Airswitch
Switching and isolating equipment for metal-enclosed switchboards

Power and productivity
for a better world™

Index

Description

General

The AirSwitch series of switching and isolating apparatus consists of medium voltage air insulated isolators, suitable for use in metal-enclosed switchgear (rotary version).
They are used in secondary distribution substations for supplying power lines, transformers and ring networks.
The switchgear rotary isolators are available in three versions:
– AM type switch-disconnectors
– AR and AS type rotary isolators
– AR500 type rotary insolator

Operating mechanisms

One of the following operating mechanisms can be used on the Airswitch isolators, according to their intended use.

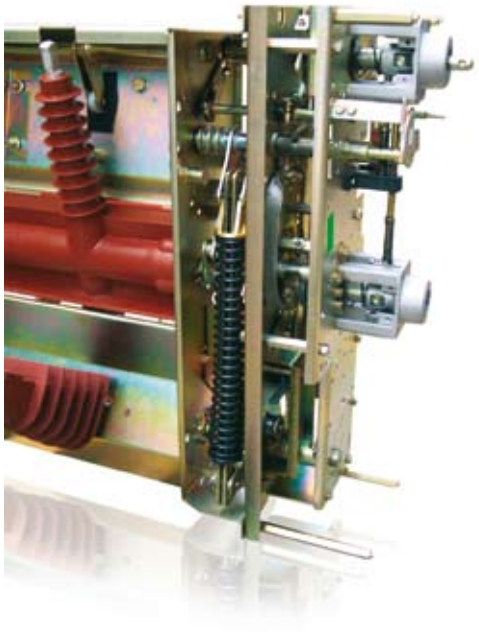
Operating mechanism with dependent operation

This allows manual closing and opening with the operator determining the operating speed.
Closing or opening is carried out by activating the operating lever.
Withdrawal of the lever from its coupling is only possible after completion of the closing or opening operation.
This type of operating mechanism is installed on AS-AR isolators and on AT earthing switches.

Operating mechanism with independent operation on exceeding dead centre

This allows rapid manual closing and opening with operation speed independent of the operator, obtained by means of a single spring. Closing or opening is carried out charging this spring until it passes the dead centre position.
This type of operating mechanism is normally installed in the AM/X switch-disconnectors.
On request, it is available in the motor operator version for AM switch-disconnectors.

1. AM switch-disconnector



2. Stored energy operating mechanism for AM switch-disconnector

Stored energy operating mechanism with independent operation

This allows rapid manual closing with operation independent of the operator, obtained by means of a spring charged past dead centre.

During the closing operation, a separate spring is automatically charged which stores the energy for opening.
Switch-disconnector opening can be carried out by means of:
– operating lever
– knob
– shunt opening release (applied on the operating mechanism itself)
– release system activated by the fuse striker (even in the case of a single blown fuse).
This type of operating mechanism is normally installed in AM/Y switch-disconnectors.

3. Medium voltage air insulated switchgear type UniAir

Description

Fuses
The isolators and switch-disconnectors can be combined with fuse-holder frames suitable for mounting fuses according to DIN Standards.

Fields of application
The rotary and hinged isolators and switch-disconnectors are used in secondary distribution substations as feeder switching and/or isolating apparatus, for transformer power supply (in combination with protection fuses or circuit-breakers), etc.

Compliance with Standards
The Airswitch and switch-disconnectors comply with Italian CEI 17-9/1 (file 1672) Standards, International IEC 60265-1 and CENELEC HD 355.1 S2 Standards.
The AM switch-disconnectors are derived from apparatus which has obtained Enel (Italian Electricity Board) approval.

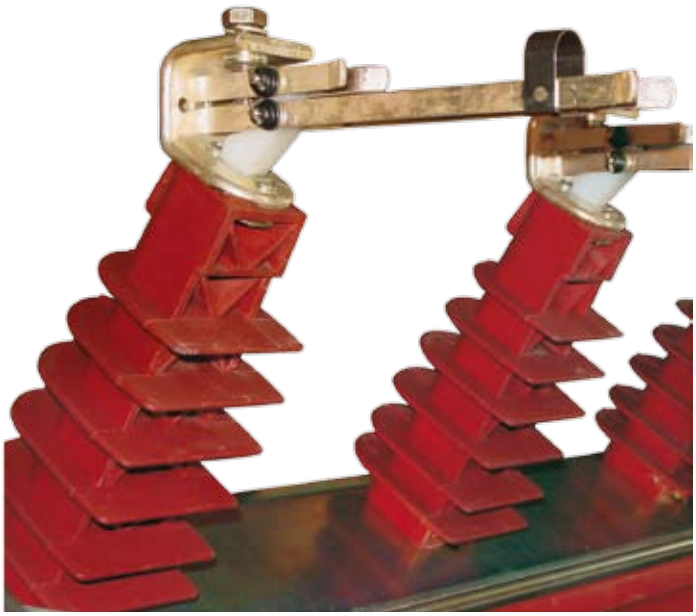
Operating temperature
The operating characteristics of the Airswitch isolators and switch-disconnectors do not alter within a range of ambient temperatures from –5°C to +40°C.

Main technical characteristics
Frame – this consists of press-bent steel sections, welded, galvanised and shaped to form a particularly study structure.

Moving contacts – in the rotary type isolators and switch-disconnectors, the rotating body consists of 3 copper bars, covered with insulating material with a finned profile (to increase creepage distances). The moving contacts are placed at the end of these bars.

In the hinged isolators, the moving contacts are of the jointed type with double blades; the contact pressure is ensured by special springs and by the self-tightening action of the current-carrying moving contact.

Insulators
In the rotary type isolators the three upper insulators act as a support for the upper fixed contacts and allow direct fixing of the main busbars.
The lower insulators act as a support for the lower fixed contacts and allow direct connection of the medium voltage cables.



4. Insulator prepared for connection of the main switchgear busbars

5. Detail of the lower insulator with piston and blast nozzle of the AM type switchdisconnector

The lower insulators of the AM switch-disconnectors also incorporate the pistons for the air blast and act as the support for the fixed arcing contacts.

In the hinged switch-disconnectors, apart from being the support for the main fixed and arcing contacts, the blowing nozzles and the terminals, the three upper insulators also incorporate the pistons for the air blast. The lower insulators support the terminals of the main moving contacts.

