AC Voltage - Typical Configurations

Single-stage			Two-stage			Three-stage		
Rated no load voltage kV (rms)	100	100	Rated no load voltage kV (rms)	200	200	Rated no load voltage kV (rms)	300	300
Output (kVA) : Continuous Short time	5 10	10 20	Output (kVA): Continuous Short time	5 10	10 20	Output (kVA): Continuous Short time	5 10	10 20
Rated current (mA)	50 100	100 200	Rated current (mA)	25 50	50 100	Rated current (mA)	16 33	33 66
Impedance voltage (%) Approx.	4	8	Impedance voltage (%) Approx.	7	14	Impedance voltage (%) Approx.	11	22
Frequency (Hz)	50/60	50/60	Frequency (Hz)	50/60	50/60	Frequency (Hz)	50/60	50/60

DC Voltage -- Typical Configurations

Single-stage			Two-stage			Three-stage		
Rated no load voltage kV	140	140	Rated no load voltage kV	280	280	Rated no load voltage kV	400	400
Rated current (mA)	13	25	Rated current (mA)	10	20	Rated current (mA)	7.5	15

Impulse Voltage ----- Typical Configurations

Single-stage		Two-stage		Three-stage	
Rated DC Charging voltage	140 kV	Rated DC Charging voltage	280 kV	Rated DC changing voltage	420 kV
Maximum stored energy with: 1. CS 25 (25 nF) 2. CS 50 (50 nF) 3. CS 100 (100 nF)	 245 J 490 J 980 J	Maximum stored energy with : 1. CS 25 (25nF) 2. CS 50 (50 nF) 3. CS 100 (100 nF)	 490 J 980 J 1.96 kJ	Maximum stored energy with : 1. CS 25 (25 nF) 2. CS 50 (50 nF) 3. CS 100 (100 nF)	 735 J 1.47 kJ 2.94 kJ
Voltage efficiancy (Approx.)	92%	Voltage efficiancy (Approx.)	92%	Voltage efficiancy (Approx.)	92%

Components for Single, Two, and Three Stage Set-Ups

Sl. No.	COMPONENTS	TYPE	AC TEST SET						DC TEST SET						IMPULSE TEST SET WITH FIBER OPTIC TRIGGER		
			5 kVA cont.			10 kVA cont.			5 kVA cont.			10 kVA cont.			CS 25/50/100		
	STAGES		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
1.	CONTROL DESK	SRP 0.5/5E	1	1	1				1	1	1						
2.	CONTROL DESK	SRP 0.5/5TrE													1	1	1
3.	CONTROL DESK	SRP 0.5/10E				1	1	1				1	1	1			
4.	TRANSFORMER	TEO 100/10	1	2	3				1	1	1				1	1	1
5.	TRANSFORMER	TEO 100/20				1	2	3				1	1	1			
6.	ELECTRODE	EL 200		1			1										
7.	ELECTRODE	EL 300			1			1									
8.	HV FLEXIBLE CONR.	HSV		1	1		1	1									
9.	SILICON RECTIFIER	GS							2	4	6	2	4	6	2	2	2
10.	IMPULSE CAPACITOR	CS							1	3	5	1	3	5	1	2	3
11.	LOAD CAPACITOR	CB													1	2	3
12.	CHARGING RESISTOR	RL													1	2	3
13.	WAVE FRONT RES.	RD													1	2	3
14.	WAVE TAIL RES.	RE													1	2	3
15.	MEASURING CAPACITOR	CM 100	1			1											
16.	MEASURING CAPACITOR	CM 200		1			1										
17.	MEASURING CAPACITOR	CM 300			1			1									
18.	MEASURING RES.	RM							1	2	3	1	2	3	1	1	1
19.	EARTHING SWITCH	ES							1	1	1	1	1	1	1	1	1
20.	ELECTRODE	EL							1	11	17	1	11	17	1	1	1
21.	EARTHING ROD	ESt	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
22.	INSULATING ROD	IS							1	8	10	1	8	10	2	5	12
23.	SPHERE GAP	KF													1	2	3
24.	DRIVE FOR KF	AKF													1	1	1
25.	CONNECTING ROD	V	1			1			1	3	3	1	3	3	1	4	7
26.	CONNECTING CUP	K	1	1		1	1		3	10	14	3	10	14	6	13	21
27.	FLOOR PEDESTAL	F(S)	1			1			3	5	6	3	5	6	6	8	8
28.	SPACER TUBE	D							2	5	7	2	5	7	5	8	9
29.	PEAK VOLTMETER	DSM	1	1	1	1	1	1									
30.	IMPULSE VOLTMETER	DSTM													1	1	1
31.	LOW VOLTAGE DIVIDER	NtZ													1	2	3
32.	DC VOLTMETER	DGM							1	1	1	1	1	1	1	1	1
33.	TRIGGER DEVICE	TU *													1	1	1
34.	ELE.TRIGGER SPHERE	EZK *													1	1	1

