711218M4512	
	125	4	7.2	9.1	CEF		16	292 442	1YMB711218M2512 1YMB711218M4512	
	160	4	9.2	11.6	CEF		20	292 442	1YMB711219M2512 1YMB711219M4512	
	200	4	11.5	14.5	CEF		20	292 442	1YMB711219M2512 1YMB711219M4512	
	250	4	14.4	18.2	CEF		25	292 442	1YMB711221M2512 1YMB711221M4512	
	315	4	18.2	22.9	CEF		31.5	292 442	1YMB711224M2512 1YMB711224M4512	
	400	4	23.1	29.1	CEF		31.5	292 442	1YMB711224M2512 1YMB711224M4512	
	500	4	28.9	36.4	CEF		50	292 442	1YMB711227M2612 1YMB711227M4612	
	630	4	36.4	45.8	CEF		50	292 442	1YMB711227M2612 1YMB711227M4612	
	800	5	46.2	58.2	CEF		63	292 442	1YMB711229M2612 1YMB711229M4612	
	1000	5	57.7	72.7	CEF		80	292 442	1YMB711231M2612 1YMB711231M4612	
	1250	5	72.2	90.9	CEF		100	292[2] 442	1YMB711233M2612[2] 1YMB711233M4612	
	1600	6	92.4	116.4	CEF		125[3]	292[2] 442	1YMB711235M2812[2] 1YMB711235M4612	

Rated system voltage [kV]	Transformer				Fuse-link					Switch-fuse combination dedicated type
	Rated power S_R [kVA]	Relative impedance voltage u_k [%]	Rated current I_R [A] 100%	Rated current I_R [A] 120 %	Type	Rated voltage U_R [kV]	Rated current I_R [A]	Length e [mm]	Catalogue number	
15 – 17.5	50[1]	4	1.9	2.4	CEF	10/17.5	6.3	292 367 442	1YMB711713M2512 1YMB711713M3512 1YMB711713M4512	NALF 17 NALF-H 17
	75	4	2.9	3.6	CEF		10	292 367 442	1YMB711716M2512 1YMB711716M3512 1YMB711716M4512	
	100	4	3.8	4.8	CEF		10	292 367 442	1YMB711716M2512 1YMB711716M3512 1YMB711716M4512	
	125	4	4.8	6.1	CEF		10	292 367 442	1YMB711716M2512 1YMB711716M3512 1YMB711716M4512	
	160	4	6.2	7.8	CEF		16	292 367 442	1YMB711718M2512 1YMB711718M3512 1YMB711718M4512	
	200	4	7.7	9.7	CEF		16	292 367 442	1YMB711718M2512 1YMB711718M3512 1YMB711718M4512	
	250	4	9.6	12.1	CEF		20	292 367 442	1YMB711719M2512 1YMB711719M3512 1YMB711719M4512	
	315	4	12.1	15.3	CEF		20	292 367 442	1YMB711719M2512 1YMB711719M3512 1YMB711719M4512	
	400	4	15.4	19.4	CEF		25	292 367 442	1YMB711721M2512 1YMB711721M3512 1YMB711721M4512	
	500	4	19.2	24.2	CEF		31.5	292 367 442	1YMB711724M2612 1YMB711724M3512 1YMB711724M4512	
	630	4	24.2	30.6	CEF		40	292 367 442	1YMB711725M2612 1YMB711725M3512 1YMB711725M4512	
	800	5	30.8	38.8	CEF		40	292 367 442	1YMB711725M2612 1YMB711725M3512 1YMB711725M4512	
	1000	5	38.5	48.5	CEF		50	292[2] 367 442	1YMB711727M2812[2] 1YMB711727M3612 1YMB711727M4612	
	1250	5	48.1	60.6	CEF		63	292[2] 367 442	1YMB711729M2812[2] 1YMB711729M3612 1YMB711729M4612	
	1600	6	61.6	77.6	CEF		80	292[2] 367 442	1YMB711731M2812[2] 1YMB711731M3612 1YMB711731M4612	
	2000	6	77.0	97.0	CEF		100	292[2] 367[2] 442	1YMB711733M2812[2] 1YMB711733M3812[2] 1YMB711733M4612	

Rated system voltage [kV]	Transformer				Fuse-link					Switch-fuse combination dedicated type
	Rated power S_R [kVA]	Relative impedance voltage u_k [%]	Rated current I_R [A] 100%	Rated current I_R [A] 120 %	Type	Rated voltage U_R [kV]	Rated current I_R [A]	Length e [mm]	Catalogue number	
20 - 24	50[1]	4	1.4	1.8	CEF-VT	10/24	4	442	1YMB752411M4512	NALF 24 NALFO 24 NALF-H 24 NALFO-H 24
	75	4	2.2	2.7	CEF		6.3	442 537	1YMB712413M4512 1YMB712413M5512	
	100	4	2.9	3.6	CEF		10	442 537	1YMB712416M4512 1YMB712416M5512	
	125	4	3.6	4.5	CEF		10	442 537	1YMB712416M4512 1YMB712416M5512	
	160	4	4.6	5.8	CEF		10	442 537	1YMB712416M4512 1YMB712416M5512	
	200	4	5.8	7.3	CEF		16	442 537	1YMB712418M4512 1YMB712418M5512	
	250	4	7.2	9.1	CEF		16	442 537	1YMB712418M4512 1YMB712418M5512	
	315	4	9.1	11.5	CEF		20	442 537	1YMB712419M4512 1YMB712419M5512	
	400	4	11.5	14.5	CEF		20	442 537	1YMB712419M4512 1YMB712419M5512	
	500	4	14.4	18.2	CEF		25	442 537	1YMB712421M4512 1YMB712421M5512	
	630	4	18.2	22.9	CEF		31.5	442 537	1YMB712424M4512 1YMB712424M5512	
	800	5	23.1	29.1	CEF		31.5	442 537	1YMB712424M4512 1YMB712424M5512	
	1000	5	28.9	36.4	CEF		40	442 537	1YMB712425M4512 1YMB712425M5512	
	1250	5	36.1	45.5	CEF		50	442 537	1YMB712427M4612 1YMB712427M5612	
	1600	6	46.2	58.2	CEF		63	442 537	1YMB712429M4612 1YMB712429M5612	
	2000	6	57.7	72.7	CEF		80	442 537	1YMB712431M4612 1YMB712431M5612	

[1] Fuse link is not able to clear independently transformer secondary side terminals short circuit current
[2] Available for 100% load only
[3] Available only for 50 Hz
The selection of fuse-links refers to calculated transformer load current for lower value of indicated ranges of rated system voltages

Reference list for ABB CEF-S fuse-link selection for transformer protection with load 100% and 120%

Transformer					Fuse-link					
Rated system voltage [kV]	Rated power S_R [kVA]	Relative impedance voltage u_k [%]	Rated current I_R [A] 100%	Rated current I_R [A] 120 %	Type	Rated voltage U_R [kV]	Rated current I_R [A]	Length e [mm]	Catalogue number	Switch-fuse combination dedicated type
10-12	50	4	2.9	3.6	CEF-S	6/12	10	292	1YMB741216M2611	NALF 12 NALF-H 12 NALFO 12 NALFO-H 12
	75	4	4.3	5.5	CEF-S		16	292	1YMB741218M2611	
	100	4	5.8	7.3	CEF-S		20	292	1YMB741219M2611	
	125	4	7.2	9.1	CEF-S		20	292	1YMB741219M2611	
	160	4	9.2	11.6	CEF-S		25	292	1YMB741221M2611	
	200	4	11.5	14.5	CEF-S		40	292	1YMB741225M2611	
	250	4	14.4	18.2	CEF-S		40	292	1YMB741225M2611	
	315	4	18.2	22.9	CEF-S		50	292	1YMB741227M2611	
	400	4	23.1	29.1	CEF-S		63	292	1YMB741229M2611	
	500	4	28.9	36.4	CEF-S		63	292	1YMB741229M2611	
	630[1]	4	30.3	38.2	CEF-S		63	292	1YMB741229M2611	
20-24	75[4]	4	2.2	2.7	CEF-S	10/24	10	442	1YMB742416M4611	NALF 24 NALFO 24 NALF-H 24 NALFO-H 24
	100	4	2.9	3.6	CEF-S		10	442	1YMB742416M4611	
	125	4	3.6	4.5	CEF-S		16	442	1YMB742418M4611	
	160	4	4.6	5.8	CEF-S		16	442	1YMB742418M4611	
	200	4	5.8	7.3	CEF-S		20	442	1YMB742419M4611	
	250	4	7.2	9.1	CEF-S		20	442	1YMB742419M4611	
	315	4	9.1	11.5	CEF-S		25	442	1YMB742421M4611	
	400	4	11.5	14.5	CEF-S		40	442	1YMB742425M4611	
	500	4	14.4	18.2	CEF-S		40	442	1YMB742425M4611	
	630	4	18.2	22.9	CEF-S		50	442	1YMB742427M4611	
	800	5	23.1	29.1	CEF-S		50	442	1YMB742427M4611	
	1000[2]	5	24.1	30.3	CEF-S		50	442	1YMB742427M4611	
30-36	25[4]	4	0.5	0.6	CEF-S	30/40.5	6.3	537	1YMB744014M5611	NALF 36 NALFO 36
	50[4]	4	1.0	1.2	CEF-S		6.3	537	1YMB744014M5611	
	75[4]	4	1.4	1.8	CEF-S		6.3	537	1YMB744014M5611	
	100	4	1.9	2.4	CEF-S		6.3	537	1YMB744014M5611	
	125	4	2.4	3.0	CEF-S		6.3	537	1YMB744014M5611	
	160	4	3.1	3.9	CEF-S		10	537	1YMB744016M5611	
	200	4	3.8	4.8	CEF-S		16	537	1YMB744018M5611	
	250	4	4.8	6.1	CEF-S		16	537	1YMB744018M5611	
	315	4	6.1	7.6	CEF-S		20	537	1YMB744019M5611	
	400	4	7.7	9.7	CEF-S		25	537	1YMB744021M5611	
	500[5]	5	8.0	10.1	CEF-S		25	537	1YMB744021M5611	

[1] Rated voltage 12 kV
[2] Rated voltage 24 kV
[3] Rated voltage 36 kV
[4] Fuse link is not able to clear independently transformer secondary side terminals short circuit current
[5] Solution is valid for rated system voltage 36 kV only.

The table was calculated according to standards IEC/TR 62655: 2013-05 and IEC 62271-105:2021-06 with following assumptions:
- Maximum long-lasting transformer current overload – 120%
- Magnetizing transformer inrush current – 12 x Ir during 100ms (up to 800 kVA) or 10 x Ir during 100ms (800 kVA and above)
- Transformer short-circuit voltage according to IEC 60076-5: 2006-02
- No fuse derating due to small enclosures assumed

The selection of fuse-links refers to calculated transformer load current for lower value of indicated ranges of rated system

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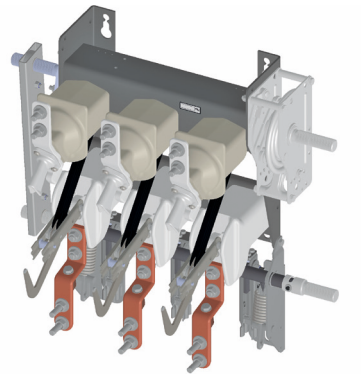
Reference list for fuse-link CEF-S/CEF selection for the transformer protection for Swedish market with 100% and 120% load (§17; fuse with cut off time within 0.1 seconds "Sverigesäkring")

Rated system voltage [kV]	Transformer				Fuse-link					Switch-fuse combination dedicated type
	Rated power S_R [kVA]	Relative impedance voltage u_k [%]	Rated current I_R [A] 100%	Rated current I_R [A] 120 %	Type	Rated voltage U_R [kV]	Rated current I_R [A]	Length e [mm]	Catalogue number	
6.6-7.2	50	4	4.4	5.2	CEF	3/7.2	10	192 292	1YMB710716M1512 1YMB710716M2512	NALF 12 NALF-H 12 NALFO 12 NALFO-H 12
	100	4	8.8	10.5	CEF		20	192 292	1YMB710719M1512 1YMB710719M2512	
	200	4	17.5	21.0	CEF		31.5	192 292	1YMB710724M1512 1YMB710724M2512	
	315	4	27.6	33.1	CEF		50	192 292	1YMB710727M1512 1YMB710727M2512	
	500	4	43.7	52.5	CEF		63	192 292	1YMB710729M1612 1YMB710729M2612	
	630	4	55.1	66.1	CEF		100	192 292	1YMB710733M1612 1YMB710733M2612	
	800	5	70.0	84.0	CEF		100	192 292	1YMB710733M1612 1YMB710733M2612	
	1000	5	87.5	104.9	CEF		125	192 292	1YMB710735M1812[1)] 1YMB710735M2812	
11-12	50	4	2.6	3.1	CEF	6/12	6.3	292	1YMB711216M2512	NALF 12 NALF-H 12 NALFO 12 NALFO-H 12
	100	4	5.2	6.3	CEF-S		16	292	1YMB741218M2611	
	200	4	10.5	12.6	CEF-S		20	292	1YMB741219M2611	
	315	4	16.5	19.8	CEF-S		25	292	1YMB741221M2611	
	500	4	26.2	31.5	CEF-S		40	292	1YMB741225M2611	
	630	4	33.1	39.7	CEF-S		50	292	1YMB741227M2611	
	800	5	42.0	50.4	CEF-S		50	292	1YMB741227M2611	
	1000	5	52.5	63.0	CEF-S		63	292	1YMB741229M2611	
22-24	50	4	1.3	1.6	CEF	10/24	6.3	442	1YMB711713M4512	NALF 24 NALFO 24 NALF-H 24 NALFO-H 24
	100	4	2.6	3.1	CEF-S		10	442	1YMB742416M4611	
	200	4	5.2	6.3	CEF-S		16	442	1YMB742418M4611	
	315	4	8.3	9.9	CEF-S		16	442	1YMB742418M4611	
	500	4	13.1	15.7	CEF-S		20	442	1YMB742419M4611	
	630	4	16.5	19.8	CEF-S		25	442	1YMB742421M4611	
	800	5	21.0	25.2	CEF-S		25	442	1YMB742421M4611	
	1000	5	26.2	31.5	CEF-S		40	442	1YMB742425M4611	
	1250	5	32.8	39.4	CEF-S		50	442	1YMB742427M4611	

[1)] Available for 100% load only

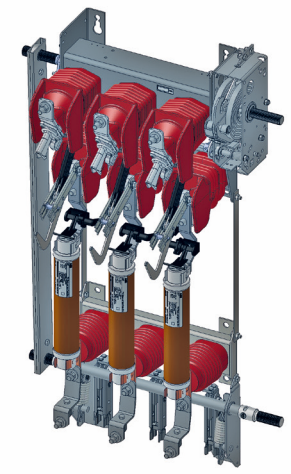
The selection of fuse-links refers to calculated transformer load current for lower value of indicated ranges of rated system voltages

Ordering examples



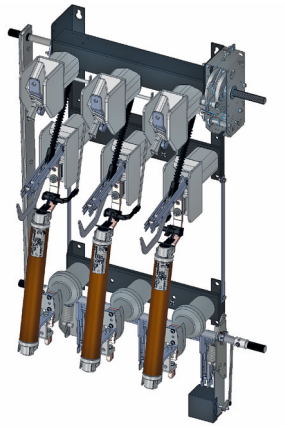
NAL 12-12 K 150 E RL (IEC)
Switch-disconnector for 12 kV/1250 A with snap action mechanism, pole distance 150 mm, equipped with a quick-make earthing switch, right operating mechanism and mechanical interlocking on the left side.

Standard supply	Optional accessories
Switch-disconnector	Auxiliary contacts
Single spring operating mechanism	Motor for the operating mechanism
Earthing switch	Auxiliary contacts
Mechanical interlock for earthing switch mounting	Installation on the opposite side
Operating lever	Extended spline shaft length
Connecting Rods	Additional insulation protection Thick-walled reinforced
Hand operating mechanism	Front bearing directly mounted on side
	Coil for preventing lever operation in earth switch
	Transmission 90° complete



NALF-H 12-6 A 150 EF RL 292LS (IEC)
Switch-fuse combination 12 kV/630 A with stored spring energy mechanism type A, pole distance 150 mm, equipped with fuse-base on the pivot side and earthing switch, with fuse-tripping device, right hand operated, dedicated for severe operating conditions and fuse-links 292 mm length.

Standard supply	Optional accessories
Switch-fuse combination	Auxiliary contacts
Double spring operating mechanism	Motor for the operating mechanism Shunt opening release
Tripping system in case of blown fuses	Auxiliary contacts for fuse interruption
Earthing switch	Auxiliary contacts
Mechanical interlock for earthing switch mounting	Installation on the opposite side
Operating lever	Extended spline shaft length
Connecting rods	Additional insulation protection Thick-walled reinforced
Hand operating mechanism	Front bearing directly mounted on side
	Coil for preventing lever operation in earth switch
	Transmission 90° complete
Current limiting fuse-links	ABB CEF reference fuse-links list-see page 12-16



NALF 24-6 A24 235 EF RL 442LS (IEC)
Switch-fuse combination for 24 kV/630 A with stored spring energy mechanism type A, pole distance 235 mm, equipped with fuse-base on the pivot side and earthing switch, with fuse-tripping device, right-hand operated mechanism and mechanical interlocking on the left side, dedicated for fuse-links 442 mm length.

Standard supply	Optional accessories
Switch-fuse combination	Auxiliary contacts
Double spring operating mechanism	Motor for the operating mechanism Shunt opening release
Tripping system in case of blown fuses	Auxiliary contacts for fuse interruption
Earthing switch	Auxiliary contacts
Mechanical interlock for earthing switch mounting	Installation on the opposite side
Operating lever	Extended spline shaft length
Connecting rods	Additional insulation protection Thick-walled reinforced
Hand operating mechanism	Front bearing directly mounted on side
	Coil for preventing lever operation in earth switch
	Transmission 90° complete
Current limiting fuse-links	ABB CEF reference fuse-links list- see page 12-16

Electrical characteristics of switch-disconnector type NAL 12 / NAL-H 12 according to IEC 62271-1:2017-07 and IEC 62271-103:2021-05

Rated voltage		U_r	kV		12	
Rated frequency		f_r	Hz		50 / 60	
Rated power-frequency withstand voltage		U_d	kV		28[1] / 32[1]	
Rated lightning impulse withstand voltage		U_p	kV		75 / 85	
Rated current		I	A	400	630	1250
Rated continuous current		I_r	A	400	630	1150
Rated short-circuit making current		I_{ma}	kA		67	
Rated peak withstand current		I_p	kA		82	
Rated short-time withstand current	1s	I_k	kA		31.5	
	2s				25	
	3s				20	
Rated mainly active load-breaking current		I_{load}	A	400	630	1250[4]
Rated closed-loop breaking current		I_{loop}	A	400	630	1250[5] 1000[6]
Rated cable-charging breaking current		I_{cc}	A	150	150	
Rated line-charging breaking current		I_{lc}	A	1	1	
Rated earth fault breaking current		I_{ef1}	A	150	150	
Rated cable-and line-charging breaking current under earth fault conditions		I_{ef2}	A	90	90	
Pole distance			mm		150; 170; 210	
Max. operating torque on the spring mechanism shaft			Nm		110	
Opening time			ms		40-60	
Max. arcing time			ms		10	
Temperature class			°C		-40 +40[2]	
Mechanical endurance class			cycles C-O		M1 (1000)	
Electrical endurance class			-	E3	E3	
Short circuit making capability class				E3	E3	E2
Designation of the type of the switch				general purpose		limited purpose
Capacitive switching class			-	C2	C2	
Service condition class according to: IEC/TS 62271-304:2008-05					Class 2[3]	

[1] 42 kV was tested according to GOST 1516.3-96 requirements.
[2] For special application +55°C is available based on agreement with manufacturer.
[3] Applicable for NAL-H versions
[4] According to class E1
[5] According to class E1 for 50 Hz
[6] According to class E1 for 60 Hz

Electrical characteristics of switch-fuse combination type NALF 12; NALF-H 12; NALFO-12 and NALFO-H 12 according to IEC 62271-1:2017-07 and IEC 62271-105:2012-09

Rated voltage	U_r	kV	12		
Rated frequency	f_r	Hz	50	60	
Rated lightning impulse withstand voltage	U_p	kV	75 / 85		
Rated power-frequency withstand voltage	U_d	kV	28[1] /32[1]		
Rated normal current with fuses	I	A	see reference list[3]		
Rated short-circuit making and breaking current[4]	I_{sc}	kA	63		
Rated transfer current	$I_{transfer}$	A	1600	1330	
Rated take-over current for release-operated combiations	I_{lto}	A	1450	1200	
Pole distance		mm	150; 170; 210		
Max. operating torque on the spring mechanism shaft		Nm	110		
Opening time		ms	40-60		
Max. arcing time		ms	12		
Temperature class		°C	-40 +40[2]		
Mechanical endurance class		cycles C-O	M1 (1000)		
Service condition class acc. IEC/TS 62271-304:2008			Class 2[5]		

Above values are valid for CEF fuse-link family produced by ABB. Other fuse-links can be used if IEC 62271-105:2021-06 clause 9.102 is met. Maximum allowable load of fuse-links depends on real application conditions.

