

**RVR-1 Type**

**Single Phase Automatic Voltage Regulator**

**2.5KV-14.4KV-19.9KV**



***Rockwill Group Automation Co., Ltd.***

**Best solution for your power!**

## ++++ **GENERAL**

The RVR-1 type feeder automatic voltage regulator is actually a single-phase oil immersed auto-transformer with RVR controller and gathering sampling of voltage & current signal, on load tap changer controlling device to achieve grid more efficient from adjust the load character by increase and decrease the voltage.

So, This RVR is a transformer equipped with on load tap changer with RVR controller sampling voltage and current data and on load tap changer steps from current transformer and voltage transformer and limit switches.

## ++++ **MAIN FEATURES**

+The RVR-1 regulate distribution line voltages from 10% raise (boost) to 10% lower (buck) in thirty-two steps of approximately 5/8% each. Voltage ratings are available from 2400 volts (60 kV BIL) to 34,500 volts (200 kV BIL) for 60 Hz and 50 Hz systems.

+With RVR type Smart controller, a self-developed technology, GPRS/GSM, Blue-tooth.

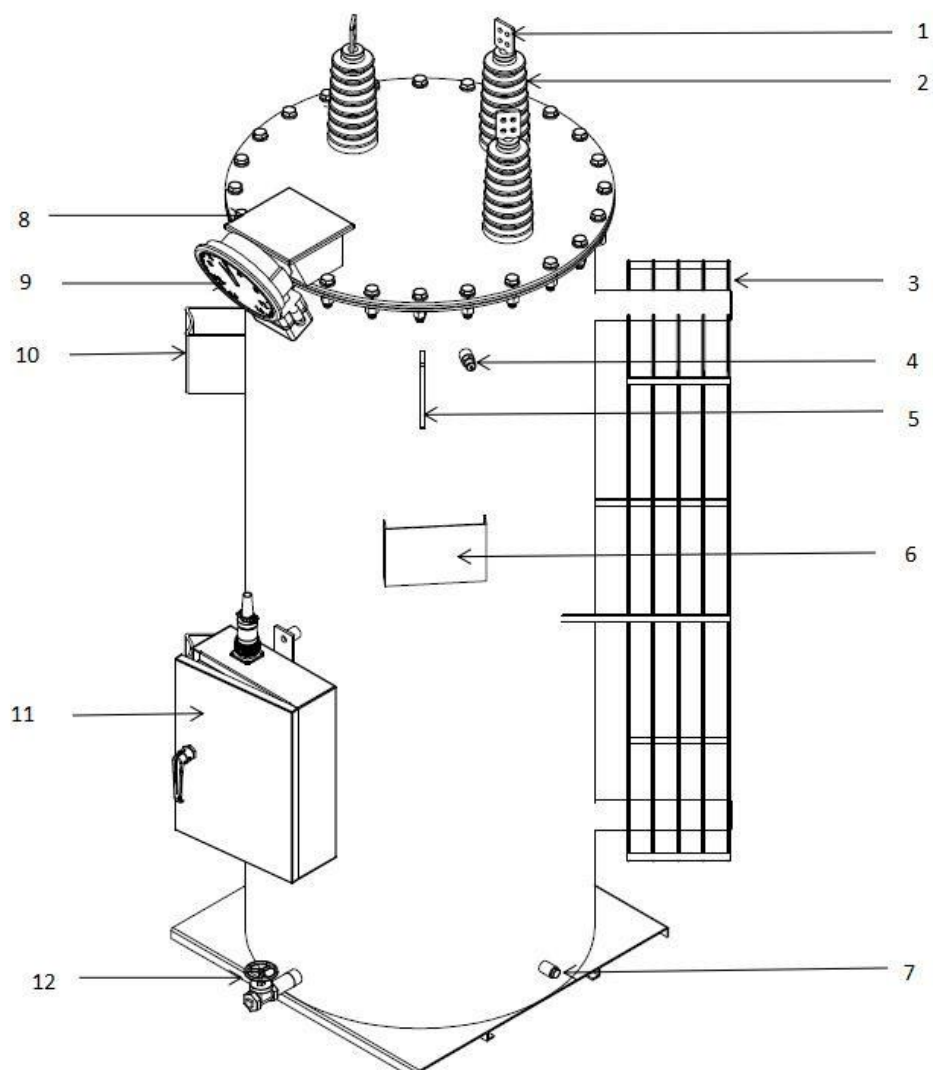
+With self-protection LOCK-OUT functions: Line fault, Overload, Over Current, Under-voltage

+With adjustable voltage datum and step scope limit, step draw delay, data setting.