Insulating parts

The insulators are made of self-extinguishing epoxy resin or polyester glass, and have a finned profile with extended peaks to ensure adequate creepage distances.

Breaking principle

In both the rotary and hinged switch-disconnectors, on opening there is compression of the air by means of the pistons contained in the insulator cylinders. Thanks to the generation of a blast of compressed air released through special nozzles, the arc is cooled and deionised on separation of the contacts. This results in a gradual increase in the arc resistance which determines extinction.
The piston movement is synchronised with the movement of the main contacts of the switch-disconnectors so that the maximum flow of air is ensured at the moment of contact separation and therefore arc extinction is ensured.

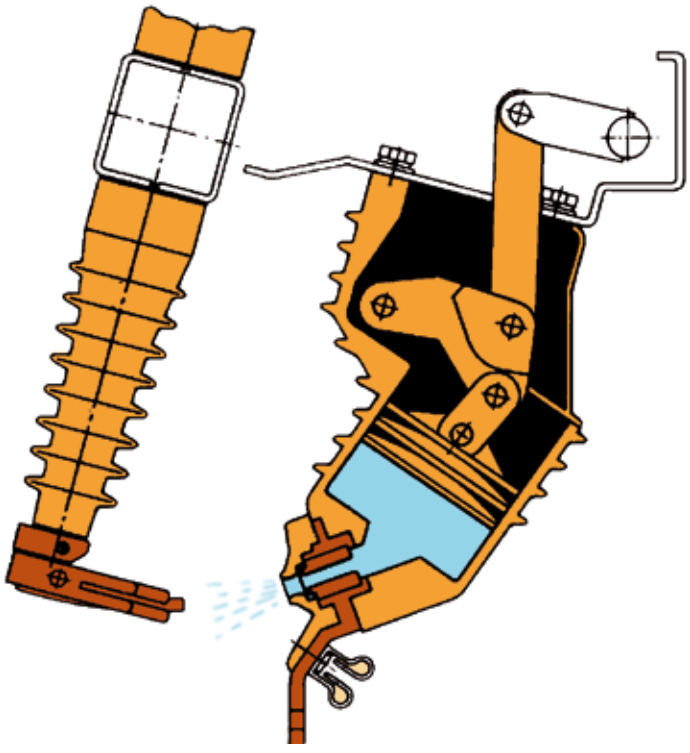
Degree of protection

The frame of the AM and AR/AS rotary isolators and switch-disconnectors is constructed so that, when installed in a switchgear, metallic segregation between the busbar compartment and the feeder-circuit-breaker compartment is always ensured, with IP20 protection.

Earthing

Contact earthing is carried out by activating the earthing switch. Furthermore, in the rotary type isolators and switch-disconnectors, in the open position, the moving contacts are automatically earthed.

6. Blast insulator of the AM switch-disconnector



7. Arc extinguishing action by means of air compression

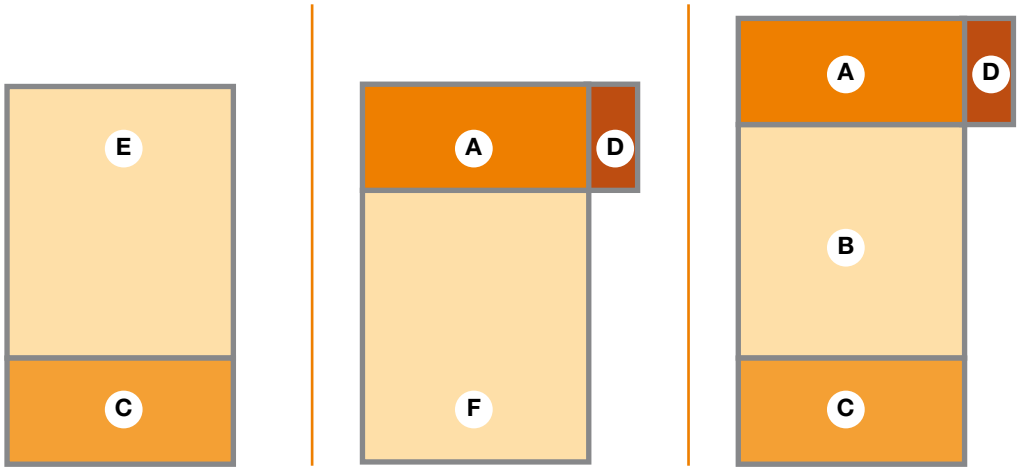
Description

Apparatus for typical ABB UniAir switchgear compartments

The drawings below show the typical units in UniAir compartments.
The Airswitch rotary isolators and switch-disconnectors indicated in the table can be installed in the various types of compartments.

A Busbar compartment
B Feeder compartment
C Incoming cable compartment
D Auxiliary circuit compartment
E Feeder compartment with outgoing busbars
F Feeder compartment with incoming cables

Typical units of UniAir switchgear



P1/A - P2/A - P3/A	P2 - P3 - ASR - M - M1/A P1/E - P1/V	P1E/2R
Switch-disconnectors: – AM/XA – AM/YA – AM/YFA – AM/XMA	**Switch-disconnectors:** – AM/XB – AM/YB – AM/YFB – AM/XMB	
Isolator: – AS/E	**Isolators:** – AS/B – AS/FB – AR/D – AS/D	**Isolators:** – ARS – ARS/B – ARS/BT

Key to the isolator and switch-disconnector codes

AM	Rotary switch-disconnector
AR/AR500	Clockwise rotary isolator (from the front of the switchgear)
AS	Anti-clockwise rotary isolator (from the front of the switchgear)
AT	Switchgear earthing switch
ARS	Double rotary isolator
/	Separation between the type of apparatus and customisation
X	Manual operating mechanism for switch-disconnector on exceeding dead centre
Y	Manual operating mechanism for switch-disconnector with stored energy for opening
M	Motor operator for control on exceeding dead centre
A	Top earthing switch
B	Bottom earthing switch
C	Earthing switch with making capacity
D	Bottom spaced earthing switch
E	Top spaced earthing switch
F	Preset for fuses in series
R	For 550mm compartments
(X)U	(X)U Approved by Enel for feeder compartment
(X)U-U	Approved by Enel for user compartment
(X)U-UA	Approved by Enel for user compartment with coupler
(XM)U	Approved by Enel for feeder compartment with motor operator
(Y)U	Approved by Enel for transformer protection compartment
-T	ENEL TO Department Recognition
24	Rated voltage (kV)
04	Rated current (Ax100)
12	Rated short-time withstand current (kA)

Quality Assurance System

Complies with ISO 9001 Standards, certified by an independent organisation.