[1] Higher value (42 kV) available based on agreement with manufacturer
[2] For special application +55°C is available based on agreement with manufacturer.
[3] Reference list is located on page 11
[4] Valid for reference fuse-links type ABB CEF only
[5] Class 0 for NALF 12, NALFO 12

Electrical characteristics of earthing switch type E 12, E-H 12 for NAL 12/ NALF 12 /NAL-H 12 /NALF-H 12 /NALFO-H 12 and stand-alone type EB 12, EB-H 12[1] according to IEC 62271-102: 2018-05

Rated voltage		U_r	kV	12	
Rated frequency		f_r	Hz	50 / 60	
Rated power-frequency withstand voltage		U_p	kV	28[2]	
Rated lighting impulse withstand voltage		U_d	kV	75	
Rated short-circuit making current[4]		I_{ma}	kA	67	--
Rated peak withstand current[4]		I_p	kA	67	82
Rated short-time withstand current	1s	I_k	kA	--	31.5
	2s			25	25
	3s			20	20
Pole distance			mm	150; 170; 210	
Temperature class			°C	-40+55	
Mechanical endurance class			cycles C-O	M0 (1000)[3]	
Short-circuit making capability class			-	E2	E0

[1] Mechanical interlocking can be fitted.
[2] 42 kV was tested according to GOST 1516.3-96 requirements
[3] M1(2000) cycles C-O for earthing switch E12
[4] Power feeding direction "P"- from the moving contact side

General characteristics of switch-disconnector type NAL 17, NAL-H 17, NAL 24, NAL-H 24. ABB confirms that the ratings declared below were tested and fulfil requirements of listed standard to IEC 62271-1:2017-07 and IEC 62271-103:2021-05.

Rated voltage	U_r	kV	17.5		24	
Rated frequency	fr	Hz	50 / 60			
Rated short-duration power-frequency withstand voltage	U_d	kV	38[1] /45[1]		50 / 60	
Rated lighting impulse withstand voltage	U_p	kV	95 / 110		125 / 145	
Rated current	I	A	400	630	400	630
Rated continuous current	I_r	A	400	630	400	630
Rated short-circuit making current	I_{ma}	kA	52			
Rated peak withstand current	I_p	kA	82			
Rated short-time withstand current 1s 2s 3s	I_k	kA	31.5 25 16			
Rated mainly active load-breaking current	I_{load}	A	400	630	400	630
Rated closed-loop breaking current	I_{loop}	A	400	630	400	630
Rated cable-charging breaking current	I_{cc}	A	100	100	80	80
Rated line charging breaking capacity	I_{lc}	A	1	1	1.5	1.5
Rated earth fault breaking current	I_{ef1}	A	75			
Rated cable-and line-charging breaking current under earth fault conditions	I_{ef2}	A	40	40	31.5	31.5
Pole distance		mm	170, 210		235, 275	
Max. operating torque on the spring mechanism shaft		Nm	115-120			
Opening time		ms	40-60			
Max. arcing time		ms	10-20			
Temperature class		°C	-40 +55			
Mechanical endurance class		cycles C-O	M1 (1000)			
Electrical endurance class		-	E3			
Designation of the type of the switch			general purpose			
Capacitive switching class		-	C2		C1	
Service condition class acc. IEC/TS 62271-304: 2008-05			Class 2[5]			

General characteristics of switch-fuse combination type NALF 17, NALF-H 17, NALF 24, NALF-H 24, NALFO 24, NALFO-H 24 ABB confirms that the ratings declared below were tested and fulfil requirements of listed standard to IEC 62271-1:2017-07 and IEC 62271-105:2021-06.

Rated voltage	U_r	kV	17.5	24
Rated frequency	f_r	Hz	50 / 60	
Rated power-frequency withstand voltage	U_d	kV	38 / 45	50 / 60
Rated lighting impulse withstand voltage	U_p	kV	95 / 110	125 / 145
Rated normal current with fuses	I	A	see reference list[8]	
Rated transfer current	$I_{transfer}$	A	1240	920
Rated take-over current	I_{lto}	A	630	400
Rated short-circuit making and breaking current[2]	I_{sc}	kA	63	
Pole distance		mm	170; 210	235; 275
Max. operating torque on the spring mechanism shaft		Nm	115-120	
Opening time		ms	40-60	
Max. arcing time		ms	10-20	
Temperature class		°C	-40 +40	
Mechanical endurance class		cycles C-O	M1 (1000)	
Service condition class acc.to: IEC/TS 62271-304:2008-05			Class 2[5]	

Above values are valid for CEF fuse-link family produced by ABB. Other fuse-links can be used if IEC 62271-105:2021-06 clause 9.102 is met. Maximum allowable load of fuse-links depends on real application conditions.

General characteristics of earthing switch type E 17, E-H 17, E 24, E-H 24 for NAL/NALF-H /NALFO-H and stand-alone type EB 17, EB-H 17, EB 24, EB-H 24[3),4)]. ABB confirms that the ratings declared below were tested and fulfil requirements of listed standard IEC 62271-102: 2018-05.

Rated voltage	U_r	kV	17.5					24				
Rated frequency	fr	Hz	50/60	50	60	50/60		50/60	50	60	50/60	
Rated power-frequency withstand voltage	U_d	kV	38					50				
Rated lightning impulse withstand voltage	U_p	kV	95					125				
Rated short-circuit making current[2)]	I_{ma}	kA	52	40	32.5	-	-	52	40	32.5	-	-
Rated peak withstand current[2)]	I_p	kA	52	40	32.5	82	42	52	40	32.5	82	42
Rated short-time withstand current/ Rated duration of short-circuit	I_k/T_k	kA	20/3s	16/3s	12.5/3s	31.5/1s 25/2s 20/3s	16/3s	20/3s	16/3s	12.5/3s	31.5/1s 25/2s 20/3s	16/3s
Power feeding direction: "P" – from moving contact side, "N" – opposite to "P".			P	N	N	P	N	P	N	N	P	N
Pole distance		mm	170; 210					235; 275				
Temperature class		°C	-40+55									
Mechanical endurance class		Cycles C-O	M0 (1000) or M1 (2000)[7)]					M0 (1000)				
Short-circuit making capability class		-	E2			E0		E1			E0	

[1)] Higher value available based on agreement with manufacturer.
[2)] Valid for ABB CEF fuse-link only. For other fuses max rated current with fuses can be reduced according to standard requirements. Other fuse--links can be used if IEC 62271-105:2021-06 clause 9.102 is met. Maximum allowable load of fuse-links depends on real application conditions.
[3)] Mechanical interlocking can be fitted.
[4)] When fed from the side opposite to moving contacts.
[5)] Applicable for NAL-H/ NALF-H/ NALFO-H versions.
[6)] The rating limited by short-circuit making current value.
[7)] 2000 cycles C-O (M1) for earthing switch E-H 17 P170
[8)] Reference list is located on the page 11.

General characteristics of switch-disconnector type NAL 36. ABB confirms that the ratings declared below were tested and fulfill requirements of listed standards: IEC 62271-1:2017-07 and IEC 62271-103:2021-05.

Rated voltage		U_r	kV	36		
Rated frequency		f_r	Hz	50 / 60		
Rated power-frequency withstand voltage		U_d	kV	80 / 88		
Rated lightning impulse withstand voltage		U_p	kV	170 / 195		
Rated continuous current		I_r	A	630	800	1000
Rated short-circuit making current [1)]		I_{ma}	kA	42/52		
Short-circuit making capability class [1)]		-	-	E3/E1		
Rated peak withstand current		I_p	kA	82		
Rated short-time withstand current [1)]	1s	I_k	kA	31.5		
	2s			25		
	3s			20		
Rated mainly active load-breaking current		I_{load}	A	630	800	800
Number of operation for mainly active load breaking		n	-	100	10	10
Rated closed-loop breaking current		I_{loop}	A	1250		
Pole distance			mm	360		
Temperature class			°C	-40 +40		
Mechanical endurance class			cycles C-O	M1 (1000)		
Designation of the type of the switch				limited purpose		
Application				Indoor		
Service condition class acc. IEC/TS 62271-304: 2008-05				Class 0		

[1)] Default Ik values is 31.5kA/1s and Ima 52kA (E1)

General characteristics of switch-fuse combination type NALF 36/NALFO 36. ABB confirms that the ratings declared below were tested and fulfill requirements of listed standards: IEC 62271-1:2017-07 and IEC 62271-105:2021-06.

Rated voltage	U_r	kV	36
Rated frequency	f_r	Hz	50 / 60
Rated power-frequency withstand voltage	U_d	kV	80 / 88
Rated lightning impulse withstand voltage	U_p	kV	170 / 195
Rated normal current with CEF-S fuses	I_r	A	see reference list[3]
Rated mainly active load-breaking current[1]	I_{load}	A	630/800
Rated transfer current[4]	$I_{transfer}$	A	122
Rated short-circuit making and breaking current	I_{sc}	kA	20
Rated making and breaking current at the maximum breaking I^2t[2]	I_{Wmax}	A	614
Pole distance		mm	360
Temperature class		°C	-40 +40
Mechanical endurance class		cycles C-O	M1 (1000)
Application			Indoor
Service condition class acc. IEC/TS 62271-304: 2008-05			Class 0

[1] The values only for the switch
[2] Based on test at 50 Hz
[3] Reference list is located on the page 14
[4] Valid for CEF-S fuse only

General characteristics of stand-alone earthing switch type EB[1] for NAL/NALF/NALFO. ABB confirms that the ratings declared below were tested and fulfil requirements of listed standards: IEC 62271-1: 2017-07 and IEC 62271-102: 2018-05.

Rated voltage	U_r	kV	36			
Rated frequency	f_r	Hz	50 / 60			
Rated power-frequency withstand voltage	U_d	kV	80			
Rated lightning impulse withstand voltage	U_p	kV	170			
Rated short-circuit making current	I_{ma}	kA	52	42	-	-
Rated peak withstand current	I_p	kA	52	42	82	42
Rated short-time withstand current/ Rated duration of short-circuit	I_k/T_k		20/3s	16/3s	31.5/1s 25/2s 20/3s	16/3s
Power feeding direction: "P"-from moving contact side, "N"-opposite to "P".			P	N	P	N
Pole distance	mm		360			
Temperature class (TC)		°C	-40 ... +55			
Mechanical endurance class		Cycles C-O	M0 (1000)			
Short-circuit making capability class			E2		E0	

[1] Mechanical interlocking can be fitted

— 08 NAL 12

— 09 NALF 12

— 10 Lower part of fuse-base with earthing switch

— 11 Mechanism A

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Technical data according to CSA certification file (NAL)

Type name		NAL 12	NAL 17	NAL 24	NAL 36
Rated voltage	kV	4.16	13.8	27.6	34.5
Rated maximum voltage	kV	4.76	15	29.8	38
Rated current	A	600/1200	600/1200	600/1200[1)]	600/800
Rated lightning impulse withstand voltage	kV	60	95	125	150
Rated power-frequency withstand voltage	kV	28	38	60	80
Pole spacing	mm/inch		170/6.69		
		150/5.9	210/8.25	235/9.25[1)]	
		210/8.25	235/9.25	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	25/2	25/2	25/2	25/2

[1)] 1200A version requires insulation plates between each phases.
Dimensional drawing presented in pictures 49, 50, 51

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 235 mm and 275 mm
- 36 kV – pole distance 360 mm

Rated currents are:

- 400, 630 and 1250 A (for 12 kV only) up to 24 kV
- 630/800/1000 A for 36 kV

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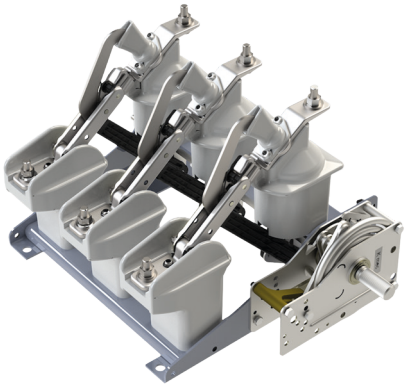
08



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.

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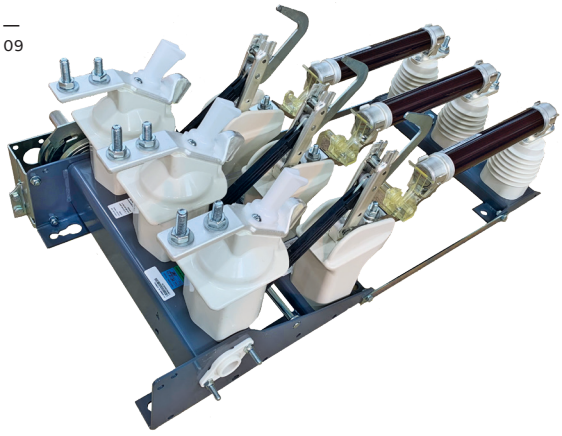
09



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--fuse combination NALF (for fuse-base with fuse tripping system).

ABB fuse types CEF, CEF-VT (with striker pin) and CEF-S are recommended for use with the NALF switch-disconnector 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 reference fuse-link tables on the pages 11-15.

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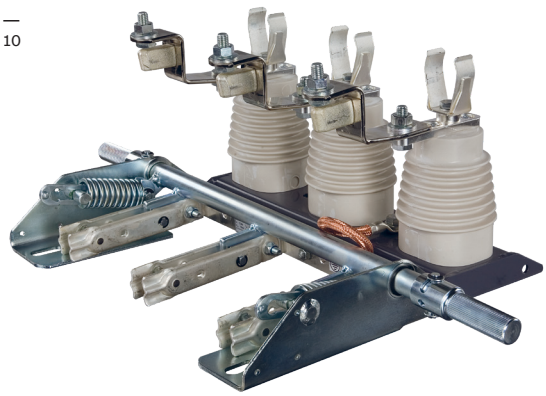
10



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.

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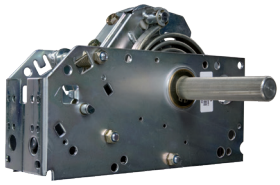
11



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12 Mechanism K

—
13 Quick earthing switch type E

—
14 Quick earthing switch type EB

—
15 Mechanical interlocking

—
16 Manual operation of HE consists of:
a) lower part (front bearing)
b) upper part (bevel gear)
c) lower part for HE with blocking coil
d) connecting rod
e) manual operating handle

Type K with one spring
Closing or opening the switch is performed by charging the spring past the dead center. A and K mechanisms may cooperate with motor drives.

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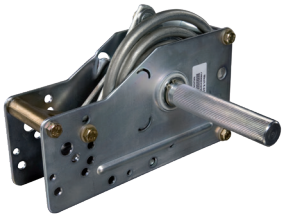
12



Plastic cover for A mechanism – 1YMX241351M0001

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-disconnector or on the fuse-base when the latter is on the pivot side of the switch.

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13

Quick earthing switch type EB
Designed to be an independent assembly for both sides of the disconnector.

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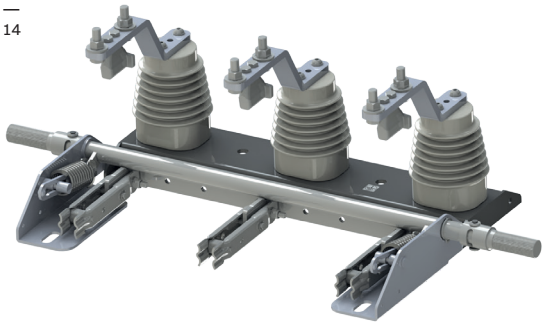
14



Mechanical interlocking
Mechanical interlocking between switch-disconnector 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-disconnector and EB earthing switch.

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15

Manual operation HE for switch-disconnector and earthing switch
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.

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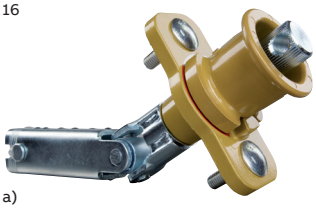
16



a)

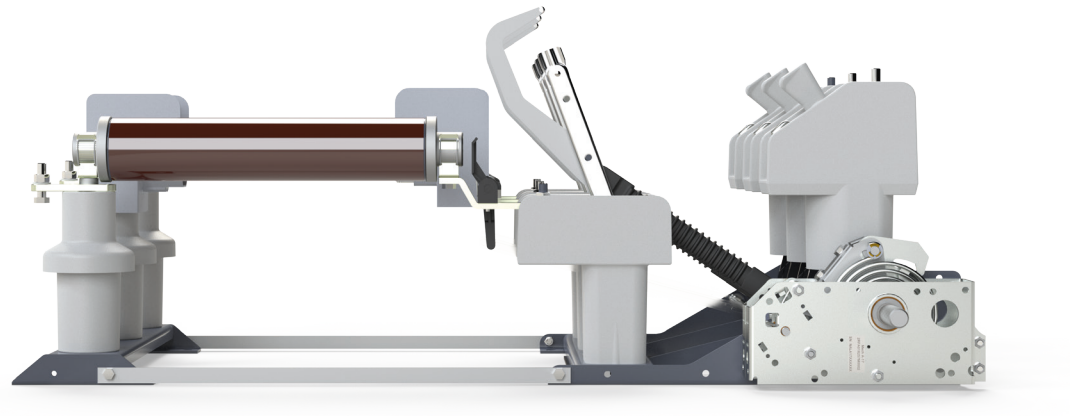
b)

c)

d)

e)

—
17 Switch-disconnector
NALF 17



—
Swich-disconnector (NAL-H) with operating mechanism (K)

Configuration description	Rated voltage [kV]	Rated current [A]	Pole distance [mm]	Ordering number	New configuration description	New ordering number	Weight [kg]
NAL-H 12-6 K 150 R	12	630	150	1YMX054011M9001	NAL-H 12-6 K 150 R (IEC)	1YMX003121M1100	35
NAL-H 12-6 K 150 L	12	630	150	1YMX501211M9001	NAL-H 12-6 K 150 L (IEC)	1YMX003121M1200	35
	12	630	210	--	NAL-H 12-6 K 210 R (IEC)	1YMX003121M3100	36
	12	630	210	--	NAL-H 12-6 K 210 L (IEC)	1YMX003121M3200	36
--	17	630	170	--	NAL-H 17-6 K17 170 R (IEC)	1YMX003223M2100	45
--	17	630	170	--	NAL-H 17-6 K17 170 L (IEC)	1YMX003223M2200	46
--	17	630	210	--	NAL-H 17-6 K17 210 R (IEC)	1YMX003223M3100	46
--	17	630	210	--	NAL-H 17-6 K17 210 L (IEC)	1YMX003223M3200	47
NAL-H 24-6 K24 235 R	24	630	235	1YMX054017M9001	NAL-H 24-6 K24 235 R (IEC)	1YMX003325M4100	45
NAL-H 24-6 K24 235 L	24	630	235	1YMX503114M9001	NAL-H 24-6 K24 235 L (IEC)	1YMX003325M4200	45
NAL-H 24-6 K24 275 R	24	630	275	1YMX054411M9001	NAL-H 24-6 K24 275 R (IEC)	1YMX003325M5100	48
--	24	630	275	--	NAL-H 24-6 K24 275 L (IEC)	1YMX003325M5200	51

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Swich-disconnector (NAL-H) with operating mechanism (A)