Accessories / Optionals for HV construction kt:
Measuring spark gap type MF / MF 250 / MF 500 , Compressed gas capacitor type CP 100, Vessel for vaccuum and pressure type DKU, Spacer bar type DD for DKU, Corona cage type KR for DKU, Oil testing cup type OP.

HI-VOLT TEKNO PRODUCTS

ANANDRAM NILAYA # 552, 14th "A" CROSS, BHUVANESHWARINAGAR, BANGALORE - 560024, INDIA. Email: marketing@hvtekpro.in

Control Desks

SRP 0.5/5E

SRP 0.5 / 5E

Technical data

Supply Voltage	: 220 V
Regulating transformer	: 5 kVA Continuous rating driven by 24V DC geared motor drive.
Regulating Voltage	: 220 V / 0-230 V
Output	: 5 kVA (continuous) 10 kVA (short time duty 2 Min.)
Frequency	: 50 Hz. / 60 Hz.
Weight	: approx. 180 kg

Application

This control desk is used to control and operate high voltage AC/DC test equipment.

The desk contains operating and signal elements for the control circuit of the test equipment for warning and safety.

SRP 0.5/5 TrE

SRP 0.5/10E

SRP 0.5 / 5TrE

Technical data

Supply Voltage	: 220 V
Regulating transformer	: 5 kVA Continuous rating driven by 24V DC geared motor drive.
Regulating Voltage	: 220 V / 0-230 V
Output	: 5 kVA (continuous) 10 kVA (short time duty 2 Min.)
Frequency	: 50 Hz. / 60 Hz.
Weight	: approx. 275 kg

Application

This control desk is used to control and operate high voltage AC/DC/Impulse test equipment.

The desk contains operating and signal elements for the control circuit of the test equipment for warning and safety.
It has additional provisions for triggering of the impulse voltage test equipment.

SRP 0.5 / 10E

Technical data

Supply Voltage	: 220 V
Regulating transformer	: 10 kVA Continuous rating driven by 24V DC geared motor drive.
Regulating Voltage	: 220 V / 0-230 V
Output	: 10 kVA (continuous) 20 kVA (short time duty 2 Min.)
Frequency	: 50 Hz. / 60 Hz.
Weight	: approx. 300 kg

Application

This control desk is used to control and operate high voltage AC/DC/Impulse test equipment.

The desk contains operating and signal elements for the control circuit of the test equipment for warning and safety.
It has additional provisions for installation for additional measuring instruments.

BASIC ELEMENTS FOR AC/DC/IMPULSE SET

TEST TRANSFORMER, COMPENSATING REACTOR

Technical data — Application

TEO 100/10 Single-Phase AC Voltage Test Transformer

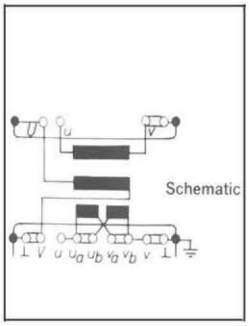
Ratio	:	2x220 V / 100kV / 220V
Rated cont. current	:	2x11.4 A / 50 mA / 15.2A
Output	:	5 kVA continuous. 10 kVA for 60 min.
Impedance voltage	:	Approx. 4%
Frequency	:	50 Hz or 60 Hz
Weight	:	215 kg

Test transformer with coupling winding for cascade connections

TEO 100/20 Single-Phase AC Voltage Test Transformer

Ratio	:	2x220 V / 100kV / 220V
Rated cont. current	:	2x22.8 A / 100 mA / 30A
Output	:	10 kVA continuous 20 kVA for 60 min.
Impedance voltage	:	Approx. 8%
Frequency	:	50 Hz or 60 Hz
Weight	:	220 kg

