ELUR/CERC MCRs — Development, Engineering, and Field Experience

CERC— Electrical Controlled Reactors, Joint Stock Company (ELUR)

Strategic partners:

- Zaporozhskiy transformer-manufacturing plant (Ukraine)
- All-Russian electrotechnical institute (Russia)
- Ramenskiy electrotechnical plant (Russia)
- Expanding Edge, LLC (USA)

2000 – CERC / ELUR is established

2003 – CERC / ELUR receives a Russian Government Award for Achievements in Science and Technology.

CERC Product Lines:

- Magnetically Controlled Shunt Reactors for Transmission networks (T-MCRs)	RTU-type	110...500 kV;
- Magnetically Controlled Shunt Reactors for Distribution networks (D-MCRs)	RTU-type	6... 35 kV;
- Arc-Quenching Magnetically Controlled Reactors for electric networks with isolated neutral (A-MCRs)	RUOM/ROU-type	6... 35 kV.

Technical requirements

Technical requirements for 110—550 kV MCRs, **UESR**— United Electric System of Russia

Basic:

1. Consumed power level is adjusted automatically or manually between 0.01 and 1.2 the rated power with unlimited possible changes.
2. Guaranteed time interval of smooth power change from one steady-state value to another is 0.3 to 0.5 sec.
3. Effective value of current distortion consumed from the network is no more than 5% of the nominal current of the fundamental harmonics within the full adjustment range.
4. Nominal mode starts less than 0.02 seconds after the reactor is connected to an HV power network.

Additional:

5. Operability in asymmetrical and open-phase conditions.
6. Fast-response (not more than 0.02 seconds) changeover of an effective power value to the mode of double power consumption with consequent return to initial state.
7. Enhancement of the consumed current curve with the current distortion reduced to 2% of the nominal value.
8. Power take-off at the low-voltage side.

TECHNICAL AND ECONOMIC INDICES FOR 110—500 KV T-MCRS

1. Basic technical and economic indices

- total unit weight: 1.5—3 kg/kvar
- specific power loss:
  - no-load: 0.5—1.0 W/kvar;
  - nominal: 4—8 W/kvar.

2. Operational characteristics

- completely automatic operation (without switches operating);
- operation expenses, reliability and regular maintenance similar to that of conventional shunt reactors.

3. Functional capabilities

- MCR can functionally substitute for conventional shunt reactors, stepwise adjustable reactors and thyristor-reactor groups;
- Combined with bank capacitors MCRs act as synchronous or thyristor compensators;
- MCRs do not require commutation of circuit breakers.

A phase of MCR-T type RODCU-60/525/√3 installed at Beliy Rast substation, Moscow Region, Russian Federation

MARKET OUTLOOK:

1. **Existing Russian MCR-Ts**

   The following controlled reactors are being manufactured or have already been installed:

   MCR 25(32)/110—4 units;

   MCR63/110—1 unit;

   MCR 1001220—2 units;

   MCR 180/330—1 unit;

   MCR 180/500—1 unit.

2. **Future Russian MCR-T**

   According to **UESR**— United Electric System of Russia estimates approximately each one in three reactors in 110—550 kV networks must be controlled.