Configuration description	Rated voltage [kV]	Rated current [A]	Pole distance [mm]	Ordering number	New configuration description	New ordering number	Weight [kg]
NAL-H 12-6 A 150 R	12	630	150	1YMX054041M9001	NAL-H 12-6 A 150 R (IEC)	1YMX003122M1100	37
NAL-H 12-6 A 150 L	12	630	150	1YMX501221M9001	NAL-H 12-6 A 150 L (IEC)	1YMX003122M1200	37
--	12	630	210	--	NAL-H 12-6 A 210 R (IEC)	1YMX003122M3100	38
--	12	630	210	--	NAL-H 12-6 A 210 L (IEC)	1YMX003122M3200	38
--	17	400	170	--	NAL-H 17-4 A17 170 R (IEC)	1YMX003214M2100	45
--	17	400	170	--	NAL-H 17-4 A17 170 L (IEC)	1YMX003214M2200	46
--	17	400	210	--	NAL-H 17-4 A17 210 R (IEC)	1YMX003214M3100	46
--	17	400	210	--	NAL-H 17-4 A17 210 L (IEC)	1YMX003214M3200	47
--	17	630	170	--	NAL-H 17-6 A17 170 R (IEC)	1YMX003224M2100	47
--	17	630	170	--	NAL-H 17-6 A17 170 L (IEC)	1YMX003224M2200	43
NAL-H 24-6 A24 235 R	24	630	235	1YMX054047M9001	NAL-H 24-6 A24 235 R (IEC)	1YMX003326M4100	45
NAL-H 24-6 A24 235 L	24	630	235	1YMX503224M9001	NAL-H 24-6 A24 235 L (IEC)	1YMX003326M4200	45
--	24	630	275	--	NAL-H 24-6 A24 275 R (IEC)	1YMX003326M5100	46
--	24	630	275	--	NAL-H 24-6 A24 275 L (IEC)	1YMX003326M5200	46

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Swich-disconnector (NAL-H) with operating mechanism (K) and earthing switch

Configuration description	Rated voltage [kV]	Rated current [A]	Pole distance [mm]	Ordering number	New configuration description	New ordering number	Weight [kg]
NAL-H 24-6 K24 235 L E	24	630	235	1YMX503214M9101	NAL-H 24-6 K24 235 E LR (IEC)	1YMX003325M4410	52
NAL-H 24-6 K24 235 R E	24	630	235	1YMX503214M9111	NAL-H 24-6 K24 235 E RL (IEC)	1YMX003325M4310	52

NALF switch-fuse combination – H version

Configuration description	Rated voltage [kV]	Rated current [A]	Pole distance [mm]	Ordering number	New configuration description	New ordering number	Weight [kg]
--	12	400	150	--	NALF-H 12-4 A 150 R 292LS (IEC)	1YMX004112M1102	37
--	12	400	150	--	NALF-H 12-4 A 150 L 292LS (IEC)	1YMX004112M1202	37
--	12	400	210	--	NALF-H 12-4 A 210 R 292LS (IEC)	1YMX004112M3102	39
--	12	400	210	--	NALF-H 12-4 A 210 L 292LS (IEC)	1YMX004112M3202	39
NALF-H 12-6 A 150 R	12	630	150	--	NALF-H 12-6 A 150 R 292LS (IEC)	1YMX004122M1102	37
NALF-H 12-6 A 150 L	12	630	150	--	NALF-H 12-6 A 150 L 292LS (IEC)	1YMX004122M1202	37
--	12	630	210	--	NALF-H 12-6 A 210 R 292LS (IEC)	1YMX004122M3102	39
--	12	630	210	--	NALF-H 12-6 A 210 L 292LS (IEC)	1YMX004122M3202	39
--	17	400	170	--	NALF-H 17-4 A17 170 L 292LS (IEC)	1YMX004214M2202	54
--	17	400	210	--	NALF-H 17-4 A17 210 R 292LS (IEC)	1YMX004214M3102	39
--	17	400	210	--	NALF-H 17-4 A17 210 L 292LS (IEC)	1YMX004214M3202	39
--	17	630	170	--	NALF-H 17-6 A17 170 R 292LS (IEC)	1YMX004224M2102	54
--	17	630	170	--	NALF-H 17-6 A17 170 L 292LS (IEC)	1YMX004224M2202	54
--	17	630	210	--	NALF-H 17-6 A17 210 R 292LS (IEC)	1YMX004224M3102	58
--	17	630	210	--	NALF-H 17-6 A17 210 L 292LS (IEC)	1YMX004224M3202	58
--	17	630	170	--	NALF-H 17-6 A24 170 R 292LS (IEC)	1YMX004226M2102	54
--	17	630	170	--	NALF-H 17-6 A24 170 L 292LS (IEC)	1YMX004226M2202	54
--	17	630	210	--	NALF-H 17-6 A24 210 R 292LS (IEC)	1YMX004226M3102	58
--	17	630	210	--	NALF-H 17-6 A24 210 L 292LS (IEC)	1YMX004226M3202	58
--	24	400	235	--	NALF-H 24-4 A24 235 R 442LS (IEC)	1YMX004316M4104	58
--	24	400	235	--	NALF-H 24-4 A24 235 L 442LS (IEC)	1YMX004316M4204	58
--	24	400	275	--	NALF-H 24-4 A24 275 R 442LS (IEC)	1YMX004316M5104	63
--	24	400	275	--	NALF-H 24-4 A24 275 L 442LS (IEC)	1YMX004316M5204	63
NALF-H 24-6 A24 235 R	24	630	235	1YMX054095M9001	NALF-H 24-6 A24 235 R 442LS (IEC)	1YMX004326M4104	58
NALF-H 24-6 A24 235 L	24	630	235	1YMX513224M9001	NALF-H 24-6 A24 235 L 442LS (IEC)	1YMX004326M4204	58
NALF-H 24-6 A 275 R	24	630	275	1YMX054436M9001	NALF-H 24-6 A24 275 R 442LS (IEC)	1YMX004326M5104	63
--	24	630	275	--	NALF-H 24-6 A24 275 L 442LS (IEC)	1YMX004326M5204	63

NALF switch-fuse combination with earthing switch – H version

Configuration description	Rated voltage [kV]	Rated current [A]	Pole distance [mm]	Ordering number	New configuration description	New ordering number	Weight [kg]
NALF-H 24-4 A24 235 R E	24	400	235	1YMX513124M9101	NALF-H 24-4 A24 235 EF RL 442LS (IEC)	1YMX004316M4334	65
NALF-H 24-6 A24 235 L E	24	630	235	1YMX513224M9101	NALF-H 24-6 A24 235 EF LR 442LS (IEC)	1YMX004326M4434	65

Earthing switch for switch-disconnector and switch-fuse combination – H version

Configuration description	Rated voltage [kV]	Rated current [A]	Pole distance [mm]	Ordering number	Weight [kg]
Earthing switch E-H 24/630A-235	24	630	235	1YMX054237M9001	9

Ordering information

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Switch-disconnector with operating mechanism (K)

Configuration description	Rated voltage [kV]	Rated current [A]	Pole distance [mm]	Ordering number	New configuration description	New ordering number	Weight [kg]
NAL 12-4K150R	12	400	150	1YMX054010M0001	NAL 12-4 K 150 R (IEC)	1YMX000111M1100	31
NAL 12-4K170R	12	400	170	1YMX065170M0001	NAL 12-4 K 170 R (IEC)	1YMX000111M2100	31
NAL 12-4K210R	12	400	210	1YMX054910M0001	NAL 12-4 K 210 R (IEC)	1YMX000111M3100	31
NAL 12-6K150R	12	630	150	1YMX054011M0001	NAL 12-6 K 150 R (IEC)	1YMX000121M1100	31
NAL 12-6K170R	12	630	170	1YMX065170M0002	NAL 12-6 K 170 R (IEC)	1YMX000121M2100	31
NAL 12-6K210R	12	630	210	1YMX054911M0001	NAL 12-6 K 210 R (IEC)	1YMX000121M3100	31
NAL 12-12K150R	12	1250	150	1YMX054012M0001	NAL 12-12 K 150 R (IEC)	1YMX000151M1100	32
NAL 12-12K170R	12	1250	170	1YMX065170M0003	NAL 12-12 K 170 R (IEC)	1YMX000151M2100	32
NAL 12-12K210R	12	1250	210	1YMX054912M0001	NAL 12-12 K 210 R (IEC)	1YMX000151M3100	32
NAL 17-4K170R	17	400	170	1YMX054013M0001	NAL 17-4 K17 170 R (IEC)	1YMX000213M2100	33
NAL 17-4K24 170R	17	400	170	1YMX054013M0002	NAL 17-4 K24 170 R (IEC)	1YMX000215M2100	33
NAL 17-4K210R	17	400	210	1YMX065210M0001	NAL 17-4 K17 210 R (IEC)	1YMX000213M3100	33
NAL 17-4K24 210R	17	400	210	1YMX065210M0002	NAL 17-4 K24 210 R (IEC)	1YMX000215M3100	33
NAL 17-6K170R	17	630	170	1YMX054014M0001	NAL 17-6 K17 170 R (IEC)	1YMX000223M2100	33
NAL 17-6K24 170R	17	630	170	1YMX054014M0002	NAL 17-6 K24 170 R (IEC)	1YMX000225M2100	33
NAL 17-6K210R	17	630	210	1YMX065210M0006	NAL 17-6 K17 210 R (IEC)	1YMX000223M3100	33
NAL 17-6K24 210R	17	630	210	1YMX065210M0005	NAL 17-6 K24 210 R (IEC)	1YMX000225M3100	33
NAL 24-4K235R	24	400	235	1YMX054016M0001	NAL 24-4 K24 235 R (IEC)	1YMX000315M4100	41
NAL 24-4K275R	24	400	275	1YMX054410M0001	NAL 24-4 K24 275 R (IEC)	1YMX000315M5100	41
NAL 24-6K235R	24	630	235	1YMX054017M0001	NAL 24-6 K24 235 R (IEC)	1YMX000325M4100	41
NAL 24-6K275R	24	630	275	1YMX054411M0001	NAL 24-6 K24 275 R (IEC)	1YMX000325M5100	41

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Switch-disconnector CSA with operating mechanism K

Configuration description	Rated voltage [kV]	Rated current [A]	Pole distance [mm]	Ordering number	New configuration description	New ordering number	Weight [kg]
NAL 12-6K 150R	4.16	600	150	1YMX084011M0001	NAL 12-6 K 150 R (CSA)	1YMX006621M1100	31
NAL 12-12K 150R	4.16	1200	150	1YMX084012M0001	NAL 12-12 K 150 R (CSA)	1YMX006651M1100	31
NAL 12-6K 210R	4.16	600	210	1YMX084911M0001	NAL 12-6 K 210 R (CSA)	1YMX006621M3100	32
NAL 12-12K 210R	4.16	1200	210	1YMX084912M0001	NAL 12-12 K 210 R (CSA)	1YMX006651M3100	32
NAL 17-6K 170R	13.8	600	170	1YMX084014M0001	NAL 17-6 K17 170 R (CSA)	1YMX006723M2100	33
NAL 17-12K 170R	13.8	1200	170	1YMX084015M0001	NAL 17-12 K17 170 R (CSA)	1YMX006753M2100	33
NAL 17-6K24 170R	13.8	600	170	1YMX084014M0002	NAL 17-6 K24 170 R (CSA)	1YMX006725M2100	34
NAL 17-12K24 170R	13.8	1200	170	1YMX084015M0002	NAL 17-12 K24 170 R (CSA)	1YMX006755M2100	42
NAL 17-6K 210R	13.8	600	210	1YMX085210M0002	NAL 17-6 K17 210 R (CSA)	1YMX006723M3100	34
NAL 17-12K 210R	13.8	1200	210	1YMX085210M0003	NAL 17-12 K17 210 R (CSA)	1YMX006753M3100	34
NAL 17-6K24 210R	13.8	600	210	1YMX085210M0004	NAL 17-6 K24 210 R (CSA)	1YMX006725M3100	33
NAL 17-12K24 210R	13.8	1200	210	1YMX085210M0005	NAL 17-12 K24 210 R (CSA)	1YMX006755M3100	41
NAL 17-6K 235R	13.8	600	235	1YMX084017M0001	NAL 17-6 K17 235 R (CSA)	1YMX006723M4100	33
NAL 17-12K 235R	13.8	1200	235	1YMX084018M0001	NAL 17-12 K17 235 R (CSA)	1YMX006753M4100	41
NAL 17-6K24 235R	13.8	600	235	1YMX084017M0002	NAL 17-6 K24 235 R (CSA)	1YMX006725M4100	34
NAL 17-12K24 235R	13.8	1200	235	1YMX084018M0002	NAL 17-12 K24 235 R (CSA)	1YMX006755M4100	42
NAL 24-6K 235R	27.6	600	235	1YMX184017M0001	NAL 24-6 K24 235 R (CSA)	1YMX006825M4100	41
NAL 24-12K 235R	27.6	1200	235	1YMX184018M0001	NAL 24-12 K24 235 R (CSA)	1YMX006855M4100	41
NAL 24-6K 275R	27.6	600	275	1YMX084411M0001	NAL 24-6 K24 275 R (CSA)	1YMX006825M5100	42
NAL 24-12K 275R	27.6	1200	275	1YMX084412M0001	NAL 24-12 K24 275 R (CSA)	1YMX006855M5100	42
NAL 36-6K 360R	34.5	600	360	1YMX084363M0001	NAL 36-6 K 360 R (CSA)	1YMX006927M6100	63
NAL 36-8K 360R	34.5	800	360	1YMX084314M0001	NAL 36-8 K 360 R (CSA)	1YMX006937M6100	63

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Switch-disconnector CSA with fuse-base, operating mechanism K, without fuse tripping

Configuration description	Rated voltage [kV]	Rated current [A]	Pole distance [mm]	Ordering number	New configuration description	New ordering number	Weight [kg]
NAL 12-6K 150R	4.16	600	150	1YMX084071M0001	NAL 12-6 K 150 R 292LS (CSA)	1YMX007621M1102	40
NAL 12-6K 210R	4.16	600	210	1YMX084926M0001	NAL 12-6 K 210 R 292LS (CSA)	1YMX007621M3102	40
NAL 17-6K 170R	13.8	600	170	1YMX084073M0002	NAL 17-6 K17 170 R 442LS (CSA)	1YMX007723M2104	43
NAL 17-6K24 170R	13.8	600	170	1YMX084073M0001	NAL 17-6 K24 170 R 292LS (CSA)	1YMX007725M2102	43
NAL 17-6K 210R	13.8	600	210	1YMX088210M0002	NAL 17-6 K17 210 R 442LS (CSA)	1YMX007723M3104	43
NAL 17-6K24 210R	13.8	600	210	1YMX088210M0003	NAL 17-6 K24 210 R 292LS (CSA)	1YMX007725M3102	43
NAL 17-6K 235R	13.8	600	235	1YMX084075M0001	NAL 17-6 K24 235 R 442LS (CSA)	1YMX007725M4104	52
NAL 24-6K 235R	27.6	600	235	1YMX184075M0001	NAL 24-6 K24 235 R 442LS (CSA)	1YMX007825M4104	52
NAL 24-6K 275R	27.6	600	275	1YMX084426M0001	NAL 24-6 K24 275 R 442LS (CSA)	1YMX007825M5104	52
NAL 36-6K 360R	34.5	600	360	1YMX084322M0001	NAL 36-6 K 360 R 537LS (CSA)	1YMX007927M6105	69
NAL 36-8K 360R	34.5	800	360	1YMX084323M0001	NAL 36-8 K 360 R 537LS (CSA)	1YMX007937M6105	69

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Switch-disconnector CSA with operating mechanism A

Configuration description	Rated voltage [kV]	Rated current [A]	Pole distance [mm]	Ordering number	New configuration description	New ordering number	Weight [kg]
NAL 12-6A 150R	4.16	600	150	1YMX084041M0001	NAL 12-6 A 150 R (CSA)	1YMX006622M1100	33
NAL 12-12A 150R	4.16	1200	150	1YMX084042M0001	NAL 12-12 A 150 R (CSA)	1YMX006652M1100	34
NAL 12-6A 210R	4.16	600	210	1YMX084921M0001	NAL 12-6 A 210 R (CSA)	1YMX006622M3100	33
NAL 12-12A 210R	4.16	1200	210	1YMX084922M0001	NAL 12-12 A 210 R (CSA)	1YMX006652M3100	34
NAL 17-6A 170R	13.8	600	170	1YMX084404M0001	NAL 17-6 A17 170 R (CSA)	1YMX006724M2100	35
NAL 17-12A 170R	13.8	1200	170	1YMX084045M0001	NAL 17-12 A17 170 R (CSA)	1YMX006754M2100	36
NAL 17-6A24 170R	13.8	600	170	1YMX084404M0002	NAL 17-6 A24 170 R (CSA)	1YMX006726M2100	35
NAL 17-12A24 170R	13.8	1200	170	1YMX084045M0002	NAL 17-12 A24 170 R (CSA)	1YMX006756M2100	36
NAL 17-6A 210AR	13.8	600	210	1YMX087210M0002	NAL 17-6 A17 210 R (CSA)	1YMX006724M3100	35
NAL 17-12A 210AR	13.8	1200	210	1YMX087210M0003	NAL 17-12 A17 210 R (CSA)	1YMX006754M3100	36
NAL 17-6A24 210R	13.8	600	210	1YMX087210M0004	NAL 17-6 A24 210 R (CSA)	1YMX006726M3100	43
NAL 17-12A24 210R	13.8	1200	210	1YMX087210M0005	NAL 17-12 A24 210 R (CSA)	1YMX006756M3100	44
NAL 17-6A 235R	13.8	600	235	1YMX084047M0001	NAL 17-6 A17 235 R (CSA)	1YMX006724M4100	43
NAL 17-12A 235R	13.8	1200	235	1YMX084048M0001	NAL 17-12 A17 235 R (CSA)	1YMX006754M4100	44
NAL 17-6A24 235R	13.8	600	235	1YMX084047M0002	NAL 17-6 A24 235 R (CSA)	1YMX006726M4100	43
NAL 17-12A24 235R	13.8	1200	235	1YMX084048M0002	NAL 17-12 A24 235 R (CSA)	1YMX006756M4100	44
NAL 24-6A24 235R	27.6	600	235	1YMX184047M0001	NAL 24-6 A24 235 R (CSA)	1YMX006826M4100	43
NAL 24-12A24 235R	27.6	1200	235	1YMX184048M0001	NAL 24-12 A24 235 R (CSA)	1YMX006856M4100	44
NAL 24-6A24 275R	27.6	600	275	1YMX084421M0001	NAL 24-6 A24 275 R (CSA)	1YMX006826M5100	43
NAL 24-12A24 275R	27.6	1200	275	1YMX084422M0001	NAL 24-12 A24 275 R (CSA)	1YMX006856M5100	44
NAL 36-6A 360R	34.5	600	360	1YMX084319M0001	NAL 36-6 A 360 R (CSA)	1YMX006928M6100	63
NAL 36-8A 360R	34.5	800	360	1YMX084320M0001	NAL 36-8 A 360 R (CSA)	1YMX006938M6100	63

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Switch-disconnector CSA with fuse-base, operating mechanism A, with fuse tripping

Configuration description	Rated voltage [kV]	Rated current [A]	Pole distance [mm]	Ordering number	New configuration description	New ordering number	Weight [kg]
NALF 12-6A 150R	4.16	600	150	1YMX084091M0001	NALF 12-6 A 150 R 292LS (CSA)	1YMX007622M1102	42
NALF 12-6A 210R	4.16	600	210	1YMX084936M0001	NALF 12-6 A 210 R 292LS (CSA)	1YMX007622M3102	42
NALF 17-6A 170R	13.8	600	170	1YMX084093M0001	NALF 17-6 A17 170 R 442LS (CSA)	1YMX007724M2104	45
NALF 17-6A24 170R	13.8	600	170	1YMX084093M0002	NALF 17-6 A24 170 R 442LS (CSA)	1YMX007726M2104	45
NALF 17-6A 210R	13.8	600	210	1YMX080210M0002	NALF 17-6 A17 210 R 442LS (CSA)	1YMX007724M3104	45
NALF 17-6A24 210R	13.8	600	210	1YMX080210M0003	NALF 17-6 A24 210 R 442LS (CSA)	1YMX007726M3104	45
NALF 17-6A 235R	13.8	600	235	1YMX084095M0001	NALF 17-6 A17 235 R 442LS (CSA)	1YMX007724M4104	54
NALF 24-6A24 235R	27.6	600	235	1YMX184095M0001	NALF 24-6 A24 235 R 442LS (CSA)	1YMX007826M4104	54
NALF 24-6A24 275R	27.6	600	275	1YMX084436M0001	NALF 24-6 A24 275 R 442LS (CSA)	1YMX007826M5104	54
NALF 36-6A 360R	34.5	600	360	1YMX084328M0001	NALF 36-6 A 360 R 537LS (CSA)	1YMX007928M6105	71
NALF 36-8A 360R	34.5	800	360	1YMX084329M0001	NALF 36-8 A 360 R 537LS (CSA)	1YMX007938M6105	71