Environmental Management System

Complies with ISO 14001 Standards, certified by an independent organisation.

Test laboratory

Complies with UNI CEI EN ISO/IEC 17025 Standards, accredited by an independent organisation.

Electrical characteristics

Apparatus		AM	AR/AS	AR500
Rated voltage	[kV]	24	24	24
Withstand voltage towards earthand	[kV]	50	50	50
between phases (50-60 Hz/1 min)				
Withstand voltage between open	[kV]	60	60	60
contacts (50-60 Hz/1 min)				
Impulse withstand voltage towards	[kV]	125	125	125
earth and between phases				
Rated frequency 50-60	[Hz]	50-60	50-60	50-60
Rated normal current	[A]	400/630	400/630	400
			800/1250	
Rated short-time withstand	[kA]	12.5	12.5	12.5
current (1 s)		16	16	–
		–	20	–
		–	25	–
Rated making capacity on	[kA]	31.5	–	–
short-circuit		40	–	–
Rated breaking capacity	Isc			
– Mainly active load service	[A]	400/630	–	–
– No-load transformer service	[A]	4 ... 16	–	–
– No-load feeder service	[A]	25	–	–
– No-load cable service	[A]	25	–	–
– Loop circuit service	[A]	400/630	–	–

AM switch-disconnectors

Description

The AM series of rotary switch-disconnectors are available in several versions suitable for constructing different types of units. The wide range has three types of operating mechanism (on passing dead centre, with stored energy, and with motor operator), earthing knives (lower and/or upper always interlocked with the feeder), fuseholder frame (suitable for use with fuses according to DIN Standards and fitted with automatic release device for fuse intervention), standard and upside-down versions.
Overall dimensions available on request.

AM type switch-disconnectors according to CEI 17-9/1 and IEC 60265-1 Standards

AM/XB: switch-disconnector with manual operating mechanism on passing dead centre, lower earthing switch with operating mechanism with dependent operation, interlocked with the line-side isolator. It is normally used to construct incoming/outgoing units (see fig. 1). It is also available in the AM/XD version (see fig. 2), with spaced lower earthing switch.

AM/YB: switch-disconnector with manual stored energy operating mechanism, lower earthing switch with operating mechanism with dependent operation, interlocked with the lineside isolator. It is normally used to construct incoming/outgoing units (see fig. 1). It is also available in the AM/YD version (see fig. 2), with spaced lower earthing switch.

AM/YFB: switch-disconnector with manual stored energy operating mechanism, fuseholder frame and release device for fuse intervention. Lower earthing switch with operating mechanism with dependent operation, interlocked with the line-side isolator. It is normally used to construct transformer protection units and can be fitted with a shunt opening release to carry out connection with the low voltage circuit (see fig. 2).

AM/XA: switch-disconnector with manual operating mechanism on passing dead centre, upper earthing switch with operating mechanism with dependent operation, interlocked with the line-side isolator. It is normally used to construct incoming units with cable entry from below (see fig. 3) (upside-down assembly).

AM/YA: switch-disconnector with manual stored energy operating mechanism, earthing switch upper with operating mechanism with dependent operation, interlocked with the lineside isolator. It is normally used to construct incoming units with cable entry from below (see fig. 3) (upside-down assembly).

AM/YFA: switch-disconnector with manual stored energy operating mechanism, fuse-holder frame and release device for fuse intervention. Upper earthing switch with operating mechanism with dependent operation, interlocked with the lineside isolator (see fig. 2). It is normally used to construct transformer protection units with cable entry from below. It can be fitted with shunt opening release to carry out connection with the low voltage circuit (see fig. 4) (upside-down assembly).

AM/XMA: switch-disconnector with motor operator, upper earthing switch with operating mechanism with dependent operation, interlocked with the line-side isolator.
It is normally used to construct units according to fig. 3.

AM/XMB: switch-disconnector with motor operator, lower earthing switch with operating mechanism with dependent operation, interlocked with the line-side isolator.
It is normally used to construct units according to fig. 1.

