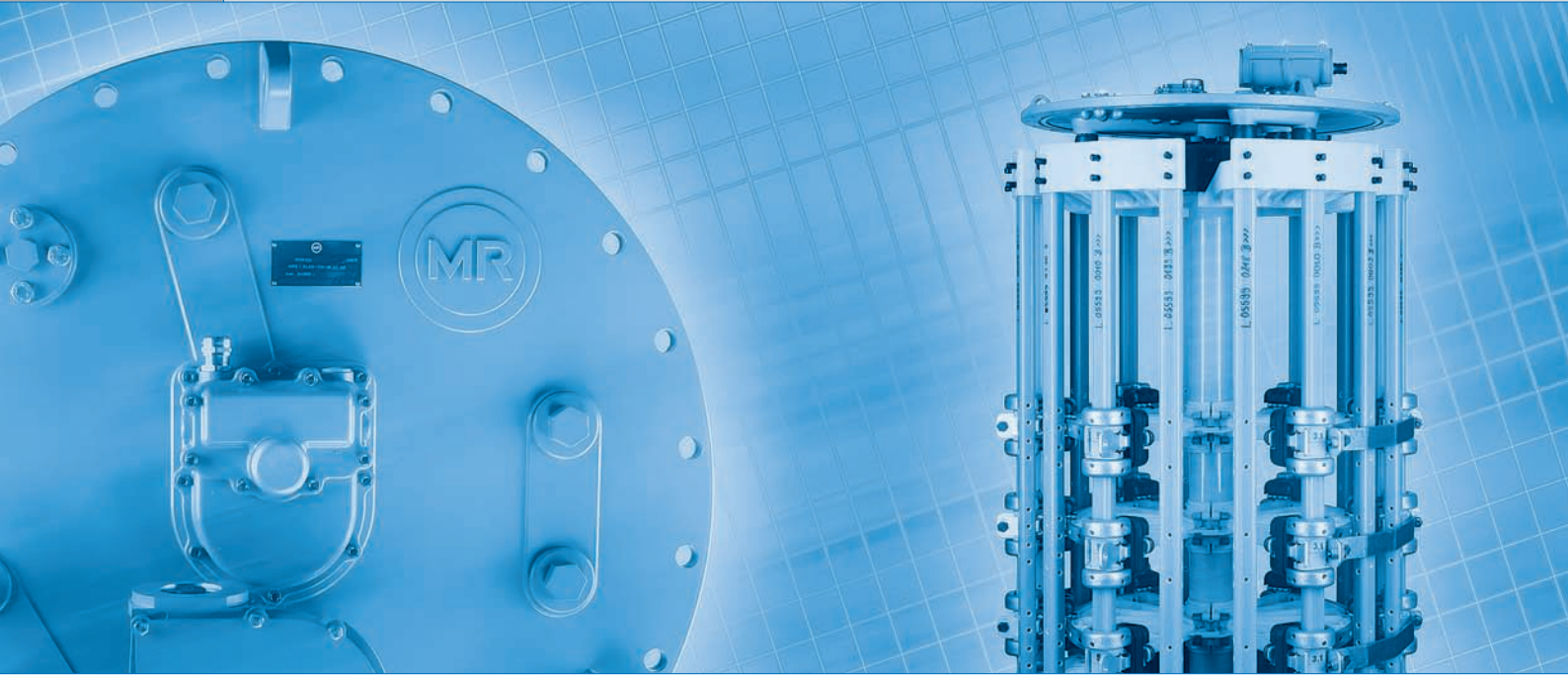
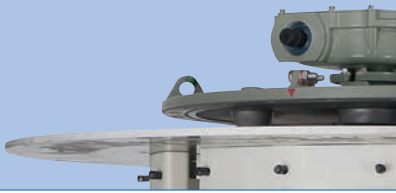


# COMTAP® ARS





## Advanced Retard Switch COMTAP® ARS

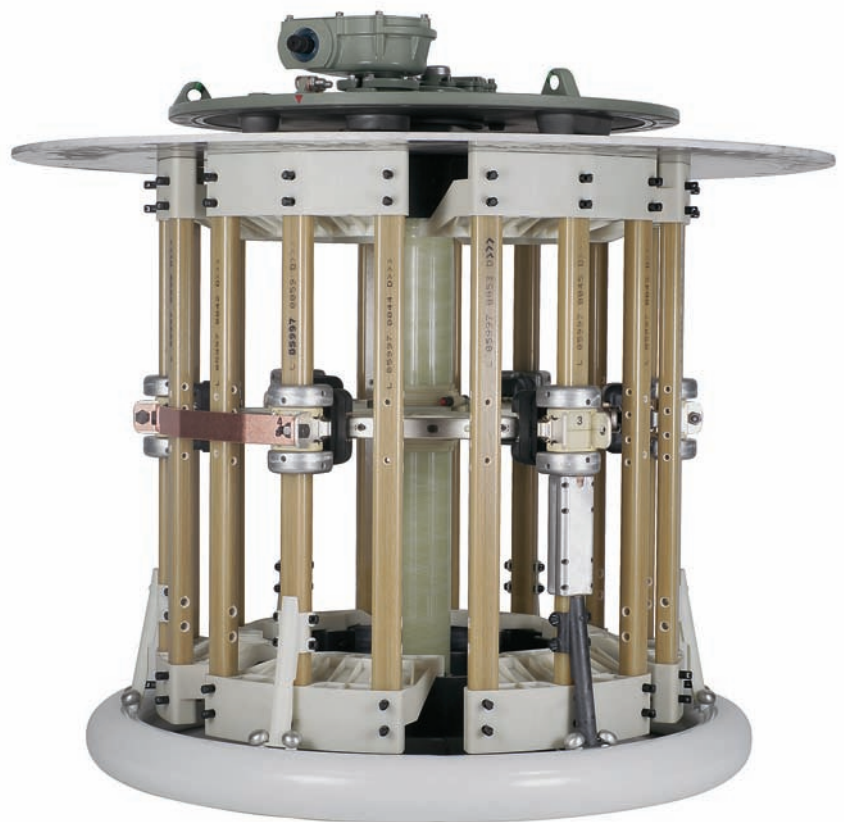
An Advanced Retard Switch (referred: ARS) is used to reverse the polarity of a winding during transformer operation.