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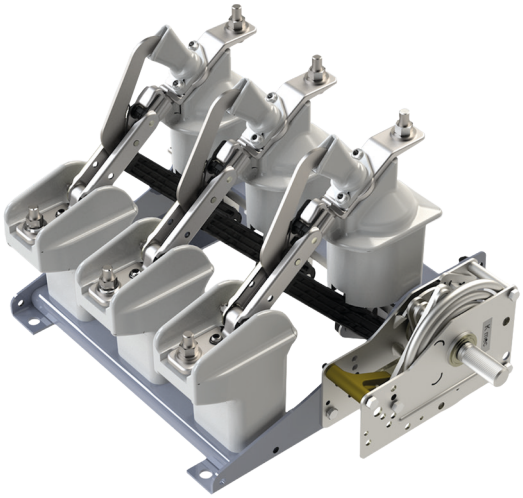
18 NAL 12
switch-disconnector
with K mechanism



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Switch-disconnector with operating mechanism (A)

Configuration description	Rated voltage [kV]	Rated current [A]	Pole distance [mm]	Ordering number	New configuration description	New ordering number	Weight [kg]
NAL 12-4A150R	12	400	150	1YMX054040M0001	NAL 12-4 A 150 R (IEC)	1YMX000112M1100	33
NAL 12-4A170R	12	400	170	1YMX067170M0001	NAL 12-4 A 170 R (IEC)	1YMX000112M2100	33
NAL 12-4A210R	12	400	210	1YMX054920M0001	NAL 12-4 A 210 R (IEC)	1YMX000112M3100	33
NAL 12-6A150R	12	630	150	1YMX054041M0001	NAL 12-6 A 150 R (IEC)	1YMX000122M1100	33
NAL 12-6A170R	12	630	170	1YMX067170M0002	NAL 12-6 A 170 R (IEC)	1YMX000122M2100	33
NAL 12-6A210R	12	630	210	1YMX054921M0001	NAL 12-6 A 210 R (IEC)	1YMX000122M3100	33
NAL 12-12A150R	12	1250	150	1YMX054042M0001	NAL 12-12 A 150 R (IEC)	1YMX000152M1100	34
NAL 12-12A170R	12	1250	170	1YMX067170M0003	NAL 12-12 A 170 R (IEC)	1YMX000152M2100	34
NAL 12-12A210R	12	1250	210	1YMX054922M0001	NAL 12-12 A 210 R (IEC)	1YMX000152M3100	34
NAL 17-4A170R	17	400	170	1YMX054043M0001	NAL 17-4 A17 170 R (IEC)	1YMX000214M2100	35
NAL 17-4A24 170R	17	400	170	1YMX054043M0002	NAL 17-4 A24 170 R (IEC)	1YMX000216M2100	35
NAL 17-4A210R	17	400	210	1YMX067210M0001	NAL 17-4 A17 210 R (IEC)	1YMX000214M3100	35
NAL 17-4A24 210R	17	400	210	1YMX067210M0002	NAL 17-4 A24 210 R (IEC)	1YMX000216M3100	35
NAL 17-6A170R	17	630	170	1YMX054044M0001	NAL 17-6 A17 170 R (IEC)	1YMX000224M2100	35
NAL 17-6A24 170R	17	630	170	1YMX054044M0002	NAL 17-6 A24 170 R (IEC)	1YMX000226M2100	35
NAL 17-6A24 210R	17	630	210	1YMX067210M0005	NAL 17-6 A24 210 R (IEC)	1YMX000226M3100	35
NAL 24-4A235R	24	400	235	1YMX054046M0001	NAL 24-4 A24 235 R (IEC)	1YMX000316M4100	43
NAL 24-4A275R	24	400	275	1YMX054420M0001	NAL 24-4 A24 275 R (IEC)	1YMX000316M5100	43
NAL 24-6A235R	24	630	235	1YMX054047M0001	NAL 24-6 A24 235 R (IEC)	1YMX000326M4100	43
NAL 24-6A275R	24	630	275	1YMX054421M0001	NAL 24-6 A24 275 R (IEC)	1YMX000326M5100	43
NAL 36-6A360R	36	630	360	1YMX054319M0001	NAL 36-6 A 360 R (IEC)	1YMX000428M6100	69
NAL 36-8A360R	36	800	360	1YMX054320M0001	NAL 36-8 A 360 R (IEC)	1YMX000438M6100	69
NAL 36-10A360R	36	1000	360	1YMX054321M0001	NAL 36-10 A 360 R (IEC)	1YMX000448M6100	69
NAL 36-6A360R	36	630	360	1YMX054319M0003	NAL 36-6 A 360 R 52kA (IEC)	1YMX054319M0003	69
NAL 36-8A360R	36	800	360	1YMX054320M0003	NAL 36-8 A 360 R 52kA (IEC)	1YMX054320M0003	69
NAL 36-10A360R	36	1000	360	1YMX054321M0003	NAL 36-10 A 360 R 52kA (IEC)	1YMX054321M0003	69

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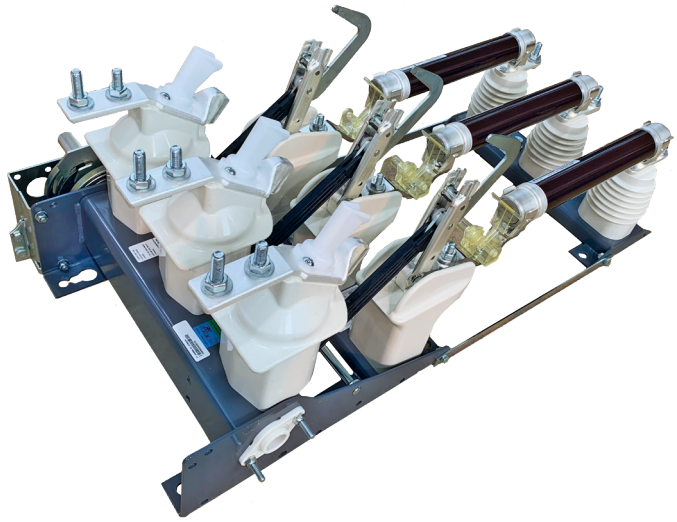
19 NALF 12
switch-fuse combination
with mechanism A



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

Configuration description	Rated voltage [kV]	Rated current [A]	Pole distance [mm]	Ordering number	New configuration description	New ordering number	Weight [kg]
NALF 12-4A150R	12	400	150	1YMX054090M0001	NALF 12-4 A 150 R 292LS (IEC)	1YMX001112M1102	42
NALF 12-4A170R	12	400	170	1YMX070170M0001	NALF 12-4 A 170 R 292LS (IEC)	1YMX001112M2102	42
NALF 12-4A210R	12	400	210	1YMX054935M0001	NALF 12-4 A 210 R 292LS (IEC)	1YMX001112M3102	42
NALF 12-6A150R	12	630	150	1YMX054091M0001	NALF 12-6 A 150 R 292LS (IEC)	1YMX001122M1102	42
NALF 12-6A170R	12	630	170	1YMX070170M0002	NALF 12-6 A 170 R 292LS (IEC)	1YMX001122M2102	42
NALF 12-6A210R	12	630	210	1YMX054936M0001	NALF 12-6 A 210 R 292LS (IEC)	1YMX001122M3102	42
NALF 17-4A170R	17	400	170	1YMX054092M0001	NALF 17-4 A17 170 R 442LS (IEC)	1YMX001214M2104	45
NALF 17-4A24 170R	17	400	170	1YMX054092M0002	NALF 17-4 A24 170 R 442LS (IEC)	1YMX001216M2104	45
NALF 17-4A210R	17	400	210	1YMX070210M0001	NALF 17-4 A17 210 R 442LS (IEC)	1YMX001214M3104	45
NALF 17-4A24 210R	17	400	210	1YMX070210M0003	NALF 17-4 A24 210 R 442LS (IEC)	1YMX001216M3104	45
NALF 17-6A170R	17	630	170	1YMX054093M0001	NALF 17-6 A17 170 R 442LS (IEC)	1YMX001224M2104	45
NALF 17-6A24 170R	17	630	170	1YMX054093M0002	NALF 17-6 A24 170 R 442LS (IEC)	1YMX001226M2104	45
NALF 17-6A210R	17	630	210	1YMX070210M0002	NALF 17-6 A17 210 R 442LS (IEC)	1YMX001224M3104	45
NALF 17-6A24 210R	17	630	210	1YMX070210M0004	NALF 17-6 A24 210 R 442LS (IEC)	1YMX001226M3104	45
NALF 24-4A235R	24	400	235	1YMX054094M0001	NALF 24-4 A24 235 R 442LS (IEC)	1YMX001316M4104	54
NALF 24-4A275R	24	400	275	1YMX054435M0001	NALF 24-4 A24 275 R 442LS (IEC)	1YMX001316M5104	54
NALF 24-6A235R	24	630	235	1YMX054095M0001	NALF 24-6 A24 235 R 442LS (IEC)	1YMX001326M4104	54
NALF 24-6A275R	24	630	275	1YMX054436M0001	NALF 24-6 A24 275 R 442LS (IEC)	1YMX001326M5104	54
NALF 36-6A360R	36	630	360	1YMX054328M0001	NALF 36-6 A 360 R 537LS (IEC)	1YMX001428M6105	71
NALF 36-8A360R	36	800	360	1YMX054329M0001	NALF 36-8 A 360 R 537LS (IEC)	1YMX001438M6105	71
NALF 36-10A360R	36	1000	360	1YMX054330M0001	NALF 36-10 A 360 R 537LS (IEC)	1YMX001448M6105	71

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

Configuration description	Rated voltage [kV]	Rated current [A]	Pole distance [mm]	Ordering number	New configuration description	New ordering number	Weight [kg]
NALFO 12-4A150R	12	400	150	1YMX354090M0001	NALFO 12-4 A 150 R 292US (IEC)	1YMX002112M1102	42
NALFO 12-4A170R	12	400	170	1YMX370170M0001	NALFO 12-4 A 170 R 292US (IEC)	1YMX002112M2102	42
NALFO 12-4A210R	12	400	210	1YMX354935M0001	NALFO 12-4 A 210 R 292US (IEC)	1YMX002112M3102	42
NALFO 12-6A150R	12	630	150	1YMX354091M0001	NALFO 12-6 A 150 R 292US (IEC)	1YMX002122M1102	42
NALFO 12-6A170R	12	630	170	1YMX370170M0002	NALFO 12-6 A 170 R 292US (IEC)	1YMX002122M2102	42
NALFO 12-6A210R	12	630	210	1YMX354936M0001	NALFO 12-6 A 210 R 292US (IEC)	1YMX002122M3102	42
NALFO 24-4A235R	24	400	235	1YMX354094M0001	NALFO 24-4 A24 235 R 442US (IEC)	1YMX002316M4104	54
NALFO 24-4A275R	24	400	275	1YMX354435M0001	NALFO 24-4 A24 275 R 442US (IEC)	1YMX002316M5104	54
NALFO 24-6A235R	24	630	235	1YMX354095M0001	NALFO 24-6 A24 235 R 442US (IEC)	1YMX002326M4104	54
NALFO 24-6A275R	24	630	275	1YMX354436M0001	NALFO 24-6 A24 275 R 442US (IEC)	1YMX002326M5104	54
NALFO 36-6A360R	36	630	360	1YMX354328M0001	NALFO 36-6 A 360 R 537US (IEC)	1YMX002428M6105	71
NALFO 36-8A360R	36	800	360	1YMX354329M0001	NALFO 36-8 A 360 R 537US (IEC)	1YMX002438M6105	71

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

Description	Rated voltage [kV]	Rated current [A]	Pole distance [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	17.5	400/630	170	1YMX054196M0001	8
F 17	17.5	400/630	210	1YMX064196M0001	8
F 24	24	400/630	235	1YMX054197M0001	13
F 24	24	400/630	275	1YMX054476M0001	13
F 36	36	630/800	360	1YMX054335M0001	17

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

Description	Rated voltage [kV]	Rated current [A]	Pole distance [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	17.5	400/630	210	1YMX064201M0001	8
F 24	24	400/630	235	1YMX054202M0001	13
F 24	24	400/630	275	1YMX054478M0001	13

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

Description	Rated voltage [kV]	Rated current [A]	Pole distance [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	210	1YMX064191M0001	8
F 24	24	400/630	235	1YMX054193M0001	13
F 24	24	400/630	275	1YMX054461M0001	13
F 36	36	630/800	360	1YMX054337M0001	17

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Earthing switch type E for NAL switch-disconnector (mechanical interlocking should be ordered separately)

Type	Rated voltage [kV]	Rated current [A]	Pole distance [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	235	1YMX054237M0001	9
E 24	24	400/630	275	1YMX054483M0001	9
E 24	24	1250	235	1YMX054219M0001	9
E 24	24	1250	275	1YMX054489M0001	9

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Earthing switch type E for NAL switch-disconnector (mechanical interlocking should be ordered separately), mounted on fuse-base

Type	Rated voltage [kV]	Rated current [A]	Pole distance [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	235	1YMX054227M0001	9
E 24	24	400/630	275	1YMX054488M0001	9

Earthing switch type EB freestanding

Type	Rated voltage [kV]	Rated current [A]	Pole distance [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	275	1YMX054274M0001	24
EB 36	36	800	360	1YMX054288M0001	45
EB 36 on pivot side NAL	36	630/800	360	1YMX344033M0001	45
EB 36 on opening side NAL	36	630/800	360	1YMX344034M0001	45
EB 36 on pivot side NALF	36	630/800	360	1YMX344035M0001	45
EB 36 on opening side NALF	36	630/800	360	1YMX344036M0001	45

Hand operating mechanism type HE with accessories

Description	Ordering number	Weight [kg]
Front bearing for HE, with cardanic joint (Fig. 16 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. 16 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. 16 c)	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
Shaft extension for left-hand side operation		
• 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. 16 d)	1YMX053346M0002	1.9
Connecting rod 3/4” L= 2000 mm	1YMX053347M0001	2.9
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 reinforced[1)]	1YMX000012M0003	2.9
Connecting rod 3/4” L= 2000 mm isolated reinforced[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

Description	Ordering number	Weight [kg]
Connecting rod 3/4" L= 1300 mm isolated reinforced CZ[1) 2)]	1YMX000012M0007	2.9
Connecting rod 3/4" L= 2000 mm isolated reinforced CZ[1)2)]	1YMX000012M0008	4.2
Connecting rod 3/4" L= 1300 mm reinforced[1)]	1YMX000004M0003	2.7
Connecting rod 3/4" L= 2000 mm reinforced[1)]	1YMX000004M0004	4.0
Connecting rod 3/4" L= 1300 mm reinforced CZ[1) 2)]	1YMX000004M0007	2.7
Connecting rod 3/4" L= 2000 mm reinforced CZ[1) 2)]	1YMX000004M0008	4.0
Insulated opening levers for switch operation (Crank arm)	1YMX053225M0001	1.7
Shaft extension 460 mm	1YMX053348M0001	1.7
Shaft extension 380 mm	1YMX053349M0001	1.4
Joint link for shaft extension	1YMX053350M0001	0.2
Support bearing		
• for NAL/NALF 12	1YMX053351M0001	1.8
• for NAL/NALF 17/24	1YMX053352M0001	1.9
• for NAL/NALF 36	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. 49 and 50)		
• bevel gear (Fig. 16b)	1YMX053362M0002	2.1
• bevel gear support	1YMX343036M0001	1.2
• rod connector	1YMX000053M0001	0.7
Transmission 90° complete	1YMX000129M0006	4.0
Test fuse, adjustable length 3.6/40 kV with striker pin	1YMX300062M0001	1.2

[1)] Recommended for motor drive UEMC40A/UEMC41 and switch-disconnector type NAL/NALF 24 – 36 kV
[2)] Zinc plated
[3)] For these items use reinforced connecting rod only
Following connecting rods should be used:
– insulated – for NAL 17.5 and 24 kV,
– reinforced – for the UEMC 41 drive,
– insulated reinforced (for NAL 36kV,
– reinforced for transmission at an angle of 90° (at least two bevel gears).
Don't drill a hole in the seam of the pipe.

—

Mechanical interlocking for earthing switch*) (Fig. 15)

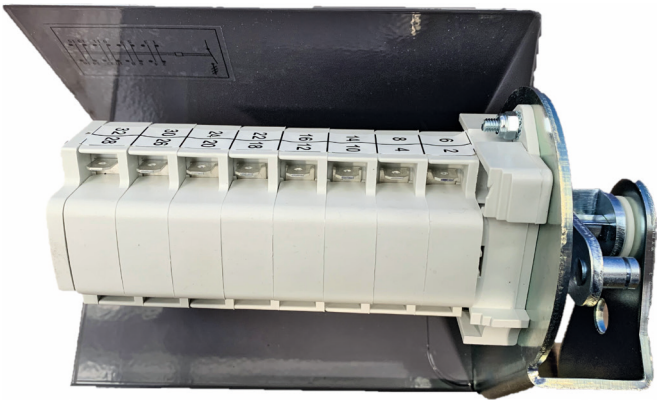
Description	Ordering number	Weight [kg]
• on NAL 12	1YMX054275M0001	2.5
• on NAL 17/24	1YMX054276M0001	3.1
• on NALF 12. Fuse e = 292 mm	1YMX054277M0001	5.7
• on NALF 12. Fuse e = 192 mm	1YMX054278M0001	5.0
• on NALF 12. Fuse e = 442 mm	1YMX054279M0001	6.4
• on NALF 12. Fuse e = 464 mm	1YMX054286M0001	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 EB on pivot side	1YMX343986M0002	5.4
• on NAL 36 EB on opening side	1YMX343986M0001	3.3
• on NALF 36 EB on pivot side	1YMX343986M0003	9.4
• on NALF 36 EB on opening side	1YMX343986M0004	7.6

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

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

21 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.

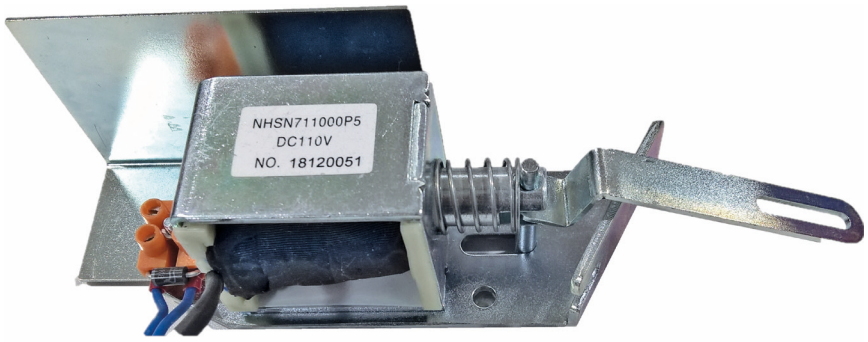
20



Aux. switches for switch-disconnectors and earthing switch (Fig. 20)

Description	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	1YMX054716M0002	0.9
• 4NO + 4NC for E/EB 12-24	1YMX054717M0001	1.0
• 4NO + 4NC for E/EB 36	1YMX054717M0002	1.0
• 2NO + 2NC for NAL(F) 36	1YMX240807M0005	0.9
• 4NO + 4NC for NAL(F) 36	1YMX240807M0006	1.0
• 8NO + 8NC for NAL(F) 36	1YMX054715M0002	1.1
Fixing materials for NAL(F) 36	1YMX240807M0004	0.1
Auxiliary contact for fuse interruption	1YMX053390M0001	0.1

21



Shunt trip for A mechanism*) (including fixing parts) (Fig. 21)

Description	Ordering number	Weight [kg]
Shunt trip 230 V AC	1YMX054740M0001	0.6
Shunt trip 110 V AC	1YMX054741M0001	0.6
Shunt trip 125 V AC	1YMX054741M0002	0.6
Shunt trip 220 V DC	1YMX054742M0001	0.6
Shunt trip 110 V DC	1YMX054743M0001	0.6
Shunt trip 125 V DC	1YMX054743M0002	0.6
Shunt trip 48 V DC	1YMX054744M0001	0.6
Shunt trip 24 V DC	1YMX054745M0001	0.6

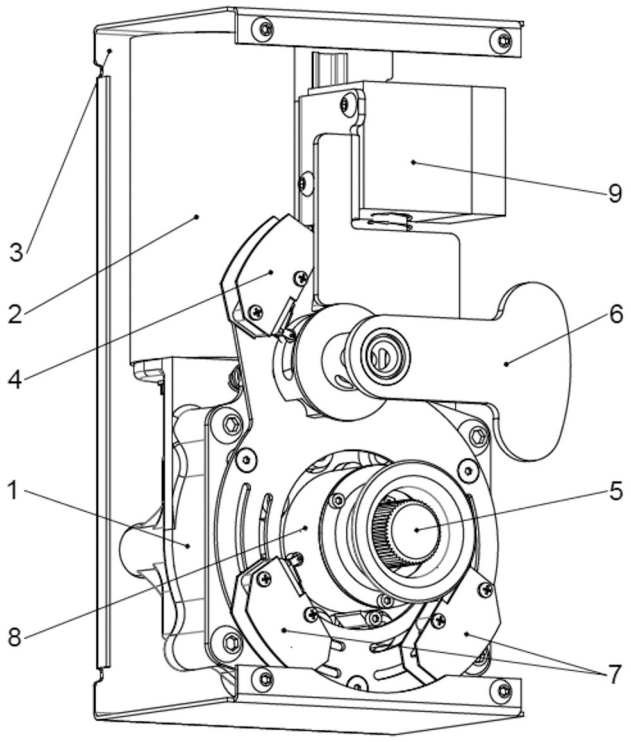
*) In connection with shunt trip, auxiliary switch that breaks shunt trip circuit, must be used.