## ++++ **STANDARD FEATURES**

- Position indicator with ADD-AMP adjustment
- Control box
- Tap changer with motor and power supply
- Oil drain valve with sampling device
- Automatic pressure relief device
- Lifting lugs
- Nameplates
- High-creep porcelain bushings
- Oil sight gauge
- Pole mounting brackets
- Control cabinet with removable front panel
- Conformally coated circuit boards
- MOV-type external series arresters.

## ++++ OUTLINE SCHEMATIC DIAGRAM

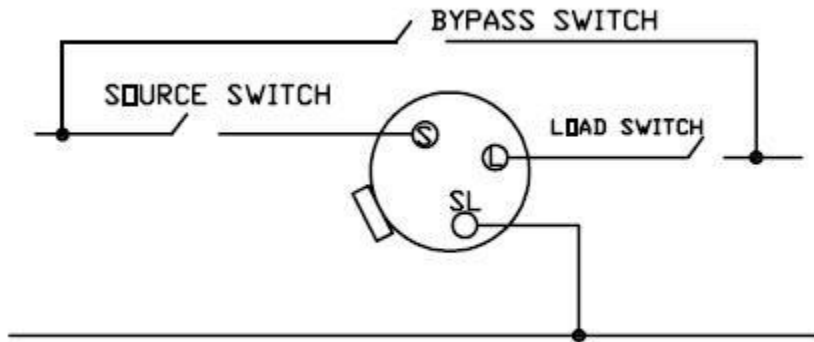


1. Terminals block
2. High-creep porcelain bushings
3. Radiator group
4. Pressure relief device
5. Lifting lugs
6. Nameplates
7. Ground stud
8. Terminal box
9. The tap position indicator
10. Pole mounting brackets
11. SEL Smart controller

## 12.Oil drain valve with sampling device

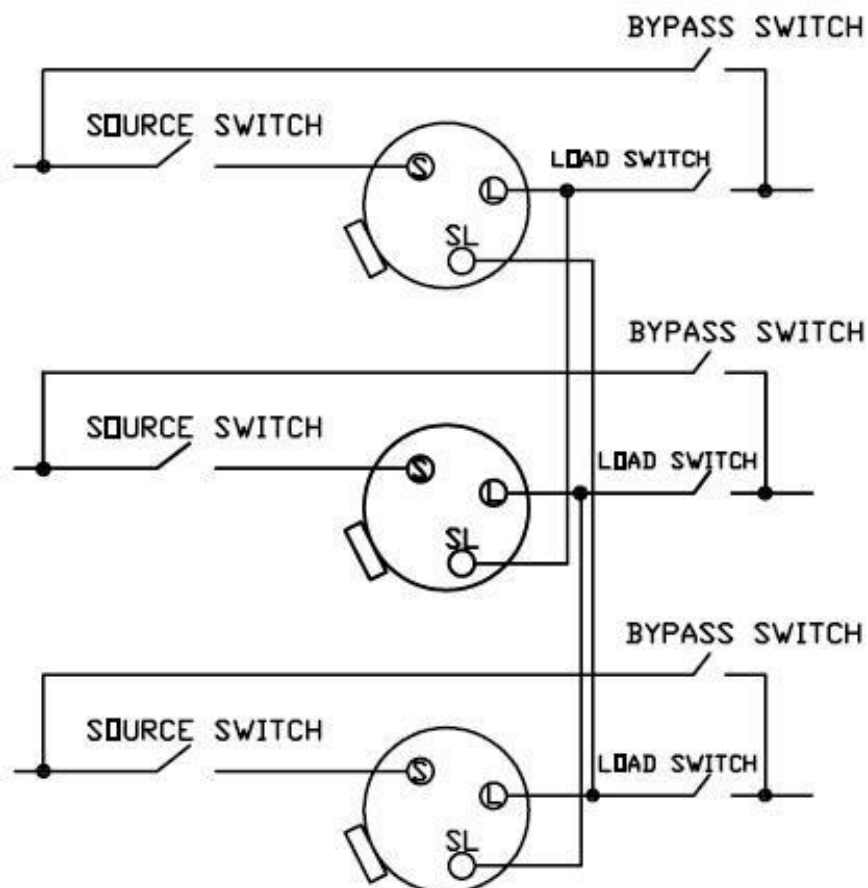
### ++++ INSTALLATION DIAGRAMS

A regulator can regulate a single-phase circuit, or three regulators connected phase-to-phase in closed-delta, can regulate a three-phase, three-wire delta circuit.



