

Power in safe hands.



Expansion clamp –
the compact and safe
connection for busbar
systems

The expansion clamp

is a flexible connector for transmitting power at medium and high voltages.

- Applications** - Flexible connector for bus bar systems (e.g. for the connection of transformers, switchgear or generators)
- Product**
- Flexible connector between pipes and/or circular conductors
 - Compensates for thermal expansion
 - Consists of several expansion connectors and two clamping elements
 - Use of high-conductivity aluminium
 - Silver-plated contact surfaces available for use with other conductive materials, such as copper
- Advantages**
- Custom-made solution for aluminium conductors
 - Power transmission at the contact point across the circumference of conductors
 - Easy to fit
 - Compensation for installation tolerances
 - Stainless screw connection completely pre-assembled
 - No welding required on the busbars
 - Maintenance free throughout service life.
 - Tested by an independent laboratory (Karlsruhe Institute of Technology (KIT))
- Testing/
Simulation**
- Type test based on IEC 61238-1:2003
 - Modelling of the relaxation time using FEM simulation and verification of the results by means of heating cycles



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Contact ageing/life cycle testing

Based on IEC 61238-1 (now IEC 61238-1-3), the service life of the expansion clamp was tested at the Karlsruhe Institute of Technology (KIT). Four 80 mm diam. type expansion clamps (136 982-021) were stressed with 300 heating cycles at 3850 A. In addition, after the first 75 heating cycles, the expansion clamps were exposed to eight thermal overloads to accelerate the contact ageing. No change in the defined ratio of the transition resistance could be determined. Based on the results of this test, the service life is expected to be greater than 30 years, with no additional thermal loading or fatigue of the expansion clamp.

Relaxation time calculation

Using the results of the heating test at the KIT, together with the Technical College Fachhochschule Nord-Westschweiz, a FEM based calculation model was developed, with which the relaxation time of the screw connection of the expansion clamp onto the conductor can be calculated (relaxation time = halving the clamp tension). The calculations show that the relaxation time for all types is substantially greater than the expected usage period of 30 years and the expansion clamps can maintain the tension throughout their service life.

Technical specifications

Type	Ø60	Ø70	Ø80	Ø100	Ø110
Product no.	136 980-021	136 981-021	136 982-021	136 983-021	136 984-021
Conductor diameter "øD"	60 mm	70 mm	80 mm	100 mm	110 mm
Material: Lamella Clamping elements	EN AW-1350 AlMgSi1				
Electrical conductivity	24-32 MS/m (clamping elements)/ 34-36 MS/m (lamella)				
Surface	Blank				
Maximum current	2700 A	3500 A	3500 A	4500 A	4500 A
Max. operating temperature	120 °C				
Max. temperature increase	100 K				
Tightening torque	40 Nm	40 Nm	40 Nm	50 Nm	50 Nm
Bar separation on installation	270 mm				
Min. radial space requirement "øA"	diam. 158 mm	diam. 168 mm	diam. 168 mm	diam. 203 mm	diam. 203 mm
Overall length	410 mm				
Max. flexible length	+10/-25 mm				
Packaging	Individually packaged in special anti-corrosion bubble wrap. Contact surfaces treated with anti-corrosion grease.				