3. Motor operating device

UEMC 41 motor operating device

22 UEMC 41 drive design
1 – Gearbox,
2 – Motor,
3 – Drive cover,
4 – Microswitch (service lock),
5 – Shaft output for manual operating,
6 – Selector (for selecting drive mode – see more in point “Mechanical selector description”),
7 – Microswitch (for setting angle of rotation),
8 – Coupling bush,
9 – Locking coil

22



UEMC 41 rated data

Characteristic		Value
Mechanical and electrical locking	-	Yes
Nominal torque	Nm	150
Max. torque	Nm	300
Max external dimensions (without control cabinet) HxWxD	mm	415x135x140
Auto blocking	-	Yes
Rotation angle adjustment	-	Yes
Default rotation angle setting	°	150
Rotation angle	°	from 0 to 300
Max. mechanical endurance	Cycles	5000
Supplying voltages	V	24VDC, 48VDC, 110, 125 AC/DC, 220/230 AC/DC
Working temperature	°C	-40 +75
Weight (depends on versions)	kg	8.2-11

The complete motor operating device NM 24...220

—
23 NM drive

Description
The motor operating device can be mounted directly on the switch disconnector or on the wall of the disconnector cubicle.
The device operates either K or A mechanism.
After each motor operation the device is mechanically disconnected and makes it possible to manually operate the disconnector

Function
The electric motor drives a gearbox that transfers power to the operating gearwheel.
The gearwheel tensions, through the disconnector shaft, the spring in the mechanism on the disconnector with a rotating angle of 150°. The gearwheel starts from position S1 and moves to the end position S2 or end position S3 for charging the spring respectively way and then goes back to position S1.

Control Unit
The control unit consists of required connection relays and terminals. The unit is fitted with automatic fuses. The unit can be placed inside the switch disconnector cubicle or in a separate operating box.
The unit is connected to the motor operating device with a plug-in connection.

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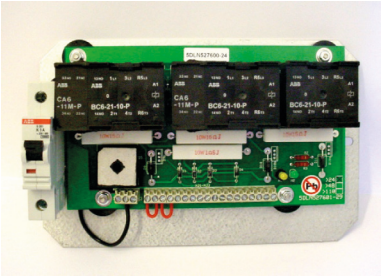
23



Technical data

Characteristic		NM24	NM48	NM110	NM220
Power consumption	W	70	70	70	70
Operating voltage. AC/DC	V	20-26	41-53	94-121	187-242
Nominal current during operation	A	3	3	0.8	0.4
Maximum current during operation	A	6	6	4	1.2
Operating time	sec	~4	~4	~8	~4
Signaling time	sec	0.5...2.0	0.5...2.0	0.5...2.0	0.5...2.0

Operating temperature -40...+50 °C
Weight 6 kg

Space bracket selection table

Index	Description	A-mech							
		NAL/F 12		NAL/F 17		NAL/F 24		NAL/F 36	
		L	R	L	R	L	R	L	R
1YMX000044M0002	Space bracket 55 mm	X		X					
1YMX000044M0004	Space bracket 105 mm					X			
1YMX000044M0005	Space bracket 39 mm		X		X		X		X
1YMX000044M0001+ 1YMX000044M0004	Space bracket 39+105 mm							X	

Index	Description	K-mech					
		NAL 12		NAL 17		NAL 24	
		L	R	L	R	L	R
1YMX000044M0001	Space bracket 39 mm		X		X		X
1YMX000044M0002	Space bracket 55 mm	X		X			
1YMX000044M0004	Space bracket 105 mm					X	

Note: L/R means motor installation side

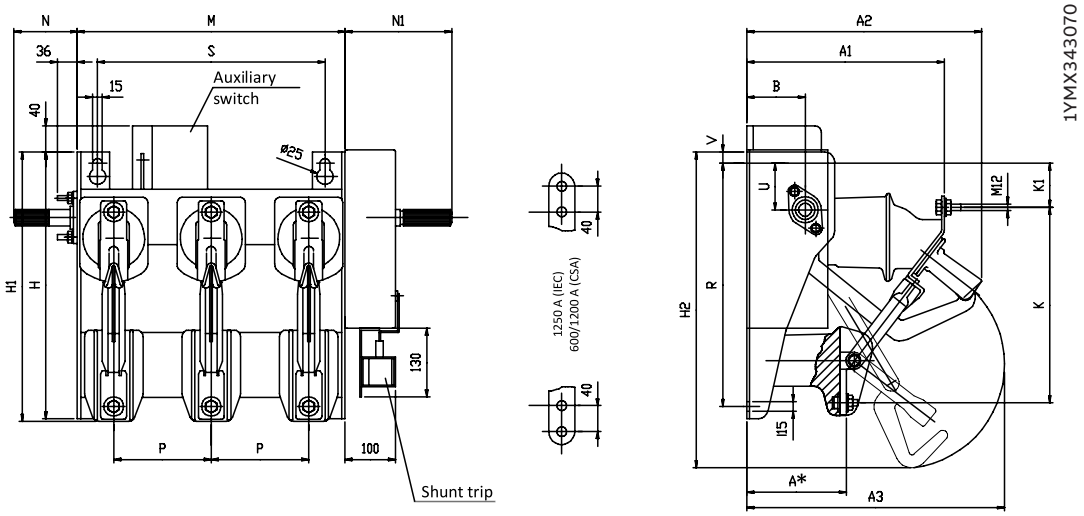
4. Dimensional drawings

— 24 NAL 12, 17 and 24 with mechansim

— 25 NAL-H 12, 17 and 24 with mechansim

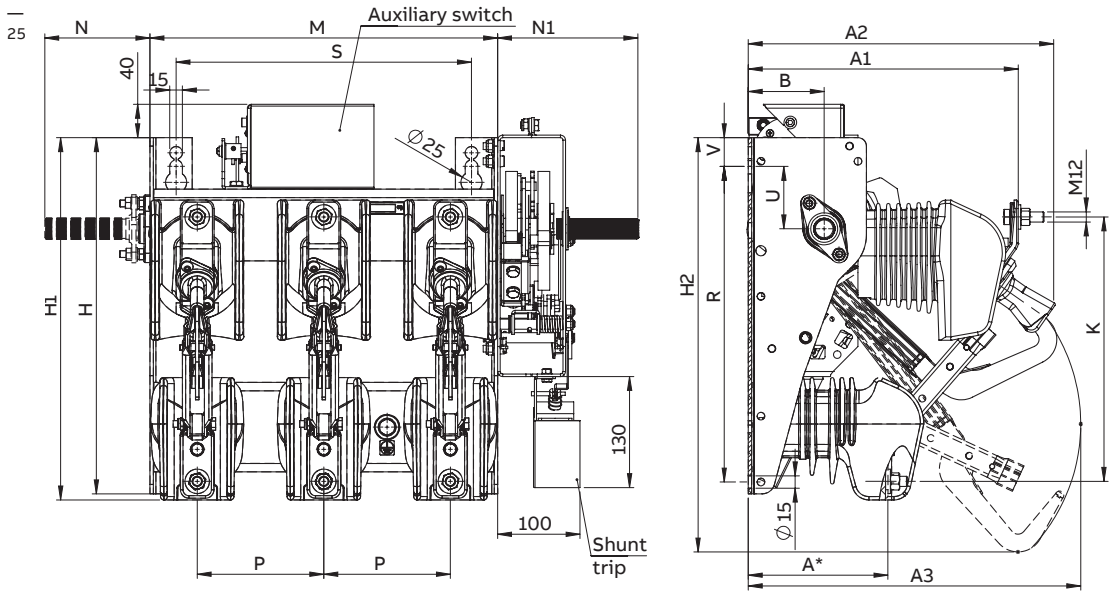
Switch-disconnector type NAL (12, 17 and 24) IEC and CSA with mechanism

— 24



Switch-disconnector type NAL-H (12, 17 and 24) IEC with mechanism

— 25



— **According to IEC**

Type	A	A1	A2	A3	B	H	H1	H2	K	K1	M	N	N1	P	R	S	U	V
NAL 12 A/K	166	320	362	394	90	422	428	510	310	63	412	122	164	150	375	350	75	33
NAL 12 A/K	166	320	362	394	90	422	428	510	310	63	452	122	164	170	375	390	75	33
NAL 12 A/K	166	320	362	394	90	422	428	510	310	63	532	122	164	210	375	470	75	33
NAL 17 A/K	227	376	420	514	98	534	577[1)]	623[1)]	438	83	452	122	166	170	500	395	90	18
NAL 17 A/K	227	376	420	514	98	534	577[1)]	623[1)]	438	83	532	122	166	210	500	475	90	18
NAL 24 A/K	227	376	420	514	98	534	577[1)]	623[1)]	438	83	582	186	203	235	500	525	90	18
NAL 24 A/K	227	376	420	514	98	534	577[1)]	623[1)]	438	83	662	186	203	275	500	605	90	18

*1250 A: dimension A +2 mm
[1)]- max. dimmension

According to CSA

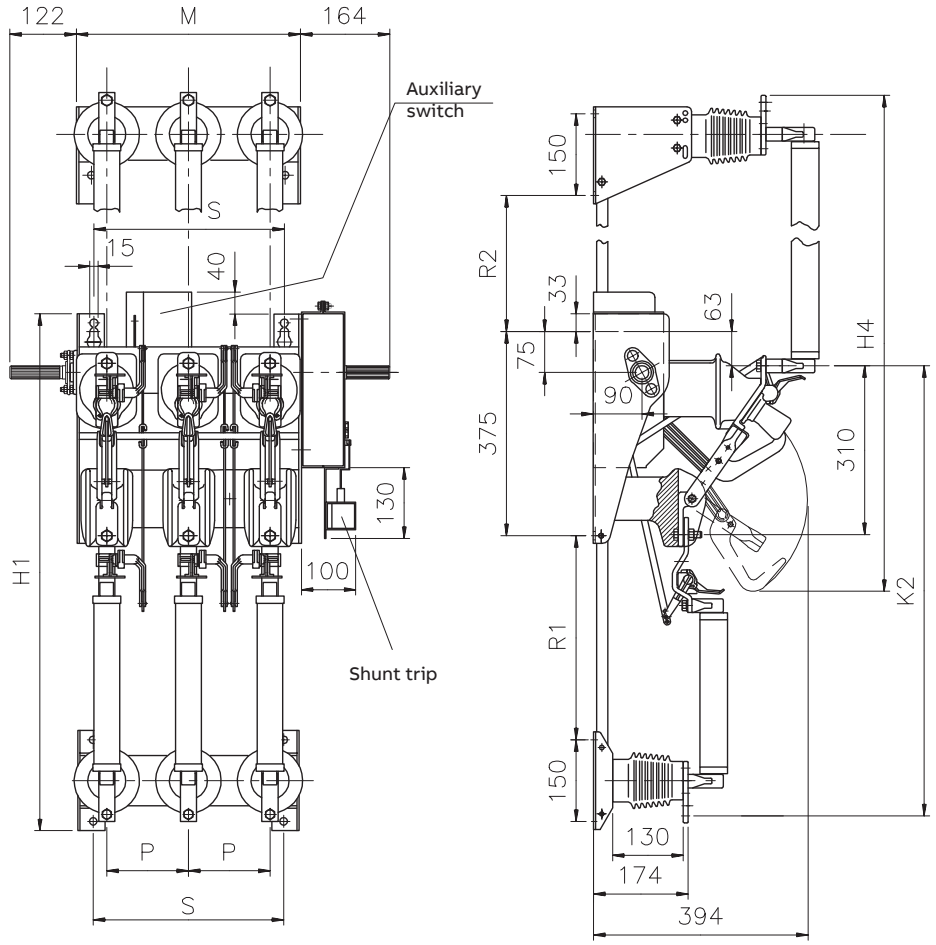
Type	A*	A1	A2	A3	B	H	H1	H2	K	K1	M	N	N1	P	R	S	U	V
NAL 12 A/K	166	320	362	394	90	422	428	510	310	63	412	122	164	150	375	350	75	33
NAL 12 A/K	166	320	362	394	90	422	428	510	310	63	452	122	164	170	375	390	75	33
NAL 12 A/K	166	320	362	394	90	422	428	510	310	63	532	122	164	210	375	470	75	33
NAL 17 A/K	227	376	420	514	98	534	577	623	445	87	452	122	166	170	500	395	90	18
NAL 17 A/K	227	376	420	514	98	534	577	623	445	87	532	122	166	210	500	475	90	18
NAL 24 A/K	227	376	420	514	98	534	577	623	445	87	582	187	203	235	500	525	90	18
NAL 24 A/K	227	376	420	514	98	534	577	623	445	87	662	187	203	275	500	605	90	18

*1250 A: dimension A +2 mm
1)- max. dimmension

26 NALF/NALFO 12 with mechanism

NALFO 12 (opening side fuse-base) and NALF 12 (pivot side fuse-base) with mechanism

26



1YMX343381

Fuses		H1*	H4**	K2	K4	R1	R2
kV	length						
3.6/7.2	192	848	710	722	598	275	50
	292	948	810	822	698	375	150
12	292						
	442	1098	960	972	848	525	300

* refers to NALF 12
** refers to NALFO 12

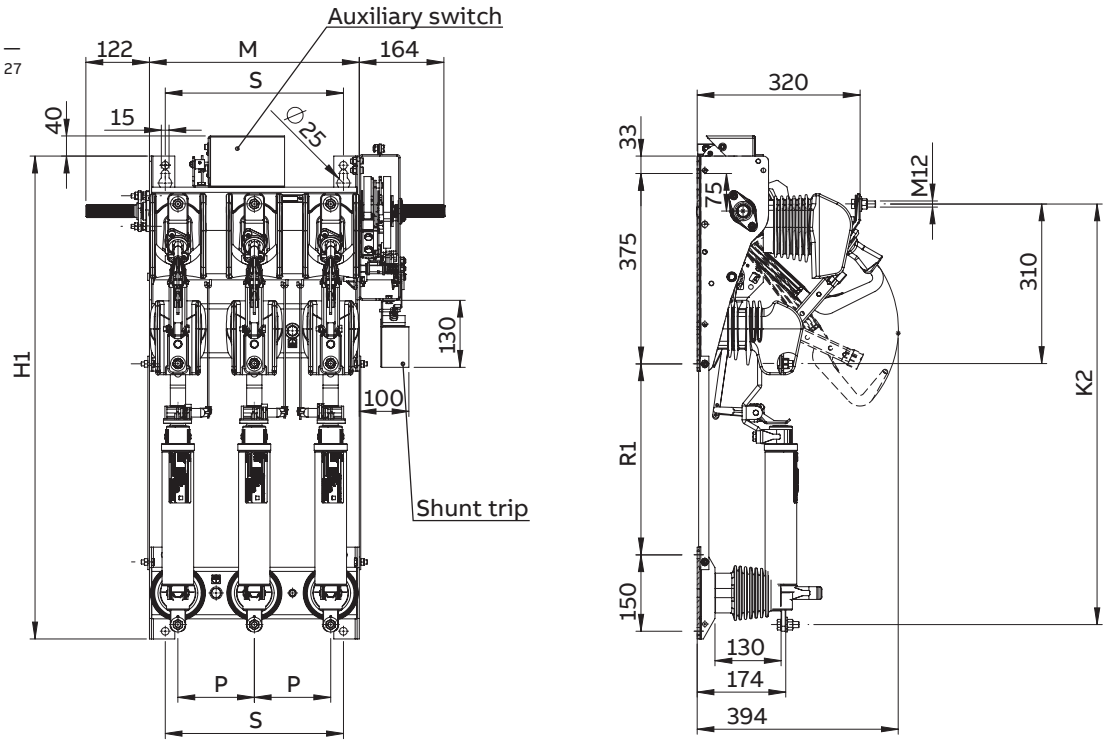
Type	M	P	S
NALF/NALFO/NALF-H /NALFO-H 12	412	150	350
NALF/NALFO/NALF-H /NALFO-H 12	452	170	390
NALF/NALFO/NALF-H /NALFO-H 12	532	210	470

—
27 NALF-H 12 with mechanism

—
28 NALF 17 with mechanism

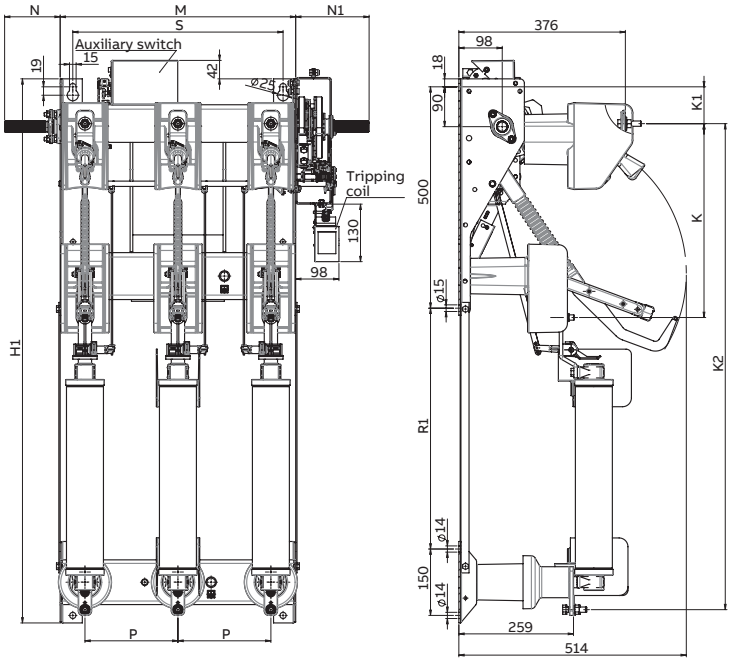
Switch-fuse combination type NALF-H 12 with mechanism

—
27



Switch-fuse combination type NALF 17 (IEC) and NAL 17 (CSA) with mechanism

—
28



—
According to IEC

Type	H1	K	K1	K2	M	N	N1	P	R1	S
NALF 17 A fuse e=292	1083	438	83	948	452	122	166	170	394	395
NALF 17 A fuse e=292	1083	438	83	948	532	122	166	210	394	475
NALF 17 A fuse e=367	1158	438	83	1023	452	122	166	170	469	395
NALF 17 A fuse e=367	1158	438	83	1023	532	122	166	210	469	475
NALF 17 A fuse e=442	1233	438	83	1098	452	122	166	170	544	395
NALF 17 A fuse e=442	1233	438	83	1098	532	122	166	210	544	475

—
According to CSA

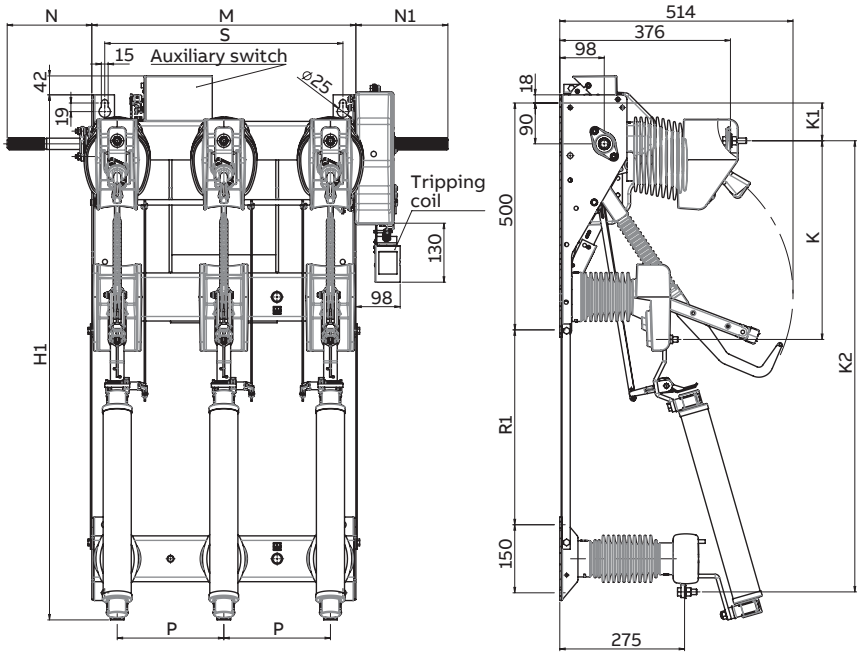
Type	H1	K	K1	K2	M	N	N1	P	R1	S
NALF 17 A fuse e=292	1157	445	87	925	452	122	166	170	375	395
NALF 17 A fuse e=442	1256	445	87	1075	452	122	166	170	525	395
NALF 17 A fuse e=292	1157	445	87	925	532	122	166	210	375	475
NALF 17 A fuse e=442	1256	445	87	1075	532	122	166	210	525	475

—
29a NALF-H 24
with mechanism

—
29b NALFO-H 24
with mechanism

Switch-fuse combination type NALF 24 and NALF-H 24 with mechanism. Dimensions are common for NALF and NALF-H, based on NALF-H drawing.

