

Data Sheet no. 1.72/2

Metal-Clad Connection and Junction Elements Type C, T, X and XX

1. Application

Connection and junction elements are necessary to establish complete metal-clad, gas-insulated test systems based on test transformers (Data Sheets 1.12 and 1.71) and reactors (Data Sheet 8.13) for factory and on-site testing of gas-insulated switchgear (GIS) and gas-insulated lines (GIL) (see Catalog Sheet 1.70 and 8.04).

2. Design

Based on long-term experience, HIGHVOLT designs metal-clad test systems as compact as possible to reduce their own capacitances, weights and number of flanges to increase the range of the load capacitance. This considers the integration of additional functions into the connection and junction elements, as voltage measurement by a capacitive sensor (HV arm of a voltage divider), protection of the test transformer or reactor by a blocking impedance (Data Sheet 1.73 and 1.74) or injection of PD calibration pulses (Data Sheet 6.12). With only three shapes of elements a remarkable variety of test systems can be realized. For the connection to test object, all necessary adapters can be supplied on special request.

The elements have a SF₆ insulation with a rated pressure of 0.5 MPa (absolute). Appropriate spacers are arranged according to the test system configuration.

3. Elements

3.1 Cylinder element, type C (Fig. 1)

The cylinder elements are available for the rated voltages of Table 1 and usually equipped with a blocking and protection impedance (Data Sheet 1.73). If no voltage sensor of the transformer or reactor shall be used, the cylinder element can be equipped with an additional measuring capacitor. For special application the cylinder element can be supplied with a HV connection instead of the blocking impedance. For dimensions and weights see Table 1, different lengths L on request.

Type designations: "C a" (with a = rated voltage in kV)

Example: C 800 is a cylinder element for 800 kV.

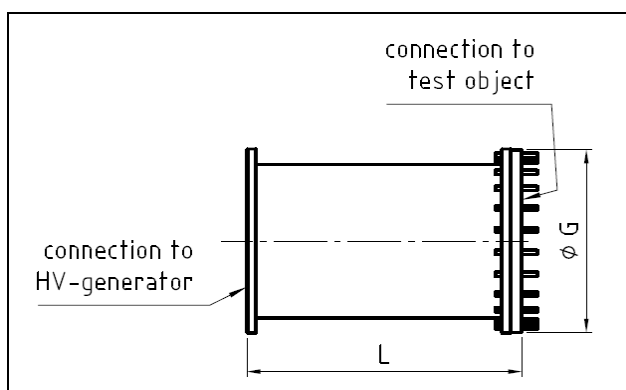


Fig. 1: Cylinder element, type C

3.2 T-element, type T (Fig. 2)

Compared to the cylinder element, type C, this element has an additional flange to connect other components, like a coupling capacitor for sensitive partial discharge measurements.

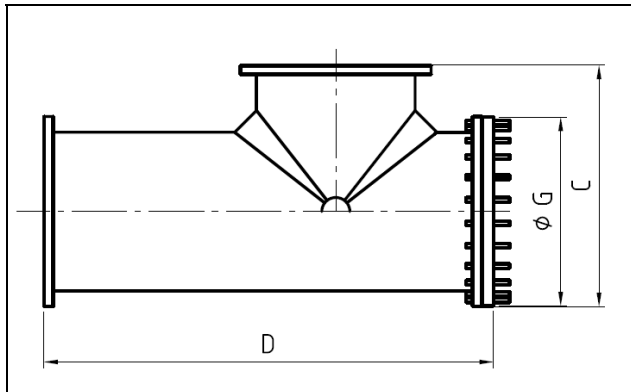


Fig. 2: T-element, type T

3.3 Cross element, type X (Fig. 3)

The cross element combines a cylinder element with the connections of a coupling capacitor and a PD calibration injector (Data Sheet 6.12). It is available for the rated voltages of **Table 1** and usually equipped with a blocking impedance and a measuring capacitor. For dimensions and weights see Table 1.

Type designations: “**X a**” (with a = rated voltage in kV)

Example: X 510 means a cross element for 510 kV.