The COMTAP® ARS has two basic operating positions. With an ARS application the through-current of a current path is commutated to another current path of the same potential. The contact system is equipped with special contacts for this purpose.

The COMTAP® ARS can be used for different applications in combination with an on-load tap-changer.

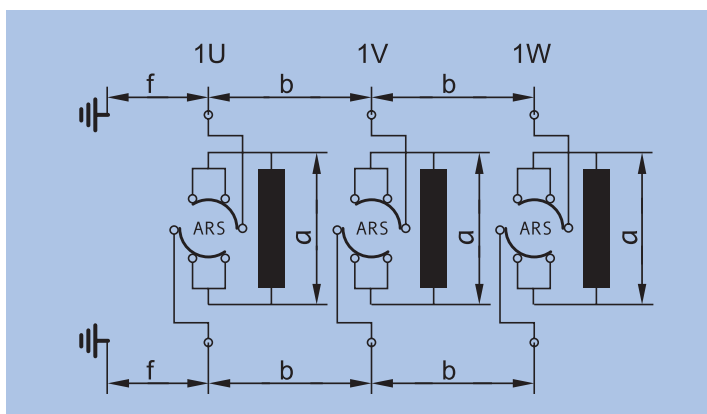
The ARS is primarily used to reverse the polarity of the regulating voltage (double reversing change-over selector function) for applications with wide regulating ranges such as phase shifter transformers, for example.

- Design based on IEC 60214-1 (valid since 2003)
- Single-phase COMTAP® ARS up to 2400 A max. rated through-current
- Three-phase COMTAP® ARS up to 1800 A max. rated through-current
- Rated insulation level up to  $U_m=170$  kV
- Particularly high degree of safety due to electrical tripping/locking contact
- Compact and robust design
  - Tube and rod material made exclusively of glass fiber reinforced plastic (GFRP)
  - Modular concept
  - Optimized field design due to smooth surfaces, rounded edges and use of innovative materials
- Easy installation in the transformer tank



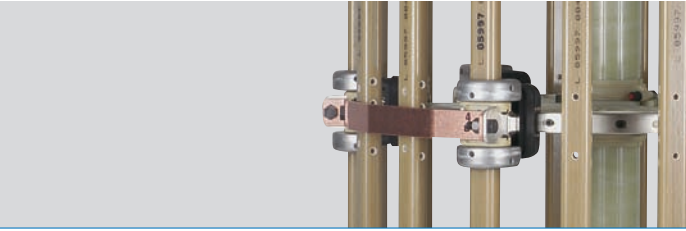
ARS I 1000

Picture of the bell-type tank version



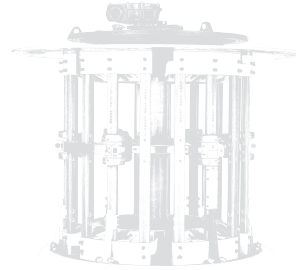
a = Between beginning and end of the winding  
 b = Between the contacts of different phases  
 f = Between the contacts of the U phase (highest located contact level) and ground

Figure: Insulation distances



## Permissible number of operations for the COMTAP® ARS

The COMTAP® ARS is mechanically approved for up to 100,000 tap-change operations. However, from an electrical point of view the number of permitted tap-change operations may be lower depending on the transformer design and the current load. A detailed description of this issue can be found in document no. 1889046/01.



COMTAP® ARS I / ARS III	ARS I 1000	ARS I 1822	ARS I 2433	ARS III 1000	ARS III 1822
Required current division	No	Yes	Yes	No	Yes
Number of phases	1	1	1	3	3
Max. rated through-current $I_{um}$ [A]	1000	1800	2400	1000	1800
Rated short-time current [kA]	10	18	24	10	18
Rated short-circuit duration [s]	3	3	3	3	3
Rated withstand current [kA]	25	45	60	25	45
Installation length [mm]	max. 1104	max. 1299	max. 1494	max. 2124	max. 2709
Weight [kg]	max. 135	max. 160	max. 185	max. 235	max. 315
Rated frequency [Hz]	50 ... 60				
Rated insulation level					
Highest voltage for equipment $U_m^{1)}$ [kV] on insulation distances f und b <sup>2) 3)</sup>	123		145		170
Rated lightning impulse withstand voltage (1,2/50) [kV] on insulation distances f und b <sup>2) 3)</sup>	550		650		750
Rated power frequency withstand voltage (50 Hz, 1 min.) [kV] on insulation distances f und b <sup>2) 3)</sup>	230		275		325
Max. operating voltage [kV] on insulation distance a <sup>3)</sup>	123		145		145
Rated lightning impulse withstand voltage (1,2/50) [kV] on insulation distance a <sup>3)</sup>	550		650		650
Rated power frequency withstand voltage (50 Hz, 1 min.) [kV] on insulation distance a <sup>3)</sup>	230		275		290
Rated lightning impulse withstand voltage between parallel levels of one phase (1,2/50) [kV]			400		

<sup>1)</sup> As per IEC 60214-1, chapter 3.57: Effective value of the conductor-conductor voltage for which a equipment is rated with regard to its insulation.

<sup>2)</sup> b distance only for three-phase COMTAP® ARS

<sup>3)</sup> Reference to insulation distances