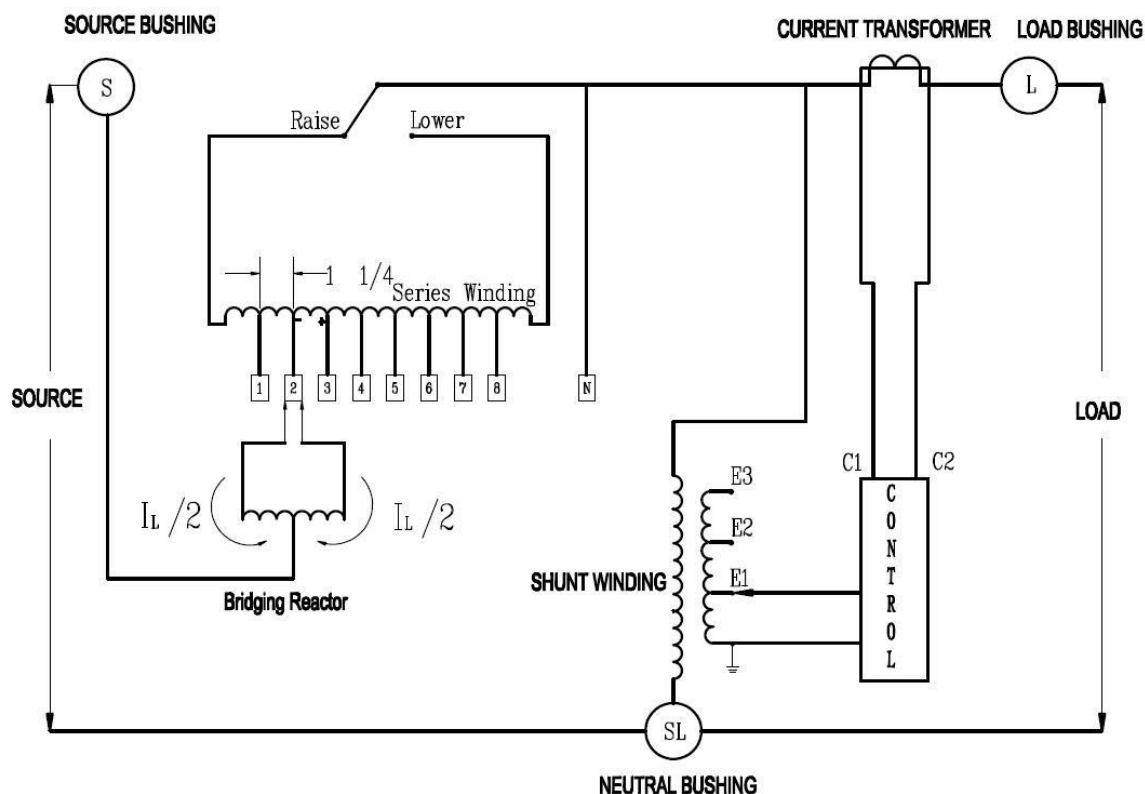
REGUCATING A SINGLE-PHASE CIRCUIT

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REGUCATING A THREE-PHASE CIRCUIT, THREE-WIRE DELTA CIRCUIT WITH THREE REGULATING

## ++++ CONNECTION DIAGRAMS



The series winding on the input (source) side of the regulator allows all windings (control, shunt, and series) to be located in one coil. The load voltage is read directly by the control winding.

The current transformer is a toroid, through which the load current passes. It furnishes a current proportional to load current to the line-drop compensator circuit in the control and to optional metering packages.

Internal potential winding taps are provided on all ratings so that each regulator may be applied within a range of system voltages.

All RVR-1 voltage regulators are equipped with a bypass arrester connected across the series winding between the source (S) and load (L) bushings. This bypass arrester limits the voltage developed across the series winding during lightning strikes, switching surges and line faults.

## ++++ INTERNAL STRUCTURE

### 1. Autotransformer

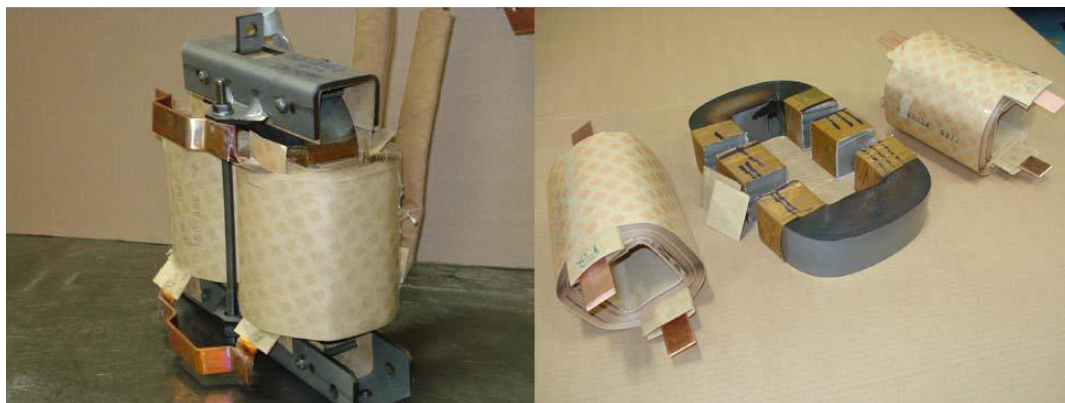
The main core-and-coil assemblies are of the shell-form configuration.



