

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
- ✓ Easy HW expansion without FW updates
- ✓ Unused protection elements can be hidden
- ✓ Custom mapping of physical current and voltage inputs to protection elements
- ✓ Can be used to protect multiple bays
- ✓ Up to 20 analog channels, 160 DI, 80 DO, and 22 LEDs
- ✓ Bonding, RSTP, PRP and HSR redundancy
- ✓ IEC 61850 ed. 1 & ed. 2 protocols, DNP3.0, Modbus RTU and PROCOME
- ✓ 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 and IEEE 1686-2013 standards. RBAC, secure keys, physical and logical port disabling, cybersecurity event log, and securing of management protocols (PROCOME, HTTPS, SFTP, SSH)
- ✓ 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**.



Characteristics

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).

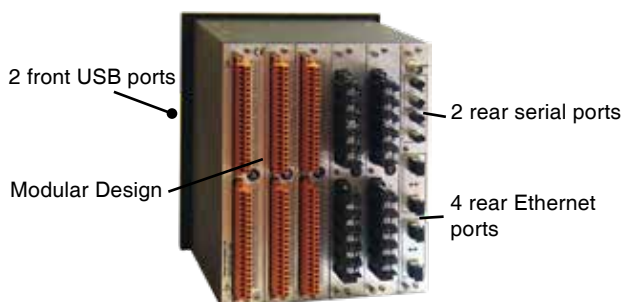
Tap Indication and Monitoring

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.

Protection and Control Units

ANSI	FUNCTIONS	
90	Voltage Regulation	1
	Line Drop Compensation (LDC Z and LDC R-X)	1
	Reactive Compensation	1
	Tap Monitoring	1
	Power Reversal Detection	1
59	Overvoltage	3
27	Undervoltage	3
81M	Overfrequency	4
81m	Underfrequency	4



Three sizes: Full 19" rack, 1/2 rack, or 1/3 rack with 6U high