Test transformer with coupling winding for cascade connections



Primary		Connection	Secondary		Output(kVA)		Impedance Voltage %	
Input Terminals	Voltage (V)		Output terminals	Voltage (kV)	TEO 100/10	TEO 100/20	TEO 100/10	TEO 100/20
		$u_a - u_b$	U - V	100	5	10	4	8
u - v	220	$u_a - u_b$						
u - v	220	$u_b - u_a$	U - V	50	2.5	5	8	16

DEG 0.5/5 Resin Cast compensating reactor

Rated Voltage	:	220 V
Frequency	:	50 Hz
Rated output	:	1) 5 kVA cont./ 10 kVA 60 min. 2) 10 kVA cont../ 20 kVA 60 min.
Inductance	:	30 mH - 15 mH
Dimension	:	425 x 462 x 190mm
Weight	:	100 kg

Ring core compensating reactor to compensate for the capacitive reactive power of the test object in two or three stage cascade configuration of the test transformers (TEO 100/10 or TEO 100/20) The compensating reactor is flanged between the stages of the transformer cascade and connected in parallel with the exciter winding

Test Out put of the Transformers in Cascade Connection

	Without compensation for transformer TEO 100/10		With compensating reactor for transformer TEO 100/10			Without compensation for transformer TEO 100/20		With compensating reactor for transformer TEO 100/20		
Cascade	Cont.	Short time	Cont.	Short time	No. of reactors	Cont.	Short time (approx.)	Cont.	Short time (approx.)	No. of reactors
Single stage	5 kVA	10 kVA	-	-	-	7.5kVA	20kVA	-	-	-
Two stage	5 kVA	10 kVA	10kVA	20kVA	1	7.5kVA	20kVA	12.5kVA	30kVA	1
Three stage	5 kVA	10 kVA	15kVA	30kVA	2	7.5kVA	20kVA	17.5kVA	40kVA	2

Continuous duty : For 5 kVA primary input power from regulating transformer use control desk SRP 0.5/5 E and for 10 kVA use SRP 0.5/10E
Short time duty : a) 2 Minutes for primary input power 10 kVA from regulating transformer in control desk SRP 0.5/5 E and 20 kVA in SRP 0.5/10E
b) 60 Min. for primary input power 10 kVA or 15 kVA from regulating transformer in control desk SRP 0.5/5E or SRP 0.5/10E respectively via additional compensating reactor DEG, connected in parallel with secondary winding of the regulating transformer

BASIC ELEMENTS FOR AC/DC/IMPULSE SET

Capacitors

CS 25

CS 25 Impulse Capacitor

Technical data		Application
DC and Impulse voltage	: 140 kV	Impulse capacitor for generation of impulse Voltages. It can also be used as smoothing capacitor in DC voltage generation.
Capacitance	: 25 nF	
Weight	: 20 kg	

CS 50

CS 50 Impulse Capacitor

Technical data		Application
DC and Impulse voltage	: 140 kV	Impulse capacitor for generation of impulse Voltages. It can also be used as smoothing capacitor in DC voltage generation.
Capacitance	: 50 nF	
Weight	: 42 kg	

CS 100

CS 100 Impulse Capacitor

Technical data		Application
DC and Impulse voltage	: 140 kV	Impulse capacitor for generation of impulse Voltages. It can also be used as smoothing capacitor in DC voltage generation.
Capacitance	: 100 nF	
Weight	: 50 kg	

CB

CM 100

CB Load Capacitor

Technical data		Application
DC and Impulse voltage	: 140 kV	Load capacitor and high voltage divider capacitor for measurement of impulse voltages.
Capacitance	: 1.2 nF	
Weight	: 8.5 kg	

CM 100 Measuring Capacitor

Technical data		Application
AC voltages	: 100 kV	High voltage divider capacitor for measurement of AC voltages.
Capacitance	: 100 pF	
Weight	: 8.5 kg	

CM 200

CM 200 Measuring Capacitor

Technical data		Application
AC voltages	: 200 kV	High voltage divider capacitor for measurement of AC voltages.
Capacitance	: 50 pF or 100 pF	
Weight	: (Approx.) 75 kg	

CM 300

CM 300 Measuring Capacitor

Technical data		Application
AC voltages	: 300 kV	High voltage divider capacitor for measurement of AC voltages.
Capacitance	: 35 pF or 100 pF	
Weight	: (Approx.) 125 kg	