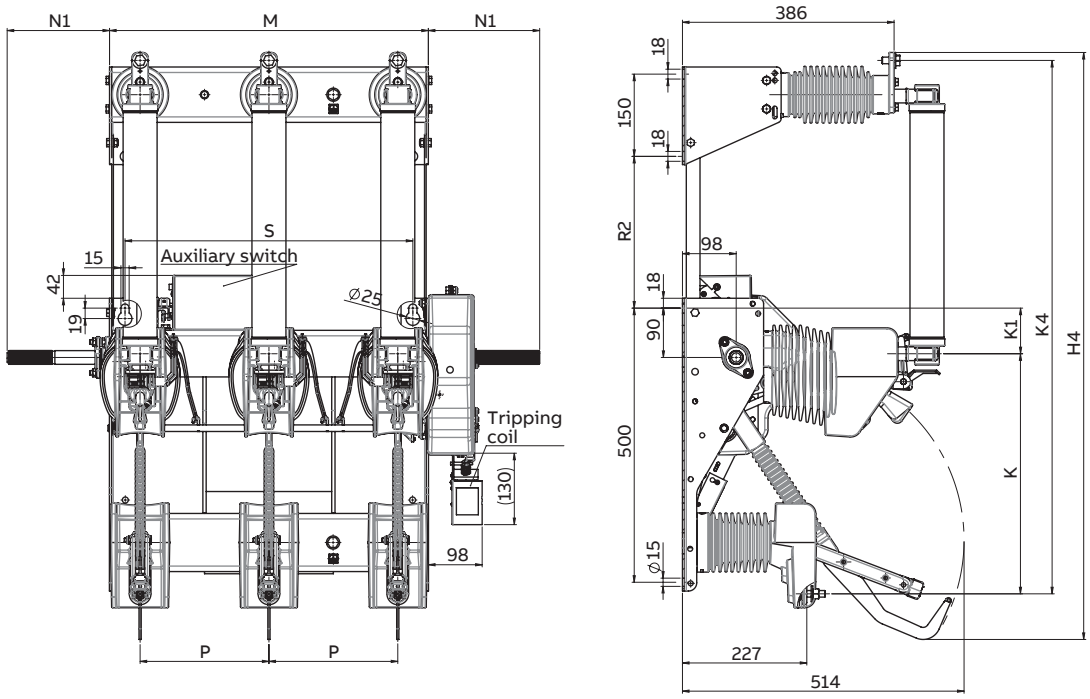
—
29a



Type	H1	K	K1	K2	M	N	N1	P	R1	S
NALF-H 24 fuse e=442	1157	438	83	994	582	186	203	235	430	525
NALF-H 24 fuse e=537	1252	438	83	1087	582	186	203	235	523	525
NALF-H 24 fuse e=442	1157	438	83	994	662	186	203	275	430	605
NALF-H 24 fuse e=537	1252	438	83	1087	662	186	203	275	523	605
NALF 24 fuse e=442	1157	438	83	994	582	186	203	235	430	525
NALF 24 fuse e=537	1252	438	83	1087	582	186	203	235	523	525
NALF 24 fuse e=442	1157	438	83	994	662	186	203	275	430	605
NALF 24 fuse e=537	1252	438	83	1087	662	186	203	275	523	605

Switch-fuse combination type NALFO 24 and NALFO-H 24 with mechanism. Dimensions are common for NALFO and NALFO-H, based on NALFO-H drawing.

—
29b



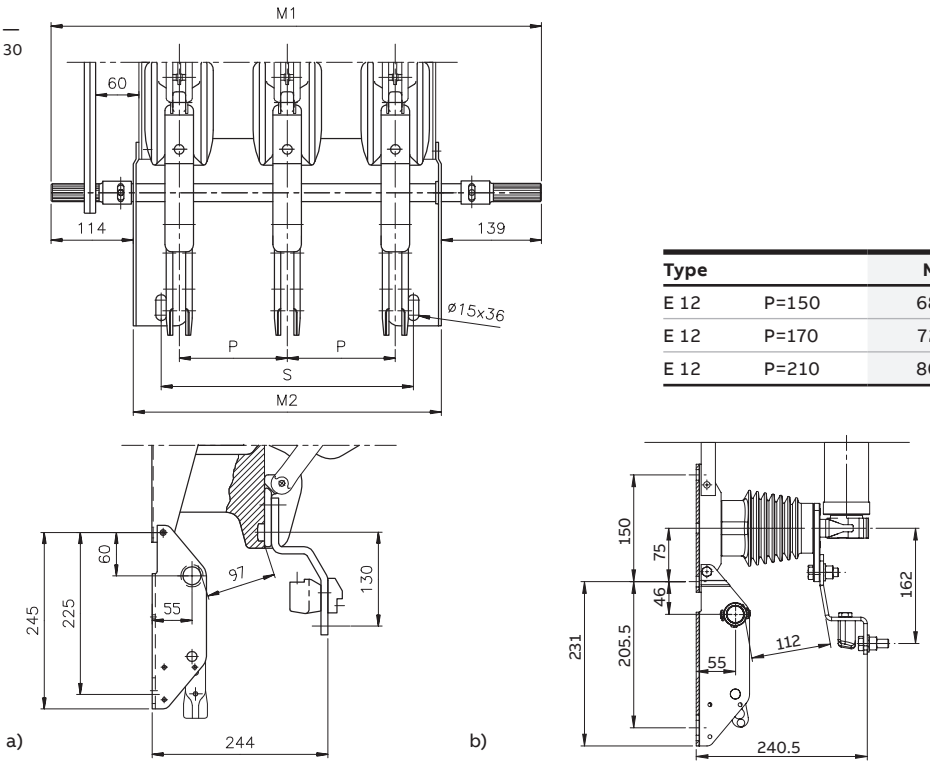
Type	H4	K	K1	K4	M	N	N1	P	R2	S
NALFO-H 24 fuse e=442	1075	438	83	974	582	186	203	235	278	525
NALFO-H 24 fuse e=537	1170	438	83	1069	582	186	203	235	370	525
NALFO-H 24 fuse e=442	1075	438	83	974	662	186	203	275	278	605
NALFO-H 24 fuse e=537	1170	438	83	1069	662	186	203	275	370	605
NALFO 24 fuse e=442	1075	438	83	974	582	186	203	235	278	525
NALFO 24 fuse e=537	1170	438	83	1069	582	186	203	235	370	525
NALFO 24 fuse e=442	1075	438	83	974	662	186	203	275	278	605
NALFO 24 fuse e=537	1170	438	83	1069	662	186	203	275	370	605

Earthing switch with making capacity type E 12

—
30
a) Earthing switch with making capacity type E 12 mounted on NAL 12
b) Earthing switch with making capacity type E 12 mounted on fuse-base F 12

—
31
a) Earthing switch with making type E 17 mounted on NAL 17
b) Earthing switch with making type E 17 mounted on fuse-base F 17

—
30

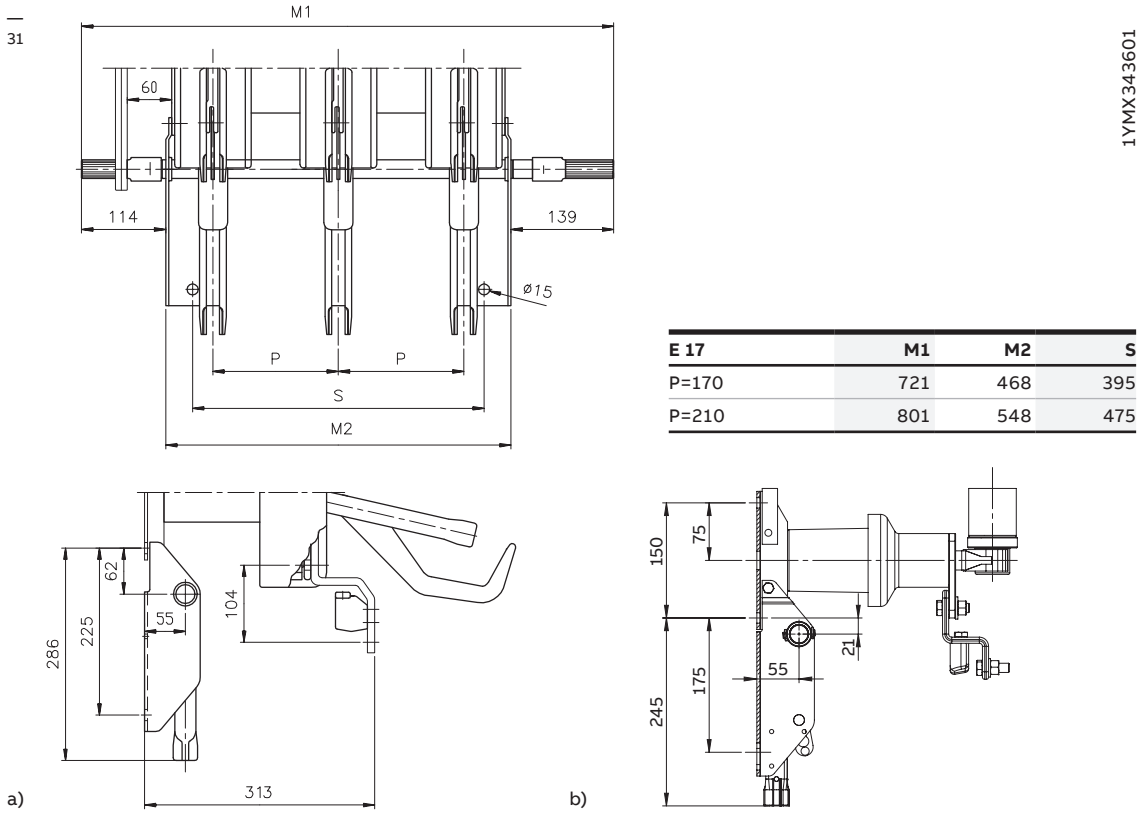


1YMX343600

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 with making capacity type E 17

—
31



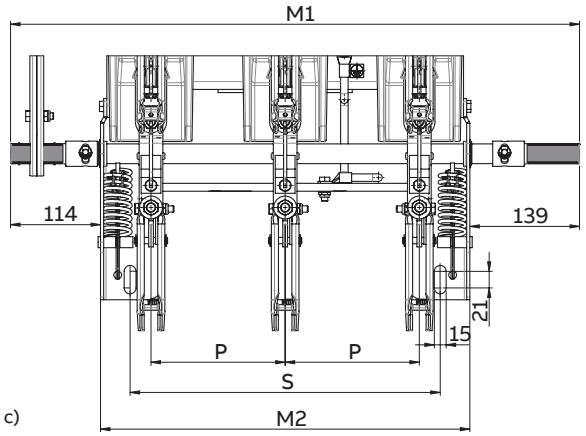
1YMX343601

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

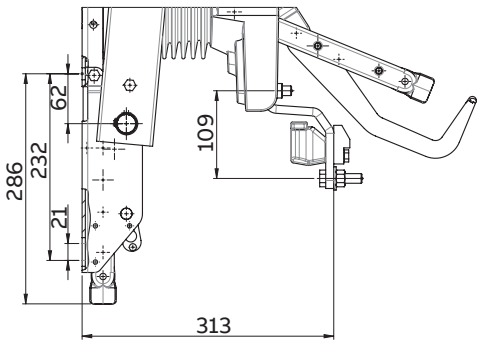
—
31
c) d) Earthing switch with making capacity type E 17 mounted on NAL-H 17
e) Earthing switch with making capacity type EF 17 mounted on NAL-H 17

—
32
a) Earthing switch with making capacity type E 24 mounted on NAL 24
b) Earthing switch with making capacity type E 24 mounted on fuse-base F 24

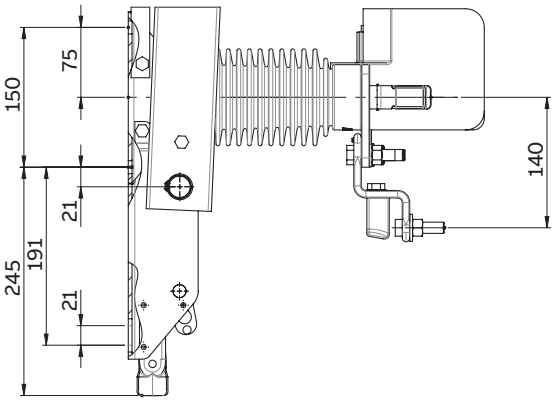
Earthing switch with making capacity type E 17 mounted on NAL-H 17



c)



d)

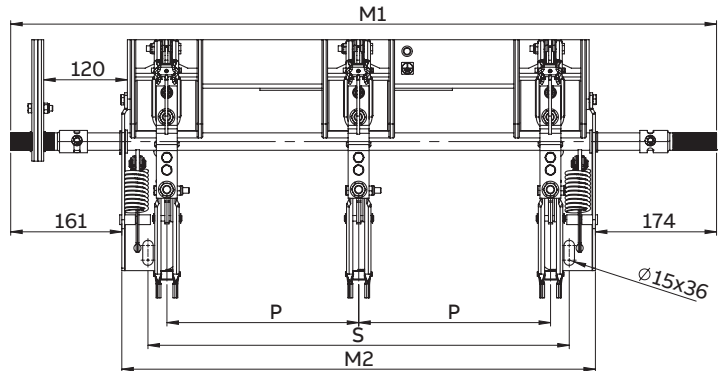


e)

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

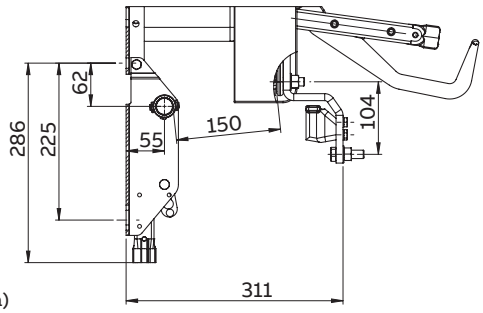
Earthing switch with making capacity type E24

—
32

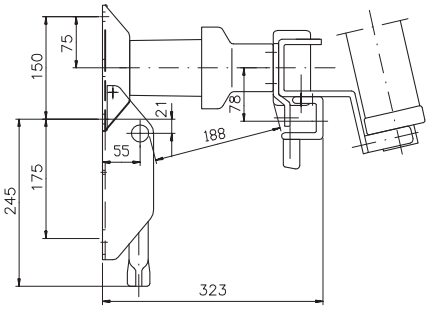


1YMX343602

Type	M1	M2	P	S
E 24	933	598	235	523
E 24	1013	678	275	605



a)

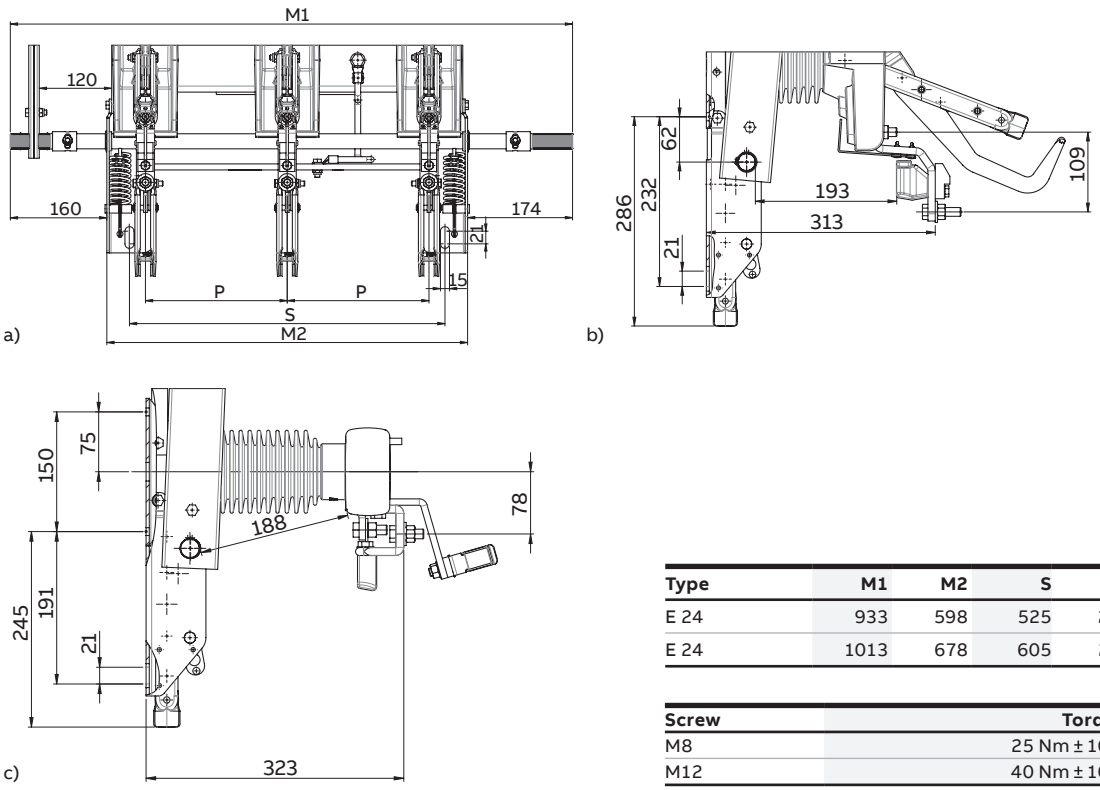


b)

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

—
33
NAL-H 24
with earthing switch
a) b) Earthing switch with making capacity type E 24 mounted on NAL-H 24
c) Earthing switch with making capacity type EF 24 mounted on NAL-H 24

—
33



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

Screw	Torque
M8	25 Nm ± 10%
M12	40 Nm ± 10%

—
34 Earthing switch EB-H 24 mounted on the fuse-base

Earthing switch with making capacity type EB-H 24 mounted on the fuse-base

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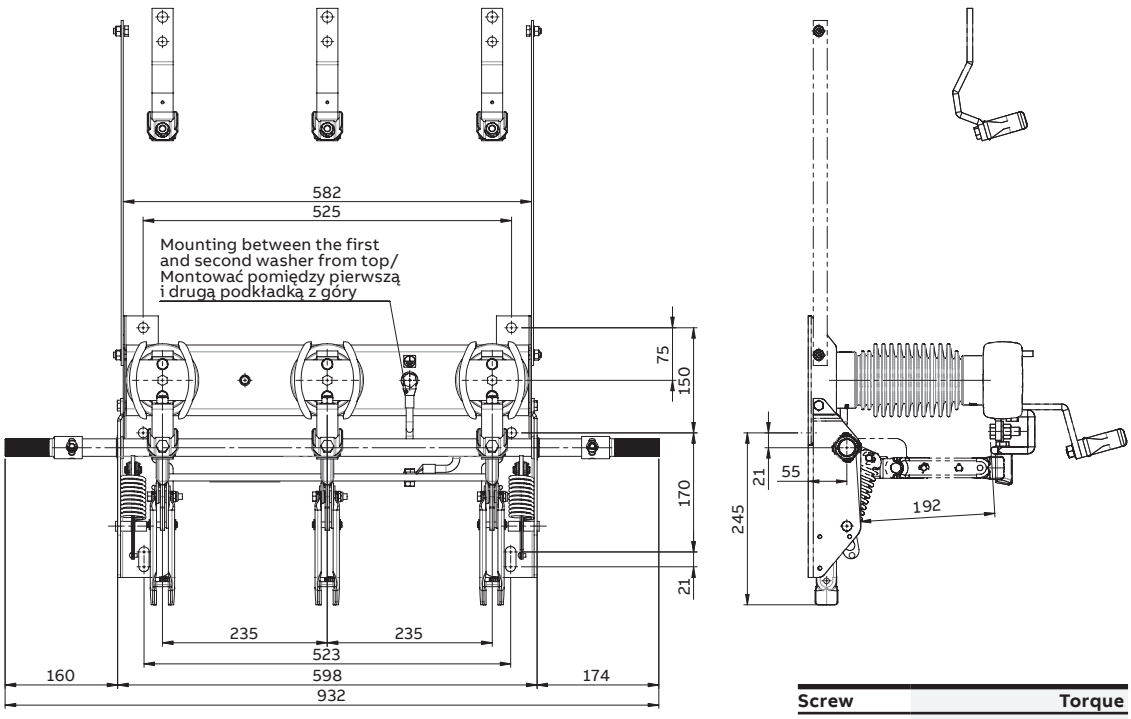
34



