



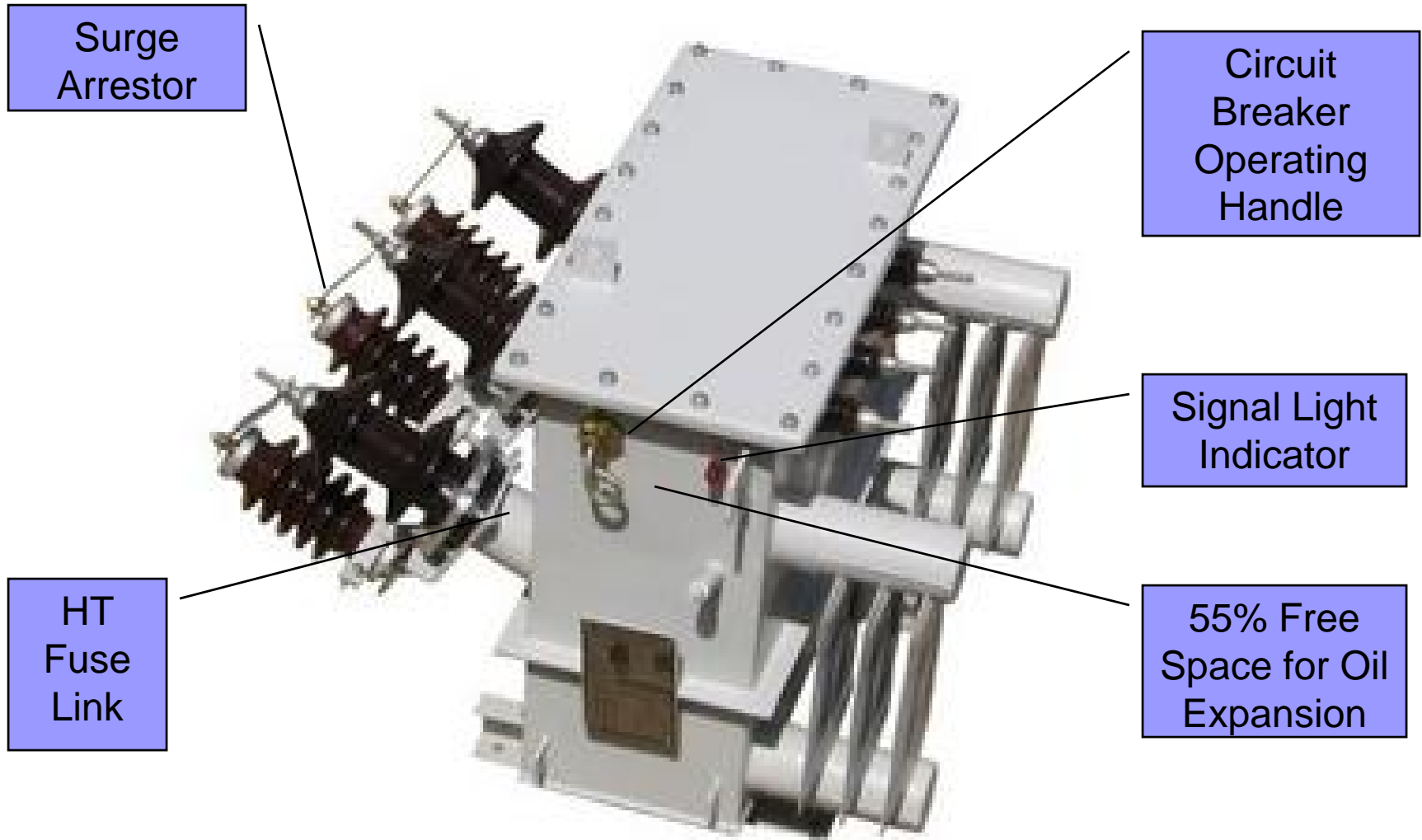
Completely Self Protected Distribution (CSP) Transformers

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What is CSP?



Why CSP?

- Protects the transformer from external faults
- Protects the grid from internal faults
- Dramatically reduces failure rate for the utility
- Reduces risk of explosion
- Low maintenance

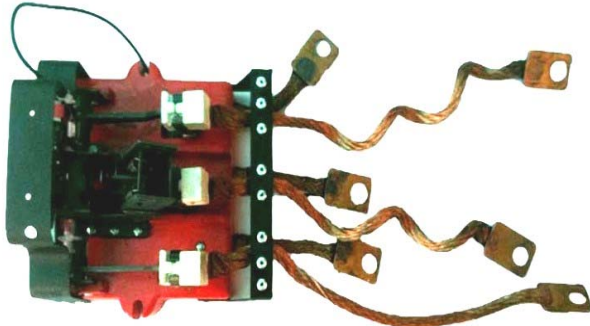
Reasons for Transformer Failure

- Long Low Voltage Lines
- Short Circuit Due To Clashing of Loosely Strung Conductor, LV System
- Changing Weather Conditions
- Overloading
- Lightning Strikes
- Manufacturing Defects

What Does CSP Transformers Protect?

- Resistant overloads not protected by conventional switchgear
- Lightning Surges
- Short Circuit Faults in Secondary
- Thermal overload due to increase in oil temperature
- Over current protection

What are CSP Components?



Internally Mounted Circuit Breaker



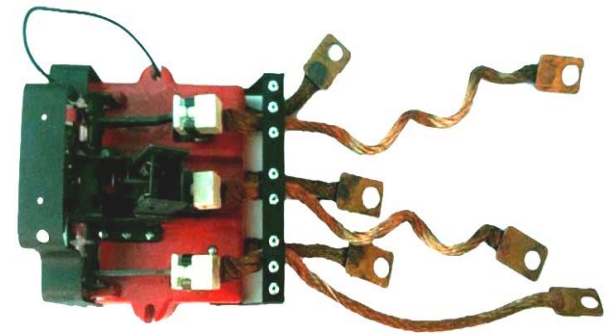
Internal Fuselink



Lightening Arrestor

Circuit Breaker

- Central component of CSP protection package
- Provides over current protection
- Tamper proof (mounted internally)
- Thermally operated
- Responds by opening the circuit to external faults or over current
- Service can be easily restored by re-closing the breaker
- Indication through signal lamp on continuous overload or tripping



Fuse-Link

- Internally Mounted (Tamper Proof)
- Isolates the system from the faulty transformer
- Rating is selected such that fuse does not blow for secondary or transient faults
- Connected in series with the HV Winding
- Protects the transformer from major fire by isolating the circuit due to internal faults
- Prevents nuisance tripping at feeder level due to faulty transformer



Surge Arrester

- Mounted to transformer tank instead on top of the structure
- Metal oxide type
- Non-Linear resistors which acts as conductors at high voltages and resistors at low voltage
- Eliminates cost of installation and cost of mounting structure for the arrester



Saves Money Too!

■ How?

- Increases life of transformer
- Where adapted, transformer failures have fallen dramatically (20% per year to 3% per year)
- Reduces risk of public hazard through explosion as faults are isolated
- Total cost of ownership of life of transformer is far lower than conventional transformer
- Increase revenues by reducing outages of power caused due to faulty transformer on the system

Conclusion

- Adapted in USA, Mexico, Brazil, India
- Recently adapted by Nigeria
- The best tamper proof protection solution available for distribution transformers
- Available for ratings upto 315KVA
- Questions
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