AM switch-disconnectors

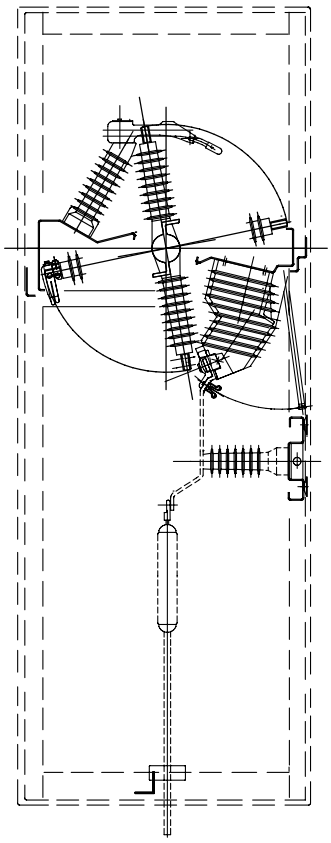


Fig. 1

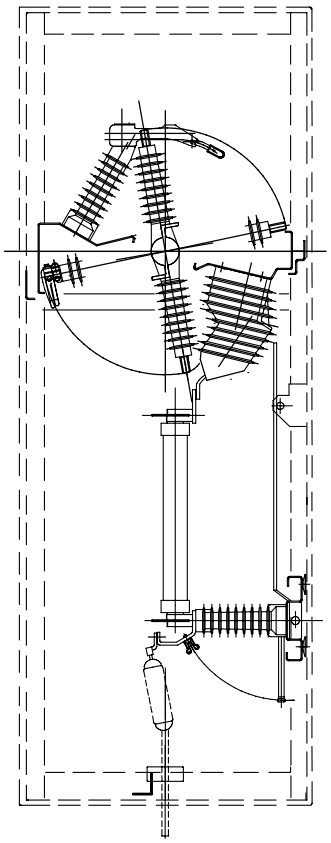


Fig. 2

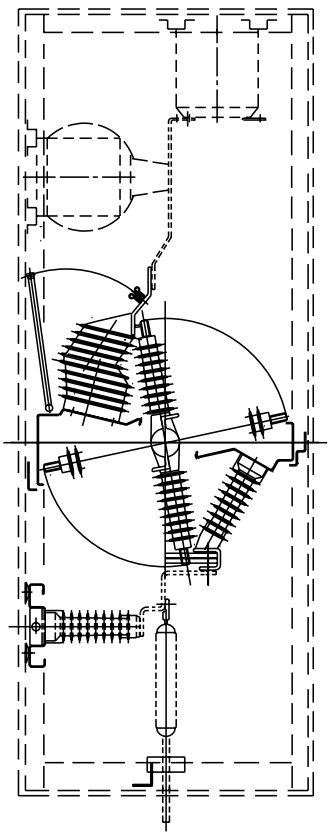


Fig. 3

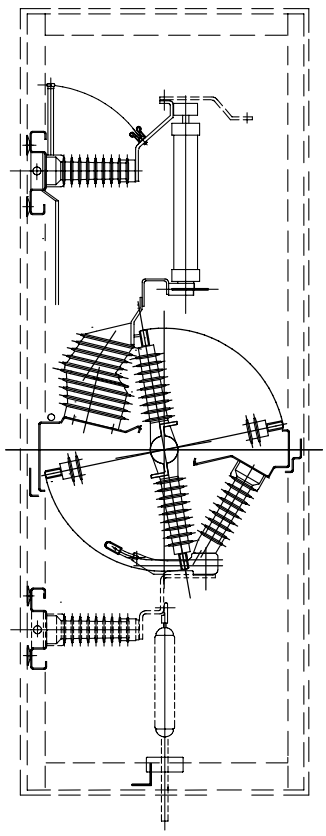


Fig. 4

Notes
– Figures 1-3-4: the crosspiece with capacitive insulators is available as an optional accessory supplied loose and can be mounted both in the busbar compartment and in the cable compartment.
– Figures 2-4: on all the switch-disconnectors with spaced earth, the crosspiece with post insulators is always supplied. On request and as an alternative, instead of the crosspiece with post insulators, the crosspiece with capacitive insulators can be supplied.

Switch-disconnectors approved by Enel

AM/XU: switch-disconnector with manual operating mechanism with independent operation, lower earthing switch with operating mechanism with dependent operation, interlocked with the line-side switchdisconnector. It is normally used to construct units type I to DY 402.

AM/YU: switch-disconnector with manual stored energy operating mechanism, fuse-holder frame, release device for fuse intervention, earthing switch lower with operating mechanism with dependent operation, interlocked with the line-side switch-disconnector. It is normally used to construct units type TM to DY 403.

AM/XU-U: switch-disconnector with manual operating mechanism with independent operation, spaced lower earthing switch with operating mechanism with dependent operation, interlocked with the line-side switch-disconnector. It is normally used to construct U type units according to DY 404.

AM/XU-UA: switch-disconnector with manual operating mechanism with independent operation, spaced lower earthing switch with operating mechanism with dependent operation, interlocked with the line-side switch-disconnector. It is normally used to construct UA type units according to DY 408.

AM/XMU: switch-disconnector with motor operator, lower earthing switch with operating mechanism with dependent operation, interlocked with the line-side switch-disconnector. It is normally used to construct IE type units according to DY 406.

Apparatus identification

AM

Switch-disconnectors according to CEI 17-9/1 and IEC 60265-1 Standards

New series	Replaced series	U [kV]	In [A]	Icw [kA]	UniAir compartment
AM/XB	GPRI1/TI	24	400	12	P3
AM/XB	GPRI1/TI	24	400	16	P3
AM/XB	GPRI1/TI	24	600	16	P3
AM/YB	GPRI2/TI	24	400	12	P3
AM/YB	GPRI2/TI	24	400	16	P3
AM/YB	GPRI2/TI	24	630	16	P3
AM/YFB	GPRI2V/TI	24	400	12	P2
AM/YFB	GPRI2V/TI	24	400	16	P2
AM/YFB	GPRI2V/TI	24	630	16	P2
AM/XD	–	24	400	12	P2
AM/XD	–	24	400	16	P2
AM/XD	–	24	630	16	P2
AM/YD	–	24	400	12	P2
AM/YD	–	24	400	16	P2
AM/YD	–	24	630	16	P2
AM/XA	GPRI1/TS-C	24	400	12	P3/A
AM/XA	GPRI1/TS-C	24	400	16	P3/A
AM/XA	GPRI1/TS-C	24	630	16	P3/A
AM/YA	GPRI2/TS-C	24	400	12	P3/A
AM/YA	GPRI2/TS-C	24	400	16	P3/A
AM/YA	GPRI2/TS-C	24	630	16	P3/A
AM/YFA	GPRI2V/TS-C	24	400	12	P2/A
AM/YFA	GPRI2V/TS-C	24	400	16	P2/A
AM/YFA	GPRI2V/TS-C	24	630	16	P2/A
AM/XMB (1)	GPRI3/TI	24	400	12	P3
AM/XMB (1)	GPRI3/TI	24	400	16	P3
AM/XMB (1)	GPRI3/TI	24	630	16	P3
AM/XMA (1)	–	24	400	12	P3/A
AM/XMA (1)	–	24	400	16	P3/A
AM/XMA (1)	–	24	630	16	P3/A

(1) Specify the power supply voltage 24, 48 V d.c., 110-220 V d.c. /a.c.