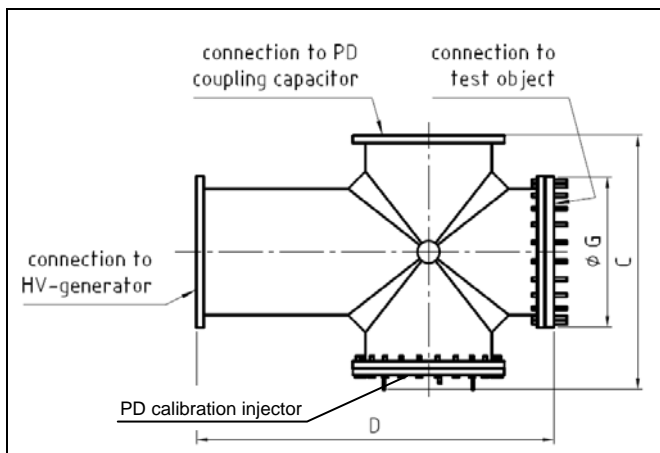


Fig. 3: Cross element, type X

3.4 Double-cross element, type XX (Fig. 4)

A double-cross element enables the extremely compact arrangement of a metal-clad test system even in test rooms of low height. Fig. 5 shows also the connection of the other components of the system. The blocking impedance and the measuring capacitor are arranged between the two crosses. For dimensions and weights see Table 1.

Type designations: “**XX a**” (with a = rated voltage in kV)

Example: XX 680 is a double-cross element for 680 kV.

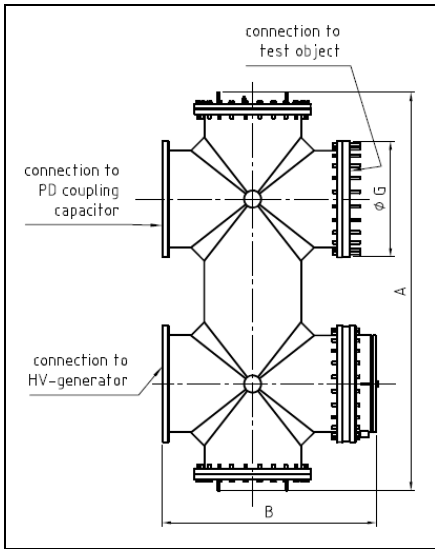


Fig. 4: Double-cross element (top view)

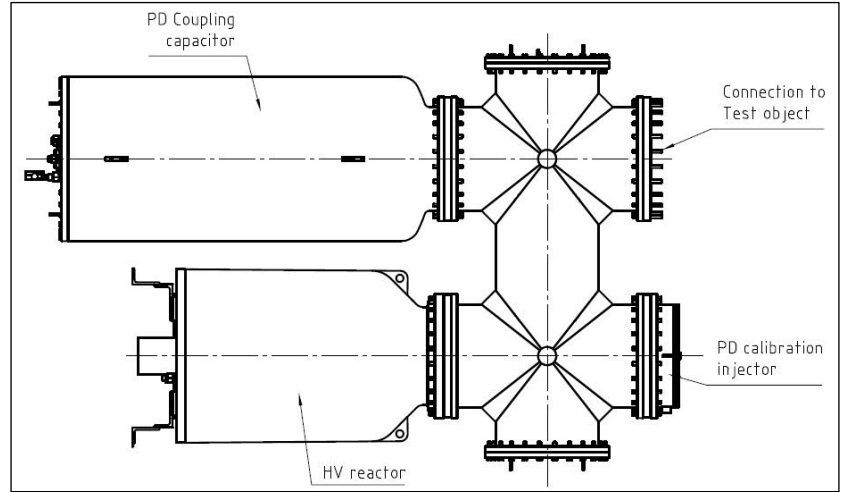


Fig. 5: Example of metal-clad HV test circuit using a double-cross element (top view)

3.5 Adapter

For the connection of test objects with any type of GIS flanges to a HIGHVOLT test system, adapters of various designs can be supplied on request. With the request, a precise drawing of the flange shall be supplied.

Table 1: Dimensions and weights of elements

rated voltage kV	Dimensions (Fig. 1 to 4) mm								weights ** kg			minimum height of test object connection mm	applicable for standard types of test systems
	G	L	A	B	C	D	E*	F*	cylinder elements	cross element	double-cross element		
510	675	1000	2325	1255	1140	1610	800	1770	450	600	1100	700	WPG 45/230G WPG 30/325G WRV 1.5/325G WP 400/400G WRV 1.5/460G WP 500/500G WPG 90/510G
680	675	1000	2325	1255	1140	1610	800	2520	450	600	1100	700	WRV 1.5/540G WP 600/600G WRV 1.5/680G
800	850	1350	2850	1650	1300	2200	1100	2520	800	1000	1850	850	WPG 250/750G WP 1000/800G
1000	850	1350	2850	1650	1300	2200	1200	2700	800	1000	1850	850	WRV 0.65/1000G WPG 375/1000G WPG 500/1000G

* Overall dimensions of the metal tank of coupling capacitors (E-diameter, F-length), for more details see Data Sheet 1.73

** including blocking impedance

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