BASIC ELEMENTS FOR AC/DC/IMPULSE SETS

IS

GS
RL
RD
RE

KF

AKF

RM

Technical data			Application
IS	**Insulating rod**		
AC voltage	:	100 kV	Insulating component
DC and Impulse voltage	:	140 kV	
Weight	:	1.5 kg	
GS	**Silicon Rectifier**		
Inverse Peak voltage	:	140 kV	
Rated current	:	20 mA	Rectifier for use in impulse voltage and DC voltage generation.
Protective resistor	:	100 k	
Weight	:	8 kg	
RL	**Charging Resistor**		
DC and Impulse voltage	:	140 kV	Charging resistor for multistage impulse voltage test equipment and current limiting resistor in DC voltage generators.
Resistance	:	10 M	
Weight	:	4.5 kg	
RD	**Wave front Resistor**		
Impulse voltages	:	140 kV	For generation of impulse voltages. These resistors determine the rise time of the impulse voltage in lightning and switching impulse voltage generation.
Weight	:	5 kg	
RE	**Wavetall Resistor**		
Impulse voltages	:	140 kV	For generation of impulse voltages. These resistors determine the time to half value of the impulse voltage in lightning and switching impulse voltage generation.
Weight	:	4.8 kg	
KF	**Sphere Gap**		
Impulse voltage	:	140 kV	For Impulse voltage generation, for pre-setting of impulse voltage peak
Sphere Diameter	:	100 mm	
Max. gap Setting	:	80 mm	
With gap setting indicator			
Weight	:	7.5 kg	
AKF	**Drive for Sphere Gap, with Insulating shaft**		
Input	:	220 V	The Sphere Gap setting is made Over the insulating shafts. The AKF is clamped to the spacer bar D.
Frequency	:	50 Hz or 60 Hz	
Weight	:	5 kg	
RM	**Measuring Resistor**		
DC voltage	:	140 kV	High voltage series resistor for measurement of DC voltages.
Resistance	:	280 M	
Rated continuous current	:	0.5 mA	
Weight	:	4 kg	

BASIC ELEMENTS FOR AC/DC/IMPULSE SETS

HSV

HSV **HV Connection**

Length : Approx. 1.5 m for 200 kV
: Approx. 2 m for 300 kV

Flexible metal connection with Length connector for the test transformer and connecting Cup. For connection of a multi-stage AC voltage test equipment with the test transformer.

ES

ES **Grounding Switch, Electrically Operated**

Impulse Voltage : 140 kV
DC Voltage : 140 kV
Service Voltage : 24 V, 50/60 Hz
Weight : 7.7 kg

For grounding the high voltage construction kit when de-energized.

EL

EL **Electrode**

Diameter : 300 mm
Weight : 1 kg

Serves as termination in conjunction with Grounding switch for safety grounding. Also Serves as corona free electrode

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EST

Est **Discharge Rod**

Length : 2.5 m
Discharge Res. : 100
Weight : 2.5 kg

For Manual discharging of equipment components.

K

K **Connecting cup**

Aluminum cast
Weight : 2.2 kg

Conductive Element: four elements can be inserted in horizontal position and two in vertical position.

F(s)

F(s) **Floor Pedestal**

Aluminum cast
Weight : 1.75 kg

Conductive Element: for mounting up to four Spacer bars horizontally and supporting one Component vertically.

V

V **Connecting Rod**

Aluminum tube
Weight : 1 kg

Conductive connection element.

D

D **Spacer tube**

Aluminum tube
Weight : 0.7 kg

Mechanical and electrical connection on ground level when inserted into floor padestal.

Technical data — Application

DSM

DSM — Peak Voltmeter (Digital Display)

Supply voltage	:	220 V 50 Hz
Measuring Range	:	100-1000 kV
Weight	:	3.4 kg
Dimensions	:	142 × 173 × 245 (W × H × D)

Measurement of AC voltage Peak, RMS, AC Peak/$\sqrt{2}$, Switching Impulse voltage. For connection to measuring capacitor (CM), coupling capacitor (CK) for AC measurements or Impulse load capacitor (CB) for switching impulse measurements.

DSTM

DSTM — Impulse Voltmeter (Digital Display)

Supply voltage	:	220 V 50 Hz
Measuring Range	:	100-1000 kV
Weight	:	3.4 kg
Dimensions	:	142 × 173 × 245 (W × H × D)

Measurement of the Impulse Voltage peak. For Connection to the load capacitor (CB).