8. AM switch-disconnector

AM

Switch-disconnectors approved by Enel

New series	Replaced series	U [kV]	In [A]	Icw [kA]	UniAir compartment (IP3X)
AM/XU	IR-NE/XU	24	04	12	I (DY402)
AM/XU	IR-NE/XU	24	04	16	I (DY402)
AM/XU-U	IR-NE/XU-U	24	04	12	U (DY404)
AM/XU-U	IR-NE/XU-U	24	04	16	U (DY404)
AM/XU-UA	IR-NE/XU-UA	24	04	12	UA (DY408)
AM/XU-UA	–	24	04	16	UA (DY408)
AM/XMU	IR-NE/ZU	24	04	12	IM (DY406)
AM/XMU	–	24	04	16	IM (DY406)
AM/XMU-T	IR-NE/ZU	24	04	12	C.TO.062
AM/YU	IR-NE/YU	24	04	12	TM (DY403)
AM/YU	IR-NE/YU	24	04	16	TM (DY403)
AM/XMUK	–	24	04	12	IM (DY406/1)
AM/XMUK	–	24	04	16	IM (DY406/1)
AM/XU-U9	–	24	04	12	U9 (DY408)
AM/XU-U9	–	24	04	16	U9 (DY408)
AM/XU-B	–	24	04	12	I (DY402)
AM/YU-B	–	24	04	12	TM (DY403)

Note: The motorised operation requires a maximum power of 300 W.

Accessories

Voltage signalling device

This device consists of voltage sensors (capacitor dividers) and a set of three lamps.

It allows the presence of voltage in a particular point of the medium voltage circuit to be signalled. Devices with fixed or withdrawable signalling box and sets of three capacitive insulators – either loose or mounted on a metal crosspiece – are available.

The following combinations are possible.

1A Capacitive insulator crosspiece and fixed signalling box (AM)

1B Switch-disconnector with spaced earthing switch or fuses, capacitive insulator crosspiece and fixed signalling box (AM)

AM	1A	1B
XB	●	
XA	●	
YB	●	
YA	●	
YFB		●

AM	1A	1B
YFA	●	●
XD		●
YD		●
XMA	●	
XMB	●	

Key lock

This allows the line-side isolator/switch-disconnector and/or earthing switch to be locked in the closed or open position.

A maximum of two key locks for the line-side isolator/switch-disconnector and two key locks for the earthing switch operating mechanism can be combined, or otherwise a key lock and an electromagnetic lock. Only one key lock can be combined with the motor operator.

The possible selections are indicated below.

AM switch-disconnectors

2A One LINE-side isolator/switch-disconnector lock (key free in open position) or EARTHING switch lock (key free in closed position)
2B One LINE-side isolator/switch-disconnector lock (key free in closed position) or EARTHING switch lock (key free in open position)
2C Two locks (one in open, the other in closed position)
2D Two LINE-side isolator/switch-disconnector locks (keys free in open position) or EARTHING switch locks (keys free in closed position)
2E Two LINE-side isolator/switch-disconnector locks (keys free in closed position) or EARTHING switch locks (keys free in open position)
2F One electromagnetic lock and one line-side switch-disconnector key lock (electromagnet de-energised, key free in open position) (1)
2G One electromagnetic lock and one earthing switch key lock (electromagnet de-energised, key free in open position) (1)
2H One electromagnetic lock and one line-side switch-disconnector key lock (electromagnet de-energised, key free in closed position) (1)
2I One electromagnetic lock and one earthing switch key lock (electromagnet de-energised, key free in closed position) (1)
2L One LINE-side switch-disconnector lock (key free in open position) for motor operator
2M One EARTHING switch lock (key free in open position) for motor operator
2N One EARTHING switch lock (key free in closed position) for motor operator.

Door lock

This is a mechanical device which does not allow the compartment door to be opened with the earthing switch open. The possible solutions are indicated below.
3A Door lock H=720 mm (panels H=1950 mm)
3B Door lock H=870 mm (panels H=2250 mm)
3C Upper door lock H=770 mm
3D Door lock (for Enel type I, TM, U and IE panels)
3E Door lock (for Enel type UA panels).

AM	3A	3B	3C
XB	●	●	
XA			●
YB	●	●	
YA			●
YFB	●	●	
YFA			●
XD	●	●	
YD	●	●	

Auxiliary contacts

These signal the state of the position of the isolator: open/closed. The possible solutions are indicated below.
4A Auxiliary contacts for LINE-side isolator (3 N.O. + 2 N.C.)
4B Auxiliary contacts for earthing switch (3 N.O. + 2 N.C.).

Auxiliary contact characteristics

Rated voltage	500V a.c. (50-60 Hz)
	220 V d.c.
Rated current	20 A
Breaking capacity	15 A (500 V a.c. - cosφ = 0,4)
	1.5 A (220 V d.c. - T = 10 ms)
Insulating level	2000 V - 50 Hz for 1 min.

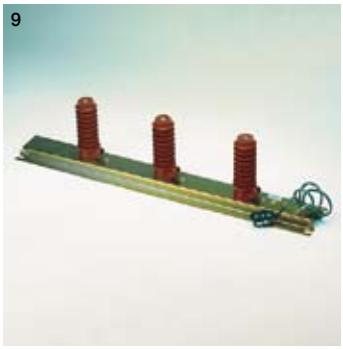
N.B.: in the AM/XMA types, the auxiliary contacts are always supplied, with a maximum number of 2 N.O. + 2 N.C. both for LINE and for EARTH.

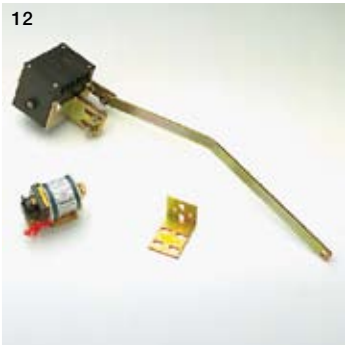
Shunt opening release (1)

This is an electromechanical device which, following energisation of an electromagnet, activates the release lever of the operating mechanism making the isolator open. This application is only compatible with stored energy operating mechanisms (AM/Y). Shunt opening release with auxiliary contacts of the line-side switch-disconnector (2 make contacts + 3 break contacts).

(1) Specify the power supply voltage of the electromagnetic locks: 24, 48, 110, 220 V d.c. /a.c.

