

RTF

Automatic Voltage Regulator (ZIV e-NET flex family)



**Voltage regulation for
up to 5 power transformers
in parallel**

General Characteristics

- ✓ Powerful programmable logic.
- ✓ 2000 event log. Up to 100 oscillography seconds.
- ✓ Alphanumeric or graphic display.
- ✓ 160 DI, 80 DO, and 22 LEDs.
- ✓ Bonding, RSTP, PRP and HSR Redundancy.
- ✓ IEC 61850 Ed. 2, DNP3, Modbus RTU and PROCOME protocols.
- ✓ Native process bus. Analog input cards operate as Merging Units for the CPU. Synchronized samples at 4800 Hz (as per IEC 61869-9).
- ✓ Cybersecurity in accordance with IEC 62351, IEC 62443 and IEEE 1686-2013 standards. RBAC, secure keys, physical and logical port disabling, cybersecurity event log, securing of management protocols (PROCOME, HTTPS, SFTP, SSH), remote authentication (LDAP, RADIUS) and digital firmware securitization.
- ✓ Time synchronization by IRIG-B, SNTP and PTP (Ordinary Clock / Transparent Clock).

Parallel transformer regulation by **master-slave**, **circulating current** and **negative reactance** methods.

Also includes line **voltage drop compensation**.



Voltage Regulation

Maintains the transformer output voltage at the setpoint value, calculating the difference between the measured voltage and the setpoint voltage and comparing it with a threshold level to decide whether to send commands to the tap changer.

The first tap change command has a time delay based on an inverse curve or a fixed time. Subsequent commands always have a fixed time delay.

Line Voltage Drop Compensation

A compensation based on the measured current and the voltage drop between the transformer and the load, that provides stable voltage under load.

The compensation can be calculated by two methods: LDC-Z or LDC-R & X.

Parallel Transformers Regulation

Parallel transformer regulation can be achieved by the following methods:

- Master / slave
- Circulating current
- Negative reactance

The first two methods in the list allow voltage regulation for up to 5 parallel transformers using GOOSE messaging (IEC 61850 ed 1 and 2).

Tap Indication and Monitoring

The active tap can be read by digital inputs (directly or in BCD code), by an analog current transducer or by a Resistor Chain.

Tap monitoring permits to generate alarms corresponding to irregular or extreme tap positions and to failures after tap change commands.

Protección / Control Units

ANSI	Function	Uns.
90	Voltage Regulator.	1
	LDC (LDC-Z, LDC R-X).	1
	Under Voltage Block with Temporization.	1
	Maximum Switching Current Block.	1
	Voltage Out of Range Block with Temporization and Reset.	1
	Power Reversal Detection.	1
59	Tap Changer Monitoring.	1
	Phase Overvoltage.	1
81m	Underfrequency.	1
60VT	VT Supervision.	1