Screw	Torque
M8	25 Nm ± 10%
M10	32 Nm ± 10%
M12	40 Nm ± 10%

—
35 Earthing switch
E 12, E 17, E 24
– dimensional drawing

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36 Earthing switch
EB 12, EB 17, EB 24
– dimensional drawing

Earthing switch with making capacity type E 12, E 17 and E 24

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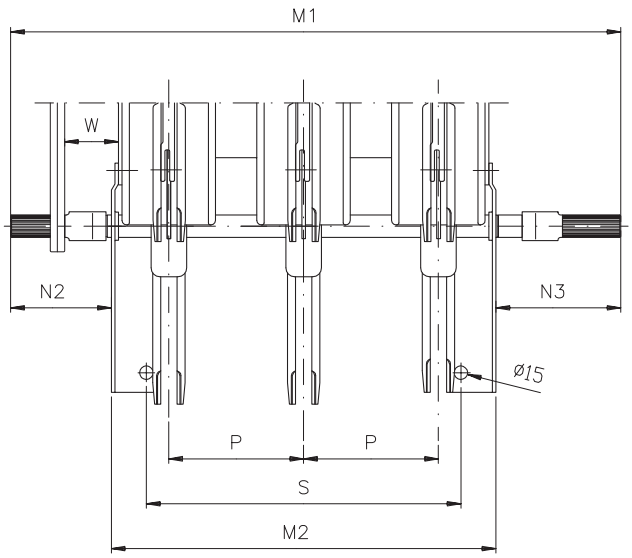
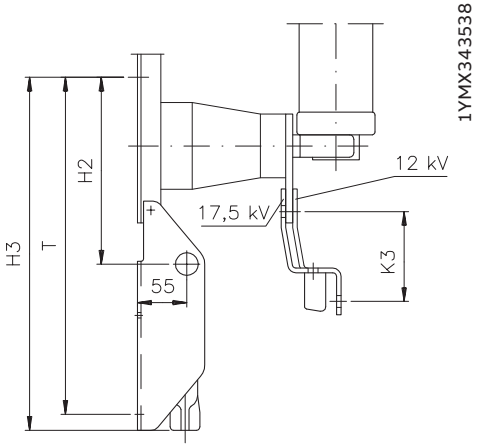
35



Earthing switch mounted on the switch-disconnector



Earthing switch mounted on the fuse-base

Type	H2	H3	I	K3	M1	M2	N2	N3	P	S	W
E 12	208	393	375	100	681	428	112	139	150	350	60
E 12	208	393	375	100	721	468	112	139	170	390	60
E 12	208	393	375	100	801	548	112	139	210	470	60
E 17	208	432	375	100	721	468	112	139	170	395	60
E 17	208	432	375	100	801	548	112	139	210	475	60
E 24	351	575	500	100	933	598	161	174	235	525	120
E 24	351	575	500	100	1013	678	161	174	275	605	120

Separately mounted earthing switch with making capacity type EB

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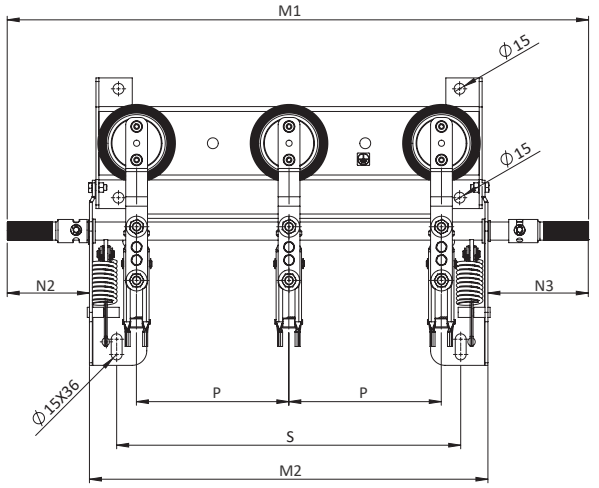
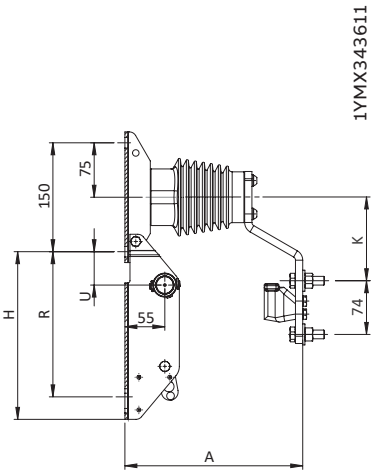
36



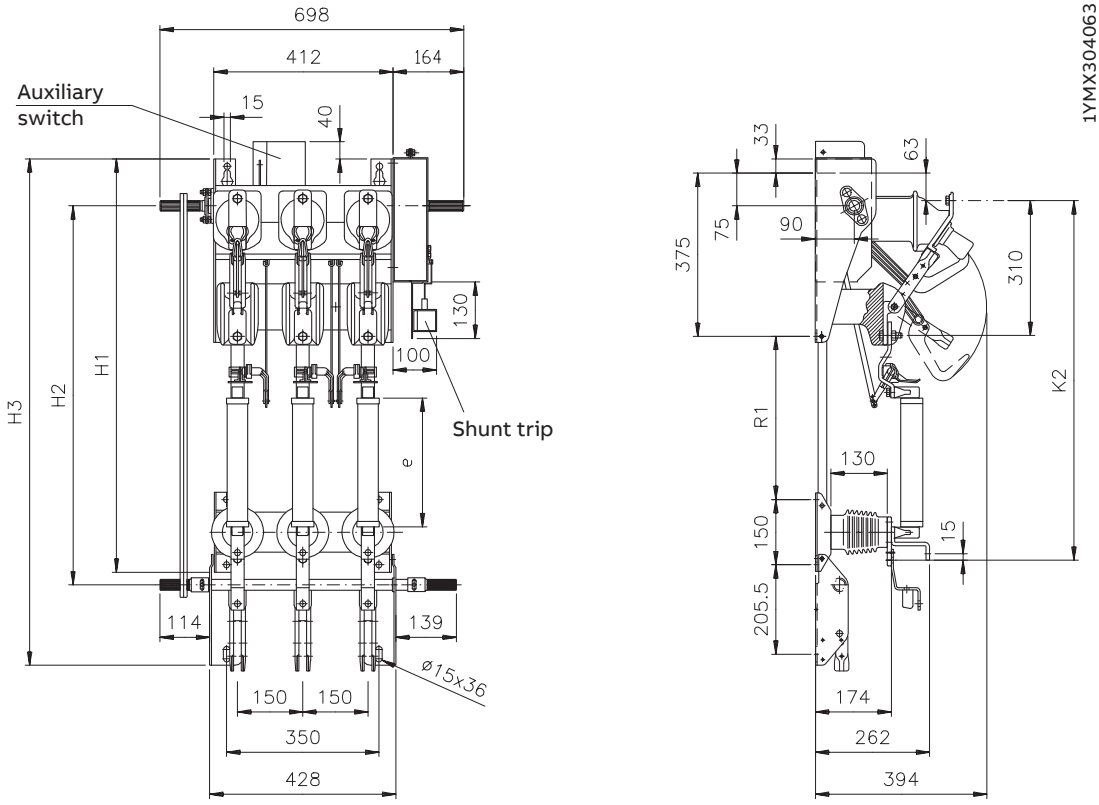


Type	A	H	K	M1	M2	N2	N3	P	R	S	U
EB 12	245	231	115	681	429	113	139	150	195	354	46
EB 12	245	231	115	721	468	114	139	170	195	399	46
EB 12	245	231	115	801	549	113	139	210	195	474	46
EB 17	310	206	90	721	468	114	139	170	170	393	21
EB 17	310	206	90	801	548	114	139	210	170	473	21
EB 24	310	206	90	932	598	160	139	235	170	523	21
EB 24	310	206	90	1012	678	160	139	275	170	603	21

Switch-fuse combination with earthing switch NALF 12 150 RE

37 NALF 12 150 RE dimensional drawing

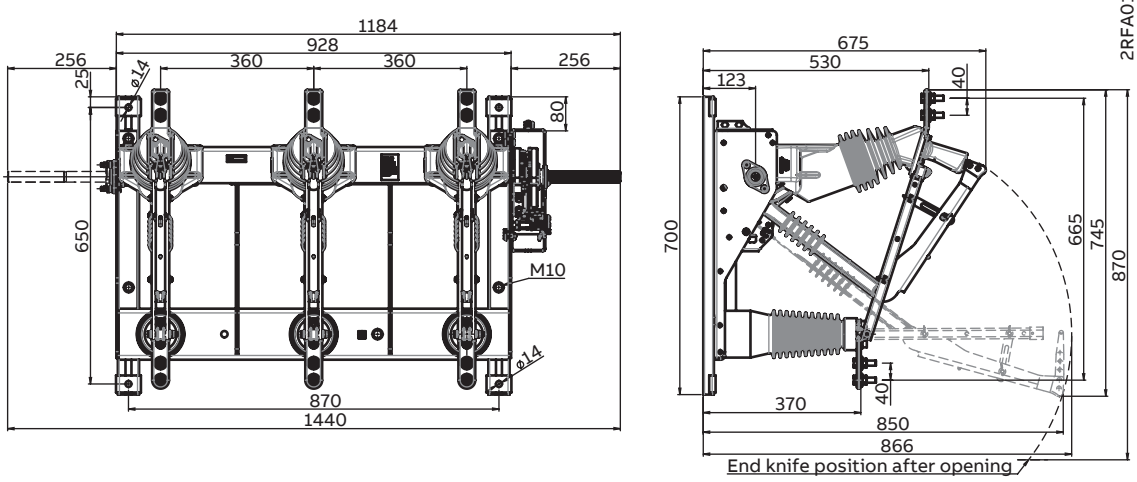
37



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

NAL 36

38 NAL 36



Switch-fuse combination with earthing switch NALF 36

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39 Switch-fuse combination NALF 36 with fuse-base on pivot side

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40 Switch-fuse combination NALFO 36 with fuse-base on opiening side

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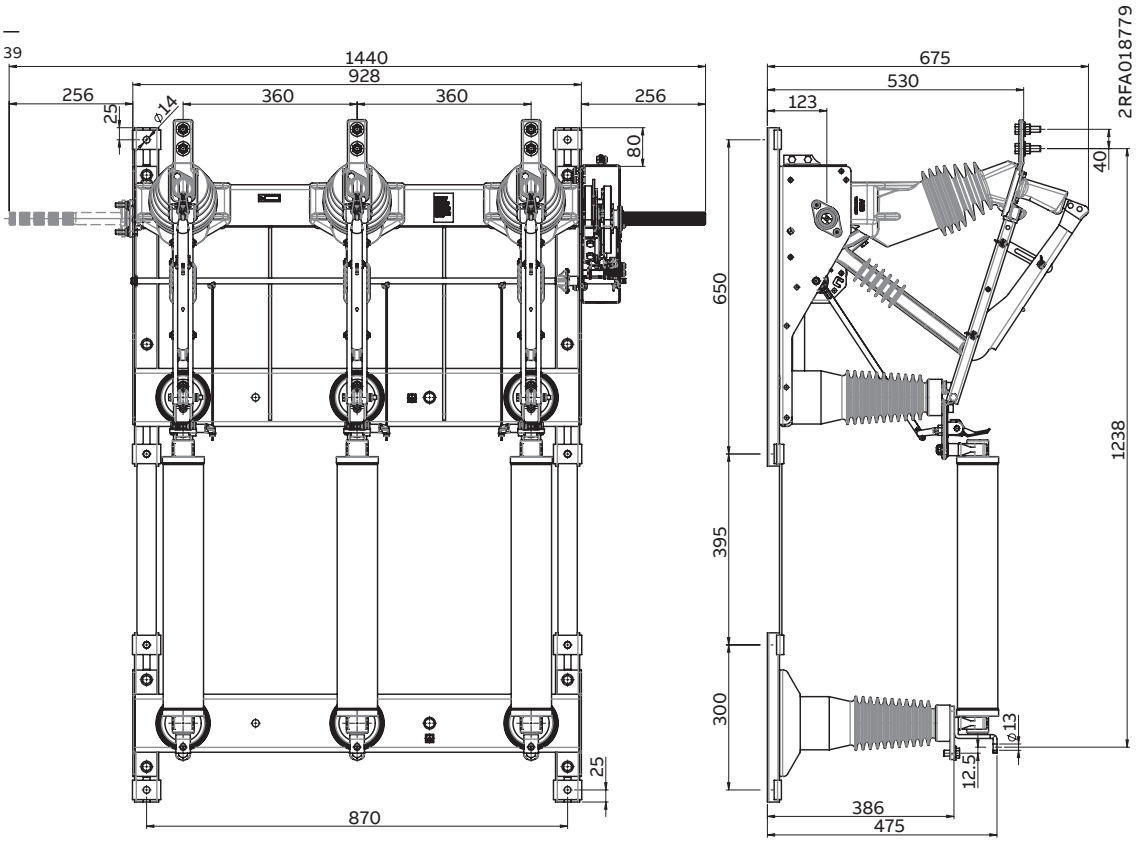
39



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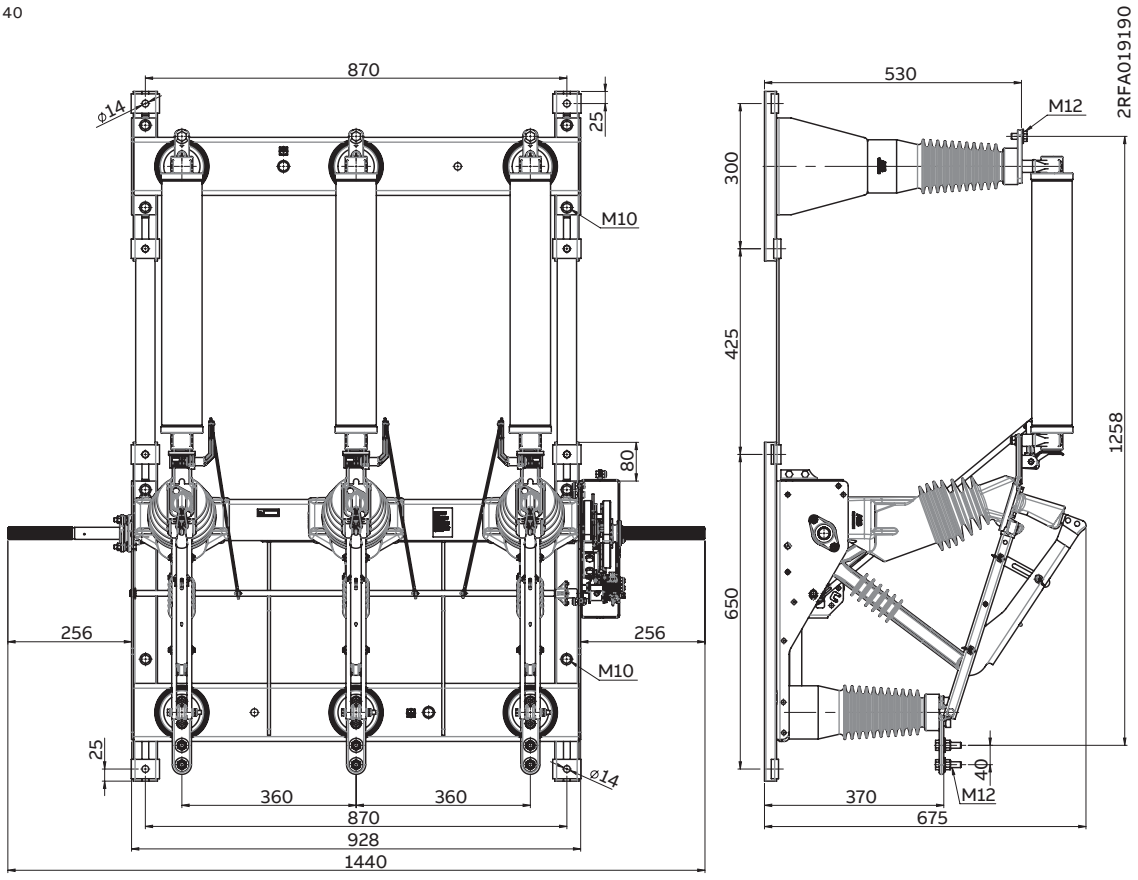

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41 Earthing switch EB 36

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42 NAL 36 with earthing switch EB 36

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43 NAL 36 with EB 36 earthing switch on opening side

EB 36

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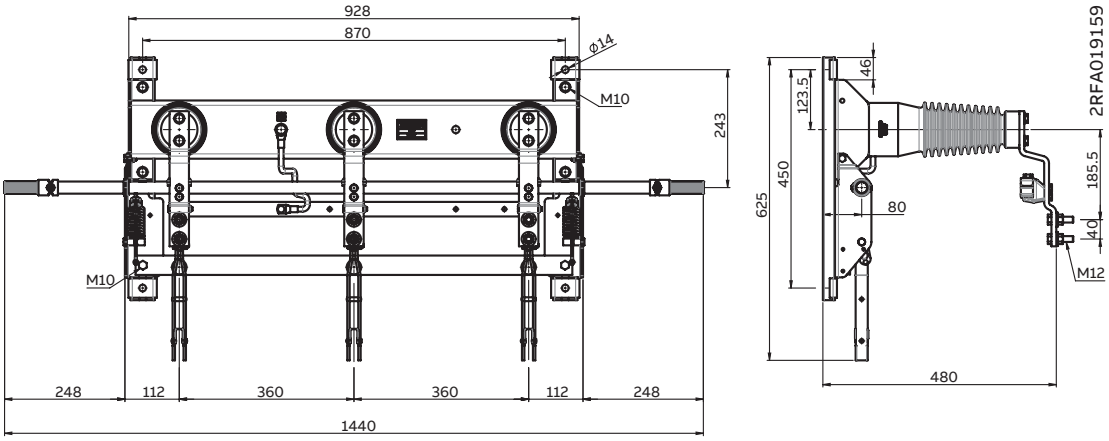
41



NAL 36 + EB 36

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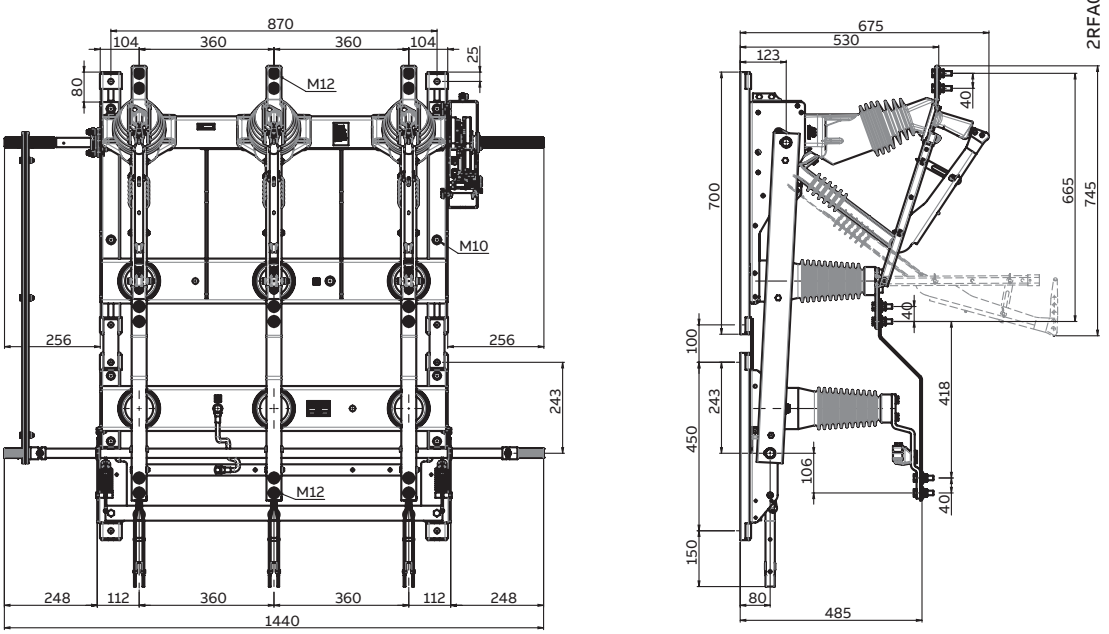
42