DGM

DGM — DC Voltmeter (Digital Display)

Supply voltage	:	220 V, 50 Hz
Measuring Range	:	140 kV/280 kV/400 kV
Weight	:	3 kg
Dimensions	:	142 × 173 × 245 (W × H × D)

Measurement of the DC Voltage. For Connection to the Measuring Resistor (RM)

TU

TU — Trigger Device

Supply voltage	:	220 V 50 Hz
Weight	:	3.7 kg
Dimensions	:	142 × 173 × 245 (W × H × D)

For Triggering impulse voltage generator impulse voltage oscilloscope and chopping spark gap.

The trigger impulse is transferred to the high voltage sphere by means of a fibre optics cable. The impulse is amplified in the electronic trigger sphere.

NTZ

NTZ — Low Voltage Divider

Measuring Ranges:		450 kV
(Optical)	:	300 kV
		150 kV
		75 kV
		37.5 kV

NTZ incorporates the Low voltage capacitors and the 75 ohm cable adapter It is plugged in to the UHF - Socket of the load capacitor (CB) and connected to the Impulse Voltage meter (DSTM) by means of co-axial cable.

EZK

EZK — Electronic trigger sphere

Diameter	:	100 mm
Weight	:	0.7 kg

Suitable for use with the sphere gaps (KF) and measuring spark gaps MF. In conjunction with the triggering device (TU), the impulse Voltage Generator can be triggered and the voltage be chopped at a pre set instant with fibre optic cable.

TEST APPARATUS

DKU

Technical data — Aplication

DKU Vessel for vacuum and pressure

AC Voltage	: 100 kV	For the determination of the flashover voltage of electrode arrangement as a function of vacuum and overpressure.
DC Voltage	: 140 kV	
Impulse Voltage	: 140 kV	
Max. operating pressure (abs) : 0-6 bar		
With different electrodes		
Sphere Electrodes	: Dia. 50 mm	
	Dia. 20 mm	
Weight	: 12 kg	

D (D)

D (D) Spacer Bar

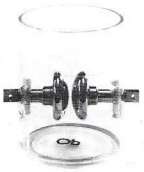
Aluminum Tube		For connection of a floor pedestal [F(s)] with the vessel for vacuum and pressure (DKU)
Length	: 652 mm	

KR

KR Corona Cage

AC Voltage	: 20 kV
DC Voltage	: 20 kV
Weight	: 0.5 kg

For determination of the glow intensity as a function of the wire diameter. The corona cage is inserted in to the DKU.
Measurement can be made at vacuum and over pressure.



OP

OP Oil Testing Cup

With electrodes having spherical shape. Gap setting 2.5 mm according to standards.

For the Measurement of breakdown voltage of insulating oils.

CP 100

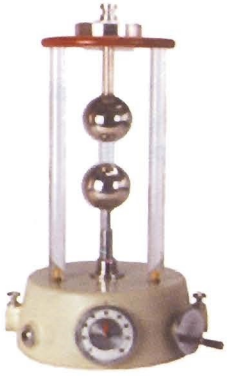
CP 100 Compressed-gas capacitor

AC Voltage	: 100 kV rms
Capacitance	: Apprix. 37pF
Loss Factor	: 2×10^{-5}
Dielectric	: SF_6
Filling pressure (abs.)	: 3.5 bar
Weight	: 15 kg

Standard Capacitor for the loss factor measuring bridge and high voltage capacitor for peak voltage measurement.

Technical data

Application



MF

MF Measuring Spark gap

AC Voltage	: 100 kV
DC Voltage	: 140 kV
Impulse Voltage	: 140 kV
For manual and motor operation with different electrodes	: 220V, 50Hz
Sphere Electrode	: Dia. 100 mm
Sphere Electrode	: Dia. 50 mm
Rod type Electrode	: Dia. 20 mm
Needle Electrode and flat electrode	
Weight	: 18 kg

For measurement of flashover voltage using various electrode arrangements.

For use as chopping spark gap after mounting the trigger sphere (EZK). With hand-wheel for manual gap settings.

Accessory: Connection cable, to control desk.