9. Voltage signaling device | 10. Key lock | 11. Door lock | 12. Shunt opening release





AS, AR, AR500 and AT isolators

Description

AS, AR and AR500 rotary isolators (CEI 17/4 - IEC 60129)

The AS and AR series of rotary isolators are available in several versions suitable for constructing different types of units.
The range is intended for use with a manual operating mechanism with dependent operation, earthing knives (lower and/or upper always interlocked with the feeder), fuse-holder frame (suitable for use with fuses according to DIN Standards).
The types available are:

AS/B: line-side isolator and lower earthing switch, interlocked, both with manual operating mechanism with dependent operation. It is normally used to construct incoming/outgoing units (see fig. 5).

AS/FB: line-side isolator with fuse-holder frame, earthing switch on the load side of the fuseholder frame, interlocked, both with manual operating mechanism with dependent operation. It is normally used to construct measuring units (see fig. 6).

AR/D: line-side isolator and spaced earthing switch lower, interlocked, both with manual operating mechanism with dependent operation. It is normally used to construct incoming/outgoing units with fixed circuit-breaker (*)(see fig. 7).

AS/D: line-side isolator and lower spaced earthing switch, interlocked, both with manual operating mechanism with dependent operation. It is normally used to construct incoming/outgoing units (see fig. 11).

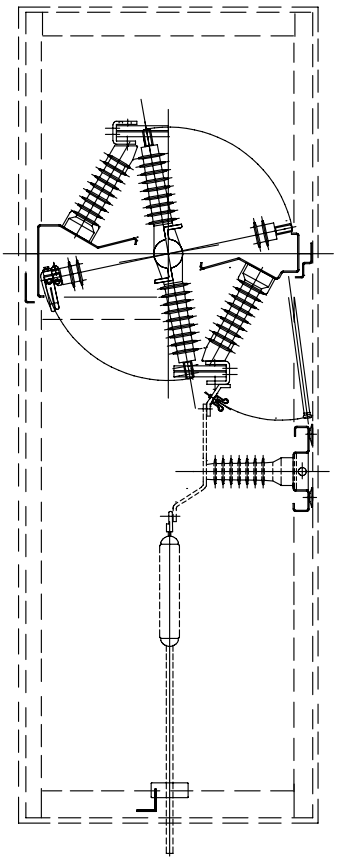


Fig. 5

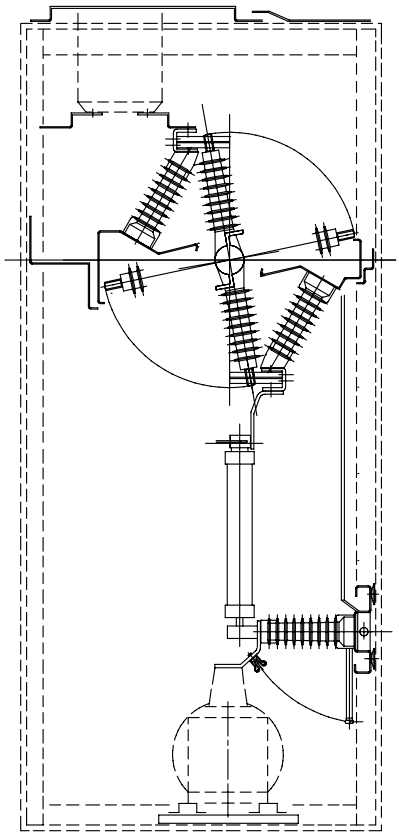


Fig. 6

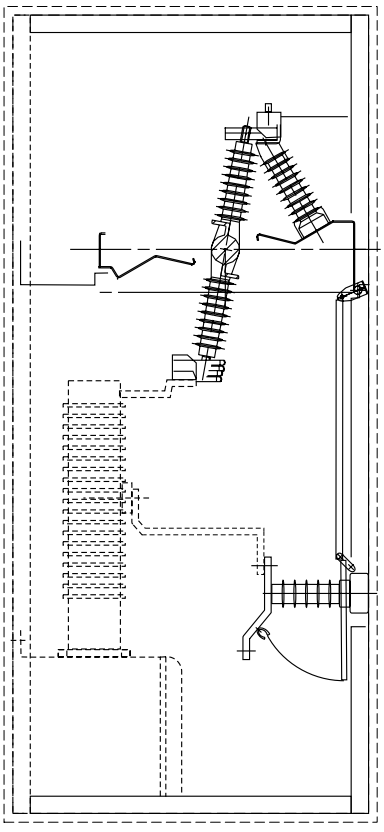


Fig. 7

Notes
Figure 5: the crosspiece with capacitive insulators is available as an optional accessory supplied loose.
Figures 6-7: isolators with spaced earthing or with fuses (only measurement units), the crosspiece with post insulators is always supplied. On request and as an alternative, the earthing crosspiece with capacitive insulators is available.

AS, AR, AR500 and AT isolators

AR/DC: line-side isolator and lower spaced earthing switch, interlocked, both with manual operating mechanism with dependent operation. It is normally used to construct incoming/outgoing units with removable circuit-breaker (**) (see fig. 7).

ARS/B: this isolator can be used to construct circuit-breaker units with double isolation (cables/busbars) and cable side isolator (fig. 8) (*).

ARS/BT: this isolator can be used to construct circuit-breaker units with double isolation (cables/busbars), cable side isolator and current transformers (fig. 8) (*).

ARS: this isolator can be used to construct circuit-breaker units with double isolation (cables/busbars) (fig. 8) (*).

AS/E: this isolator can be used to construct circuit-breaker units with cable side isolator and busbar side earthing switch (fig. 9) (*).

AR500 rotary isolator

(CEI EN 62271-102)
AR500 rotary isolator is dedicated to secondary distribution 500 mm panels with MV circuit-breakers. The isolator is two-position type (line-earth) with simultaneous movement of three poles (monoblock). AR500 is provided in below presented standard configuration with manual operating mechanism adapted to cooperation with earthing switch. The operating mechanism contains an interlocking system to assure correct cooperation with a circuit-breaker and earthing switch. There are also available two auxiliary switches for position indications. The accessories listed on page 16 are not dedicated for AR500. The AR500 was designed and type tested with UniMix panel according to DY800 ENEL specification (Fig 11).

AT earthing switches

(CEI 17/4 - IEC 60129)
The AT type isolators are earthing switches without making capacity.
They are available in two versions: AT, for 700 mm wide units, and AT/R, for 550 mm wide units.