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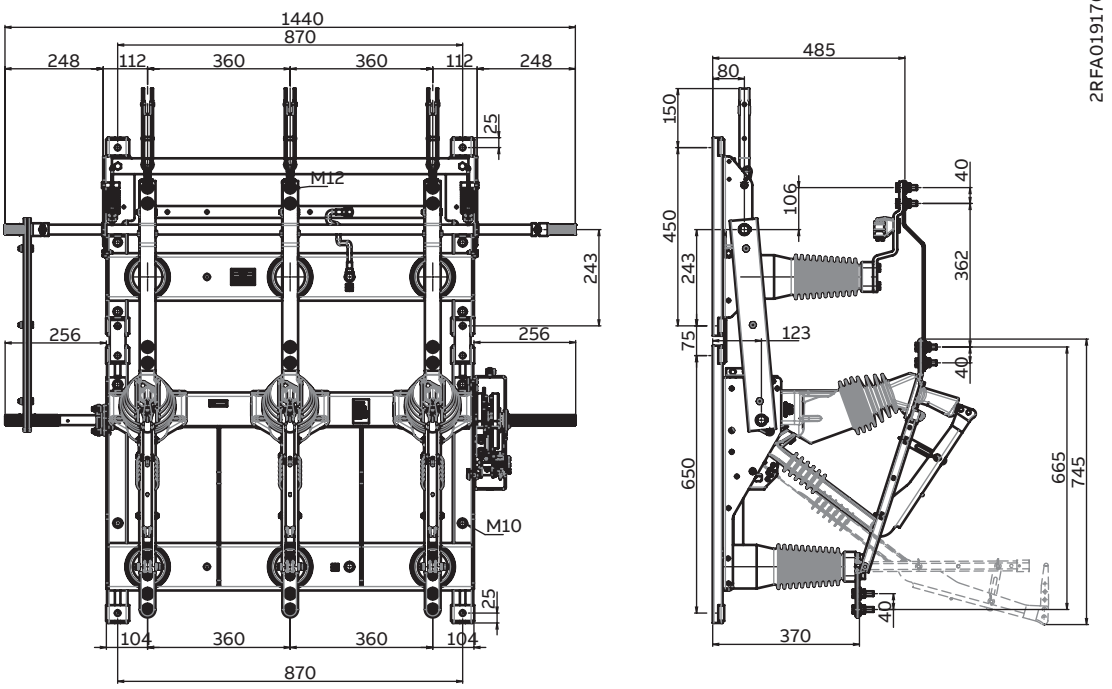

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44 NALF 36 with EB 36 earthing switch on pivot side

—
45 NALF 36 with earthing switch EB 36 on opening side

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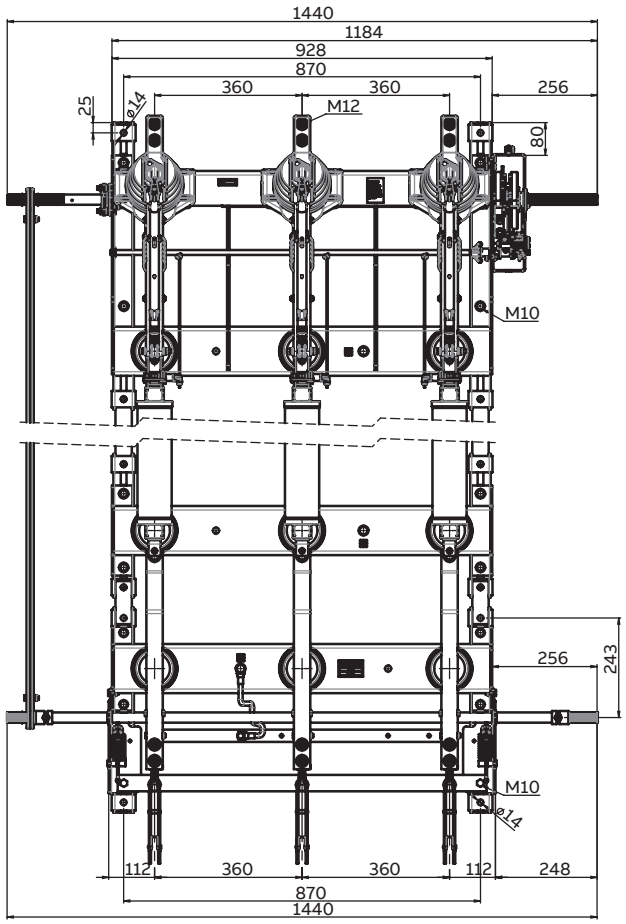
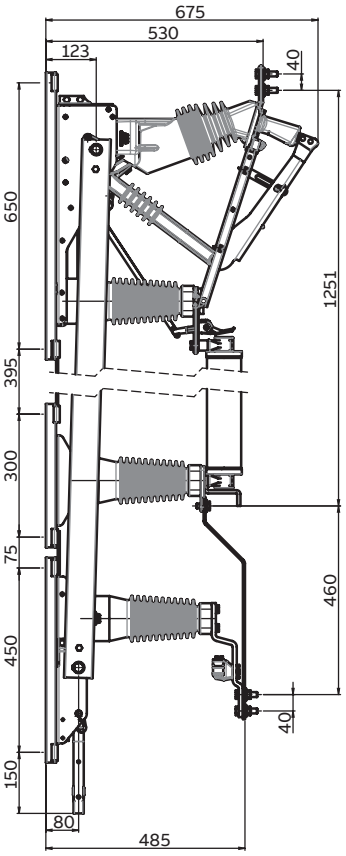
44





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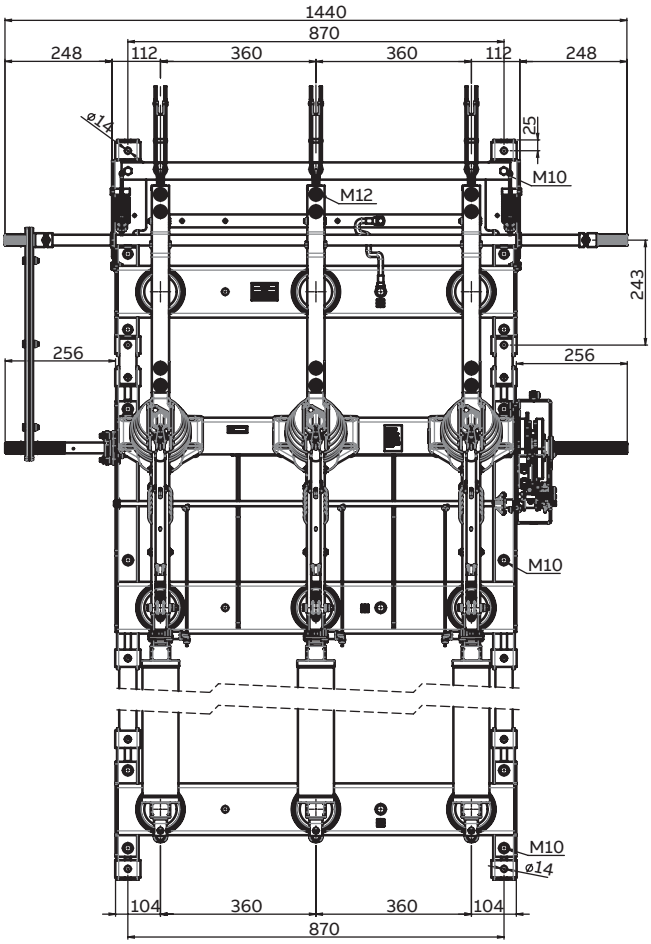
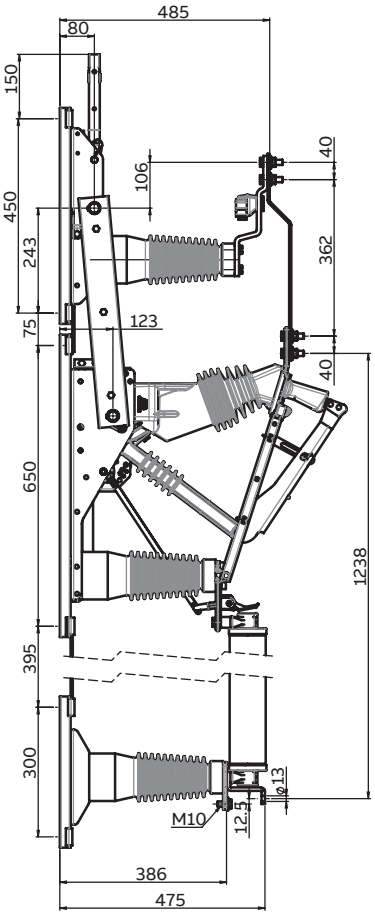
45





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46 NALFO 36 with EB earthing switch on opening side

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47 NALFO 36 with EB 36 earthing switch on pivot side

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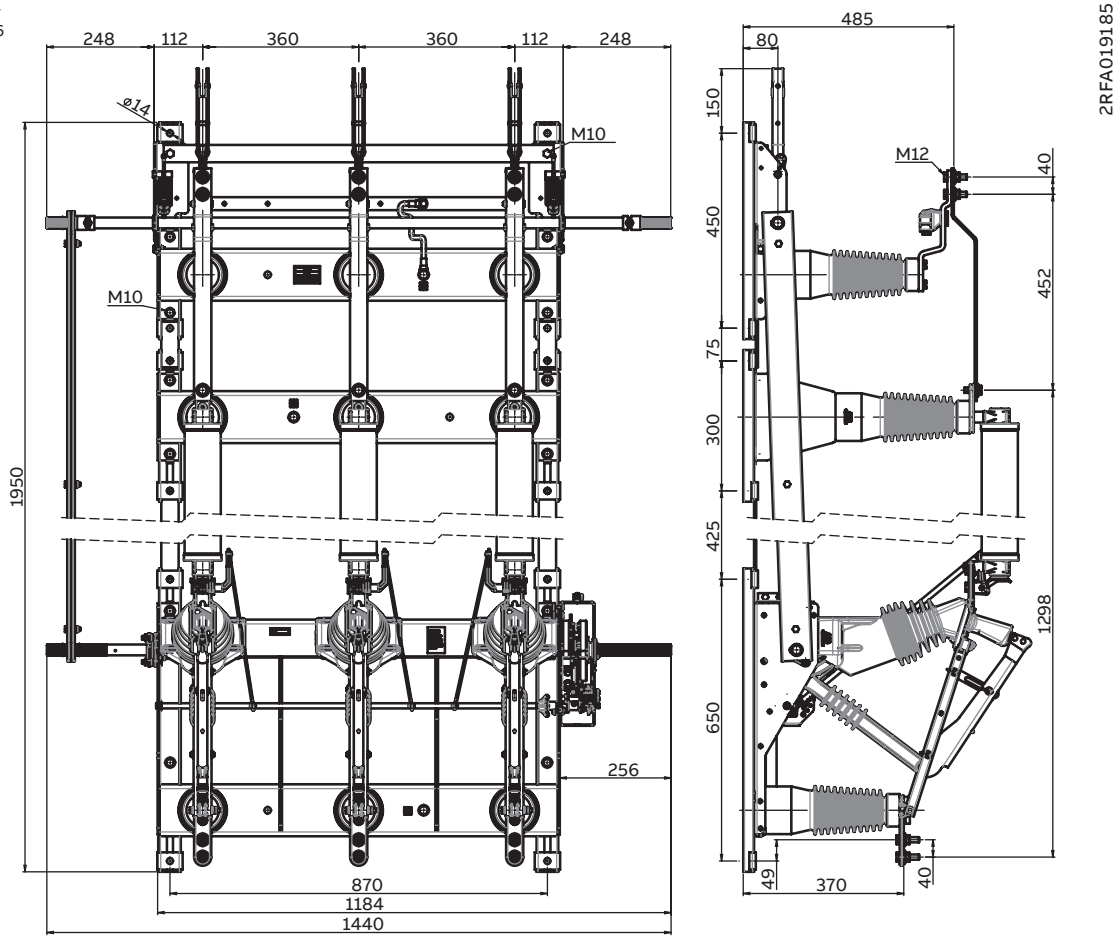
46



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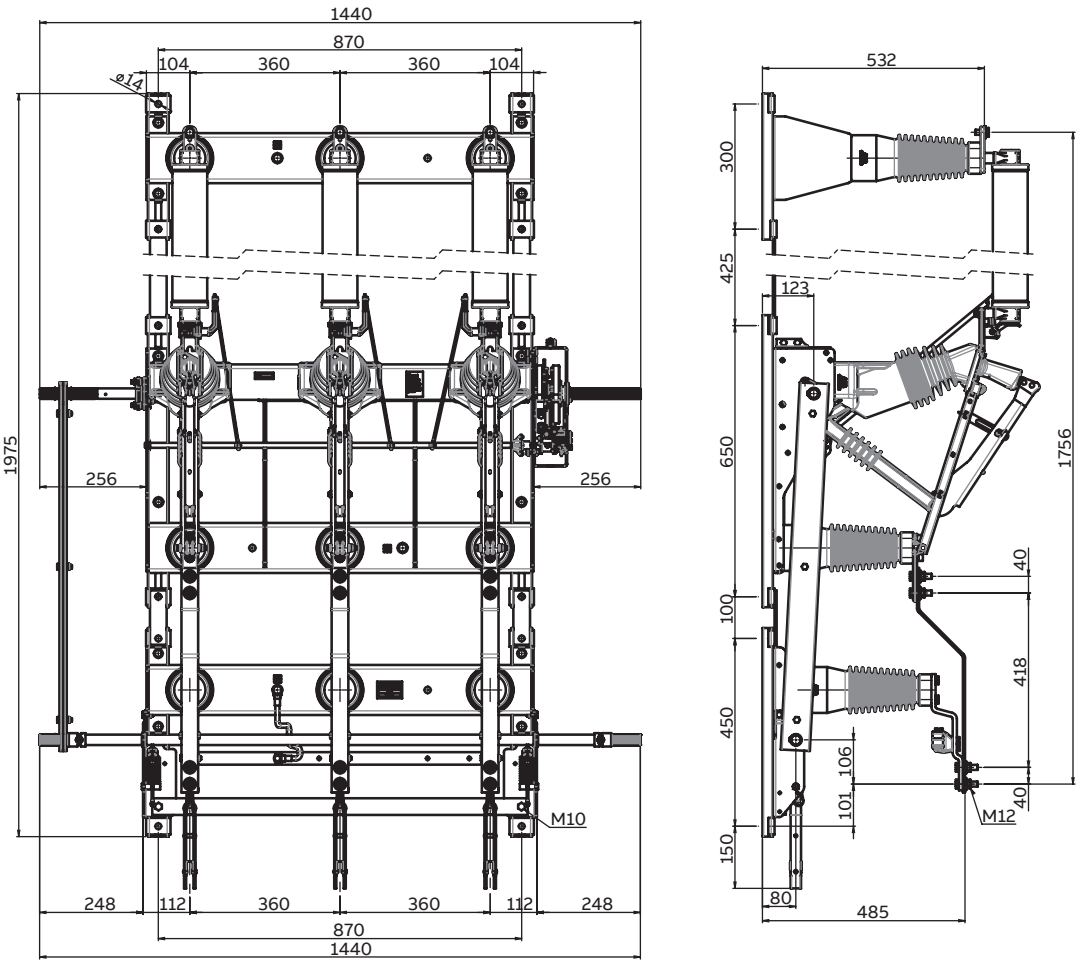

2RFA019188

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48 Dimmensions of NAL 36 primary terminal

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49 Standard hand operating mechanizm HE

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50 Arrangement of HE with switch disconnector 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

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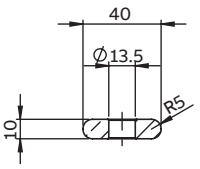
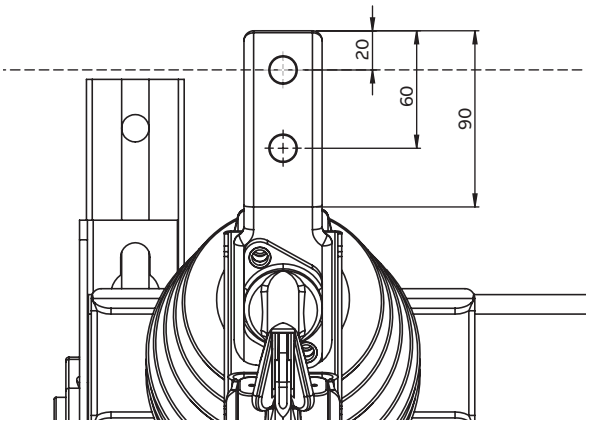
48





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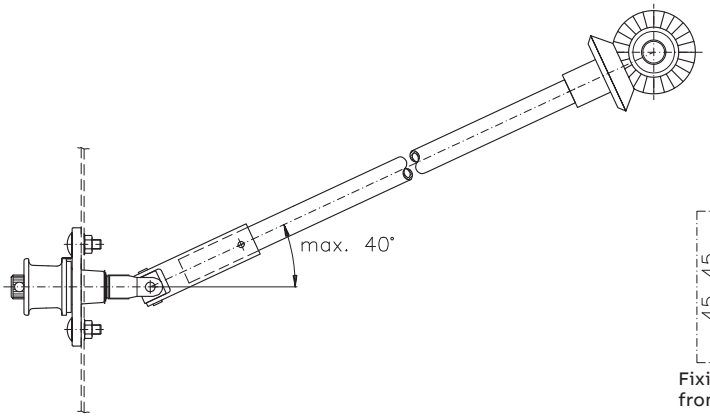
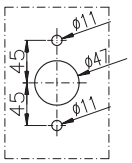
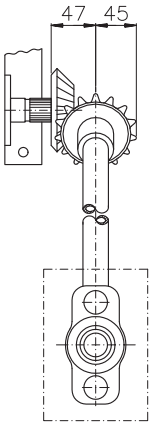
49





Fixing holes for front bearing



Operating angle 180°

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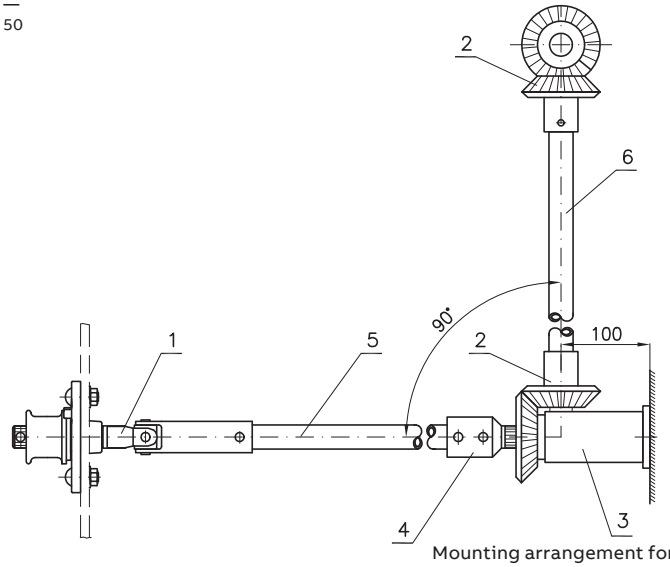
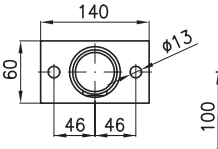
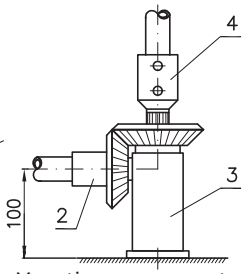
50



Mounting arrangement for A and K mech.





Mounting arrangement for K mech. only

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