

Protection for distributed generation

BELplus OZE

The BELplus OZE device is a digital protection relay designed for the protection and supervision of MV and LV switchgears installed in distributed generation facilities incorporated into the distribution network by means of an LV/MV transformer, e.g. on photovoltaic farms.

The device also functions as a telemechanics controller, a disturbance recorder, and implements various substation automations and interlocks.

A complete set of protection functions designed for such facilities (e.g. overcurrent, over/undervoltage, frequency, automatic reclosing after disconnection from the network, etc.) has been implemented in the controller, complying with the requirements of the Distribution Grid Code applicable to DSOs.

BELplus OZE is adapted to measure electrical values in the switchgear on both the MV and LV sides. The BELplus OZE device meets the latest guidelines regarding the need to perform measurements on both the primary and secondary sides of the MV/LV transformer installed in RES installation.



Functionality

- Supervision and full protection of the switchgear
- Comprehensive set of protection functions, fulfilling the requirements of the Distribution Grid Code
- Built-in automatic reclosing on both the MV and LV sides
- Sophisticated graphical panel with colour touchscreen display and programmable LEDs
- 4 settings banks with automatic changeover
- Event log with various levels of detail
- Disturbance recorder with the function of a criterion recorder
- Visualisation and recording of P and Q energy meter measurements via a dedicated website
- Simultaneous two-way communication with SCADA systems of the DSO and the facility owner
- Remote engineering channel for changing parameters, automations, logic, and software
- Simple operation using dedicated BEL Navi software or web access
- Self-monitoring system for protection operation, signalling of warnings
- Dedicated outputs for controlling the MV circuit breaker with continuity monitoring of tripping and closing circuits
- Internal Breaker Failure Protection function – implemented by reserving the LV circuit breaker with the MV circuit breaker

Design

▪ Signalling and control circuits

The device is equipped as standard with 30 signalling inputs and 19 control outputs providing supervision of the switchgear and enabling control of circuit breakers on both the medium-voltage and low-voltage sides. The circuits controlling the medium-voltage circuit breaker are equipped with a continuity monitoring system.

▪ Housing

Manufactured from an aluminium profile, it features a colour LCD touchscreen display, indicator LEDs and buttons for operating the device.

▪ Measurement inputs

The device incorporates two measurement packages for measuring voltages and currents on both the medium-voltage and low-voltage sides.

Technical parameters

Power supply	Supply voltage	24 V DC	
	Power consumption	≤ 22 W	
Signalling and control circuits	Number of signalling inputs	30	
	Number of control outputs	19	
	Operating voltage	24 V DC	
Measurement inputs MV side	Voltage circuits	$3 \times U_f$ $1 \times 3U_0$ $1 \times U_4$	$U_{max} = 100 \text{ V}$ $U_{0max} = 100 \text{ V}$ $U_{4max} = 120 \text{ V}$
	Current circuits	$3 \times I_f$ $1 \times 3I_0$	$I_n = 5 \text{ A}, I_{max} = 20 \times I_n$ $3I_{0n} = 1 \text{ A}, I_{0max} = 5 \times I_n$
Measurement inputs LV side	Voltage circuits	$3 \times U_f$ $1 \times U_0$	$U_{max} = 300 \text{ V}$ $U_{0max} = 300 \text{ V}$
	Current circuits	$3 \times I_f$ $1 \times I_0$	$I_n = 5 \text{ A}, I_{max} = 20 \times I_n$ $I_{0n} = 1 \text{ A}, I_{0max} = 5 \times I_n$
Connectivity	Communication interface	ETH 10/100BASE-TX Main telemechanics channel to SCADA OSD and engineering channel	
		RS 422 Backup telemechanics channel to SCADA OSD	
		RS 232 Secondary communication channel to the facility owner's SCADA	
	Communication protocols	DNP 3.0	
Housing	Weight	≤ 5 kg	
	Housing version Housing dimensions (HxWxD)	flush-mounted – 218 x 218 x 185 mm	
	Work area	closed	
	Protection class in accordance with EN 60529	IP20	
Operating conditions	Operating / storage temperature	from -10°C to +55°C / from -20°C to +70°C	
	Relative humidity	up to 95%	