(*) The use of VD4/R-HD4/R series circuit-breakers, fixed version with right lateral operating mechanism is recommended (see catalogues 1VCP000037 and 1VCP000028 respectively).
Connections to the switchgear must be made by the Customer.
(**) The use of VD4/R-HD4/R series circuit-breakers, fixed version with right lateral operating mechanism associated with accessory 5 indicated in this catalogue is recommended.
Connections to the switchgear must be made by the Customer.

Incoming from above

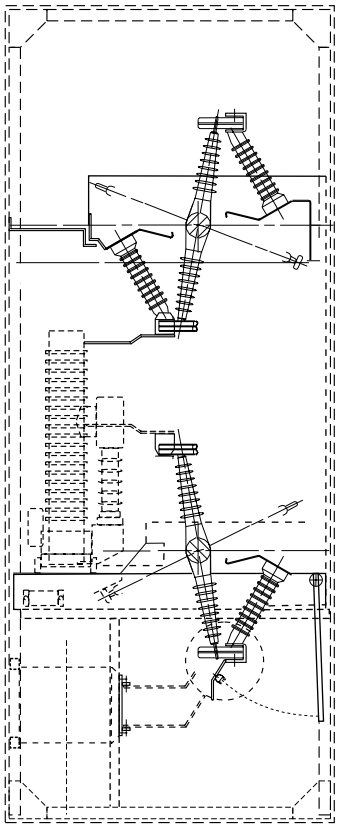


Fig. 8

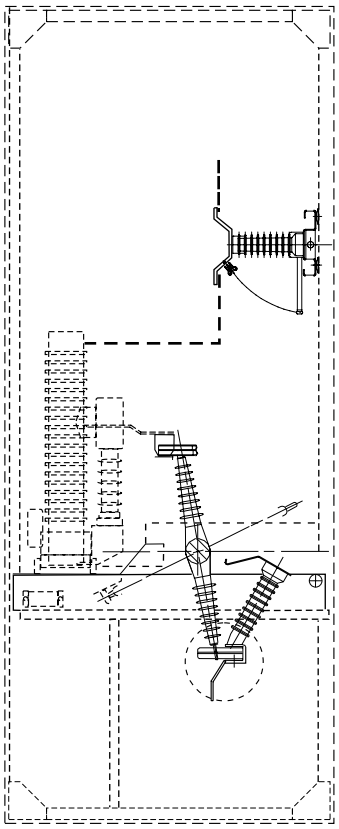


Fig. 9

Incoming from below

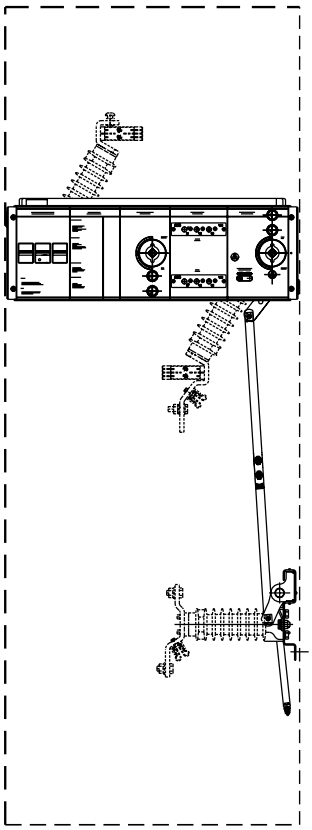


Fig. 10

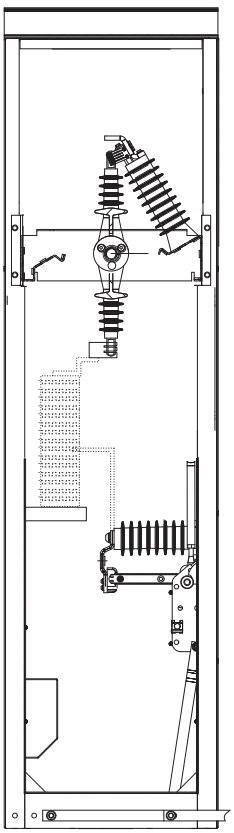


Fig. 11

Apparatus identification

AS

New series IP3X		Replaced series	U [kV]	In [A]	Icw [kA]	UniAir compartment
AS/B	SRNI/TI	SRNI/B	24	04	12	ASR
AS/B	SRNI/TI	SRNI/B	24	04	16	ASR
AS/B	SRNI/TI	SRNI/B	24	06	16	ASR
AS/B	SRNI/TI	SRNI/B	24	08	20	ASR
AS/B	SRNI/TI	SRNI/B	24	12	20	ASR
AS/B	RNI/TI	SRNI/B	24	12	25	ASR
AS/D	SRNID/TI	SRNID/TI n	24	04	12	ASR
AS/D	SRNID/TI	SRNID/TI n	24	04	16	ASR
AS/D	SRNID/TI	SRNID/TI n	24	06	16	ASR
AS/D	SRNID/TI	SRNID/TI n	24	08	20	ASR
AS/D	SRNID/TI	SRNID/TI n	24	12	20	ASR
AS/D	SRNID/TI	SRNID/TI n	24	12	25	ASR
AS/FB	SRNIV/TI	SRNI/FB	24	04	12	M-M1/A
AS/FB	SRNIV/TI	SRNI/FB	24	04	16	M-M1/A
AS/FB	SRNIV/TI	SRNI/FB	24	06	16	M-M1/A
AS/FB	SRNIV/TI	SRNI/FB	24	08	20	M-M1/A
AS/FB	SRNIV/TI	SRNI/FB	24	12	20	M-M1/A
AS/FB	SRNIV/TI	SRNI/FB	24	12	25	M-M1/A