MF 250

MF 250 Measuring Spark gap

AC Voltage	: 200 kV
DC Voltage	: 280 kV
Impulse Voltage	: 280 kV
With hand-and motor drive 220V, 50Hz and 60 Hz	
Sphere type Electrodes	: Dia. 250 mm
Hight	: Approx. 1500 mm
Weight	: 50 kg

For the measuring the breakdown voltage

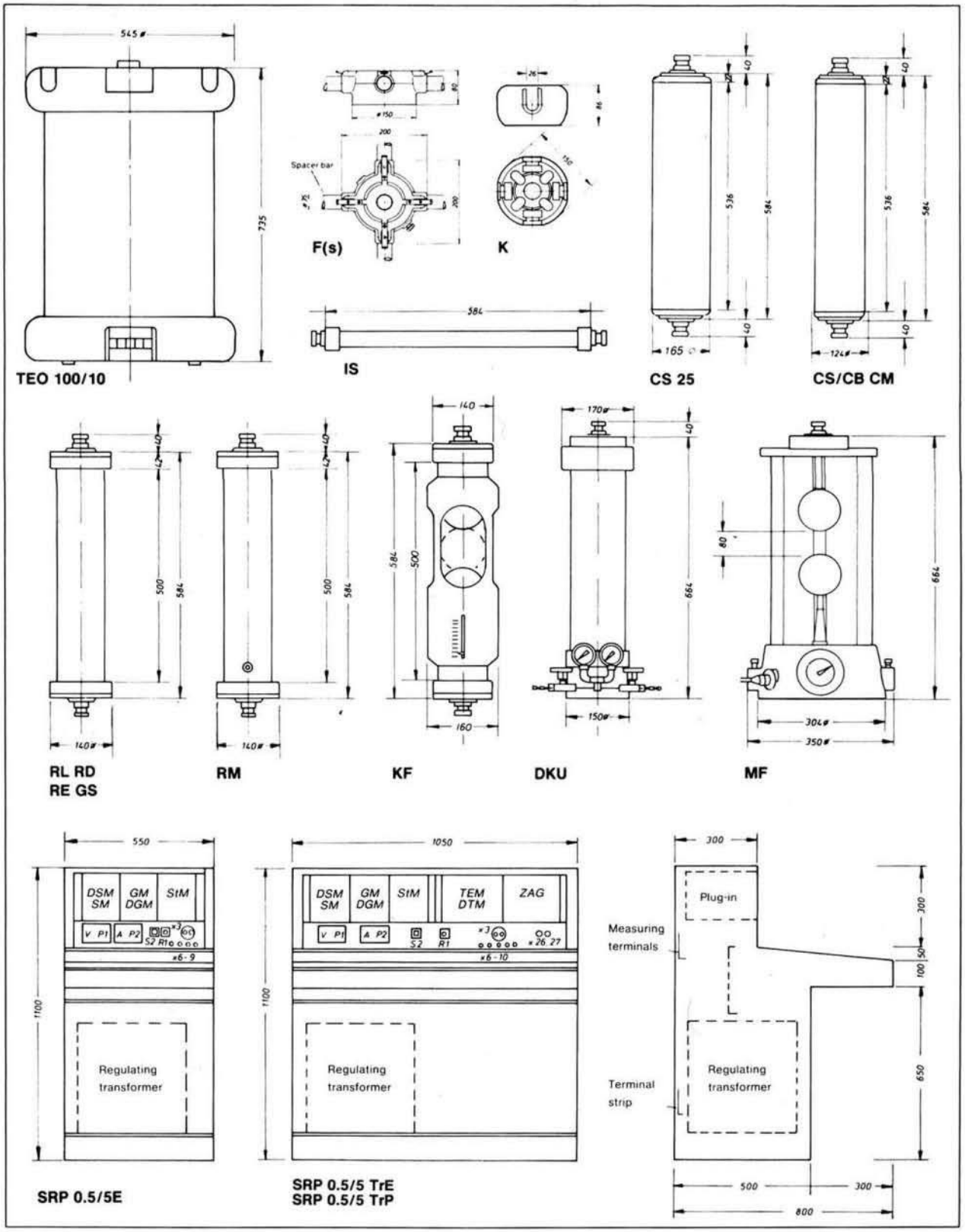
MF 500

MF 500 Measuring Spark gap

AC Voltage	: 400 kV
DC Voltage	: 500 kV
Impulse Voltage	: 500 kV
With hand-and motor drive 220V, 50Hz and 60 Hz	
Sphere type Electrodes	: Dia. 500 mm
Hight	: Approx. 4100 mm

For the measuring the breakdown voltage

Drawings of test transformer, components, control desks



HI-VOLT TEKNO PRODUCTS

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