(Figure1)

### 2.The bridging reactor

The preventive auto or bridging reactor is a core-form design, consisting of a coil on each leg of the core. The inside half of one coil is connected to the outside half of the other coil and vice versa, providing equal current in each half of the reactor winding. This interlacing of the two coils reduces the interwinding leakage reactance to a very low value. The reactor is completely isolated from ground by stand-off insulators since the reactor coil is at line voltage above ground. The reactor core, core clamps, and other associated parts approach this level.



(Figure2)



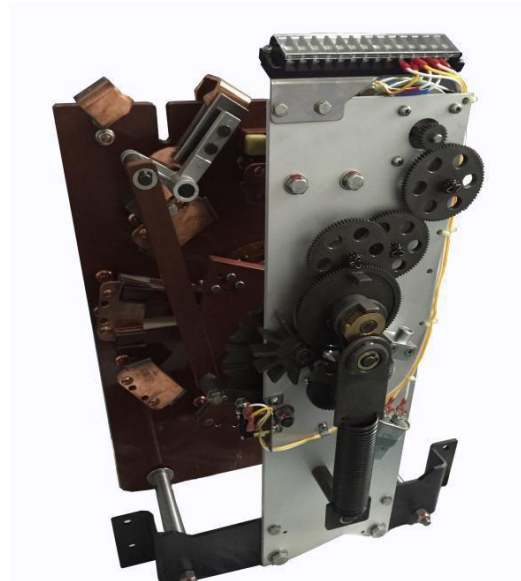
(Figure3)

### 3.The tap position indicator

The tap position indicator (Figure3) is located on the cover-mounted terminal block enclosure and is directly connected to the tap changer by a flexible drive shaft (Figure4). The indicator Dial plate is marked in 32 steps, 16 each on the RAISE and LOWER segments of the dial. The “zero” mark designates the neutral position. Drag hands follow the pointer and indicate the pointer’s maximum and minimum positions Since the last reset. Drag hands can be reset using the drag hand reset switch on the front panel of the control unit.



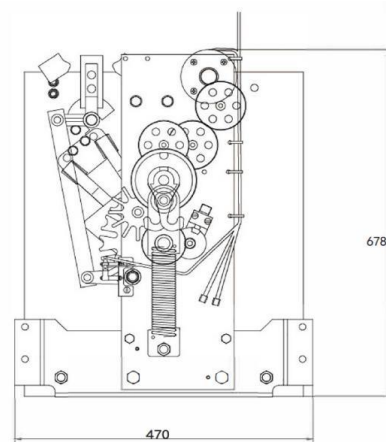
(Figure4)



(Figure5)

### 4.Tap Changer

All RVR-1 regulators feature rugged gear-driven tap changers (Figure 5). The tap-changing mechanism and current-carrying contacts are designed to provide exceptional reliability and long service life exceeding one million mechanical operations. The tap changer uses an electric motor, gear train, and spring drive to provide quick, reliable operation. The switch is mechanically coupled to the external tap position indicator (Figure 3) to provide visual



## 5.RWT-20 Voltage Regulator Control

- **Distribution Automation Ready.** Interface with either on-the-fly settings changes over DNP, or master controller direct-operate interface.
- **Flexible Communications.** Easily interface with your network with the Industry's most network connectable regulator controller.
- **Programmable Without a Laptop.** Connect a USB flash drive to upload new settings, upgrade firmware, retrieve existing settings, or retrieve reports from the RWT-20.
- **Expandable, Removable Memory.** Connect a USB flash drive and enable Automatic Backup to write all common reports to the USB for long-term storage and easy retrieval.
- **IEEE C37.118 Synchro phasor Protocol.** Identify connected phase of downstream voltage regulators by coordinating with synchro phasor measurements in the substation.





**++++ LOAD CURRENT AND KVA RATINGS, 50/60 HZ**

<b>Voltage (kV)</b>	<b>Load Current (Amperes)</b>	<b>kVA</b>
2.5 kV 60 kV BIL	200	50
	300	75
	400	100
	500	125
	668	167
	1000	250
	1332	333
	1665	416
5.0 kV 75 kV BIL	100	50
	150	75
	200	100
	250	125
	334	167
	500	250
	668	333
	833	416
7.62 kV 95 kV BIL	100	76
	150	114
	219	167
	328	250
	438	333
	546	416
	656	500
	875	667
	1093	833
13.8 kV 95 kVBIL	100	138
	150	207
	200	276
	300	414
	400	552
	483	667
	604	833
	19.92 kV 150 kV BIL	50
100		200
167		333
200		400
335		667
418		833
502		1000