AR

New series IP3X	Replaced series	U [kV]	In [A]	Icw [kA]	UniAir (IP3X) compart-ment	VD4/UniAir-HD4/UniAir Circuit-breaker
AR/D	SRNIDR/TI+n	24	04	12	P1/F	–
AR/D	SRNIDR/TI+n	24	04	16	P1/F	–
AR/D	SRNIDR/TI+n	24	06	16	P1/F	–
AR/D	SRNIDR/TI+n	24	08	20	P1/F	–
AR/D	SRNIDR/TI+n	24	12	20	P1/F	–
AR/D	SRNIDR/TI+n	24	12	25	P1/F	–
AR/DC		24	04	12	P1/E	UniAir
AR/DC		24	04	16	P1/E	UniAir
AR/DC		24	06	16	P1/E	UniAir
AR/DC		24	08	20	P1/E	UniAir
AR/DC		24	12	20	P1/E	UniAir
AR/DC		24	12	25	P1/E	UniAir
ARS/B	SRNIHE/2R-TI	24	04	12	P1E/2R	UniAir 2R
ARS/B	SRNIHE/2R-TI	24	04	16	P1E/2R	UniAir 2R
ARS/B	SRNIHE/2R-TI	24	06	16	P1E/2R	UniAir 2R
ARS/B	SRNIHE/2R-TI	24	08	20	P1E/2R	UniAir 2R
ARS/B	SRNIHE/2R-TI	24	12	20	P1E/2R	UniAir 2R
ARS/B		24	12	25	P1E/2R	UniAir 2R
ARS/B/T	SRNIHE/2R-TI TA	24	04	12	P1E/2R	UniAir 2R
ARS/B/T	SRNIHE/2R-TI TA	24	04	16	P1E/2R	UniAir 2R
ARS/B/T	SRNIHE/2R-TI TA	24	06	16	P1E/2R	UniAir 2R
ARS/B/T	SRNIHE/2R-TI TA	24	08	20	P1E/2R	UniAir 2R
ARS/B/T	SRNIHE/2R-TI TA	24	12	20	P1E/2R	UniAir 2R
ARS/B/T		24	12	25	P1E/2R	UniAir 2R
ARS		24	04	12	P1E/2R	UniAir 2R
ARS		24	04	16	P1E/2R	UniAir 2R
ARS		24	06	16	P1E/2R	UniAir 2R
ARS		24	08	20	P1E/2R	UniAir 2R
ARS		24	12	20	P1E/2R	UniAir 2R
ARS		24	12	25	P1E/2R	UniAir 2R
AS/E		24	04	12	P1/A	UniAir A
AS/E		24	04	16	P1/A	UniAir A
AS/E		24	06	16	P1/A	UniAir A
AS/E		24	08	20	P1/A	UniAir A
AS/E		24	12	20	P1/A	UniAir A
AS/E		24	12	25	P1/A	UniAir A

AS, AR, AR500 and AT isolators

Apparatus identification

AT

New series IP3X		Replaced series	U [kV]	In [A]	Icw [kA]	UniAir compartment
AT	MAT/R	MAT	24	-	12	A
AT	MAT/R	MAT	24	-	16	A
AT	MAT/R	MAT	24	-	20	A
AT	MAT/R	MAT	24	-	25	A
AT/R			24	-	12	CUSTOMER
AT/R			24	-	16	CUSTOMER
AT/R			24	-	20	CUSTOMER
AT/R			24	-	25	CUSTOMER

AR500

New series IP3X	Replaced series	U [kV]	In [A]	Icw [kA]	UniMix compartment
AR500	-	24	400	12.5	ICS/1 (DY800/1 ENEL)
AR500	-	24	400	12.5	ICS/2 (DY800/2 ENEL)
AR500	-	24	400	12.5	ICS/3 (DY800/3 ENEL)

Accessories (not dedicated for AR500)

Voltage signalling device

This device consists of voltage sensors (capacitor dividers) and a set of three lamps.
It allows the presence of voltage in a particular point of the medium voltage circuit to be signalled. Devices with fixed or withdrawable signalling box and sets of three capacitive insulators – either loose or mounted on a metal crosspiece – are available.
The following combinations are possible:

1A Capacitive insulator crosspiece and signalling box.

1B Line isolator with earthing switch, capacitive insulators crosspiece and signalling box.

	1A	1B
AS/B		●
AT	●	
AS/FB	●	
AR/D	●	

	1A	1B
AS/D	●	
AS/D + kit TA	●	
AS/E		●
–		

Key lock

This allows the line-side isolator and/or the earthing switch to be locked in the closed or open position.
A maximum of two key locks can be combined for the operating mechanism of the line-side isolator and two key locks for the operating mechanism of the earthing switch, or otherwise one key lock and one electromagnetic lock.

The possible selections are indicated below.

2A One LINE-side isolator lock (key free in open position) or EARTHING switch lock (key free in closed position)

2B One LINE-side isolator lock (key free in closed position) or EARTHING switch lock (key free in open position)

2C Two locks (one in open, the other in closed position)

2D Two LINE-side isolator locks (keys free in open position) or EARTHING switch locks (keys free in closed position)

2E Two LINE-side isolator locks (keys free in closed position) or EARTHING switch locks (keys free in open position)

2F One electromagnetic lock and one LINE-side isolator key lock (electromagnet de-energised, key free in open position) (1)

2G One electromagnetic lock and one EARTHING switch key lock (electromagnet de-energised, key free in open position) (1)

2H One electromagnetic lock and one LINE-side isolator key lock (electromagnet de-energised, key free in closed position) (1)

2I One electromagnetic lock and one EARTHING switch key lock (electromagnet de-energised, key free in closed position) (1).

Door lock

This is a mechanical device which does not allow the compartment door to be opened with the earthing switch open.
The possible solutions are indicated below.

3A Door lock H=720 mm (panels H=1950 mm)

3B Door lock H=870 mm (panels H=2250 mm).

Auxiliary contacts

These signal the state of the position of the isolator: open/closed.
The possible solutions are indicated below.

4A Auxiliary contacts for line-side isolator (3 N.O. + 2 N.C.)

4B Auxiliary contacts for earthing switch (3 N.O. + 2 N.C.)

Auxiliary contact characteristics

Rated voltage	500V a.c. (50-60 Hz)
	220 V d.c.
Rated current	20 A
Breaking capacity	15 A (500 V a.c. – cosφ = 0,4)
	1.5 A (220 V d.c. – T = 10 ms)
Insulating level	2000 V – 50 Hz for 1 min.

Set of pliers for circuit-breaker

The set includes three sliding contacts to be applied to the top and bottom terminals of the circuit-breaker.

5A For 630 A/16 kA isolators

5B For 800-1250 A/20 kA isolators

5C For 800-1250 A/25 kA isolators.

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