

GR1

12kV RING MAIN UNIT

Safe | Reliable | Compact



Answer For Reliable and Efficient Network

The switchgear specialist

www.tamco.com.my

TAMCO

Tamco has been manufacturing medium voltage Ring Main Units in Malaysia since the early 1970's. The type GR1 is a proven product with more than 60,000 units installed worldwide. The design of GR1 combines tried and tested construction principles with state-of-the-art insulation and current interruption techniques.



TYPE TESTED WITH

- IEC 60056 : 1987, BS5311 : 1988 Tee-off Circuit Breaker
- IEC 60265 : 1983, BS5463 : 1977 Ring Switch
- IEC 60129 : 1984, BS5253 : 1975 Earthing Switch
- IEC 62271-100
- IEC 62271-200

Temperature Range - 5°C to + 40°C

DELIVERING PEACE OF MIND

KEY FEATURES

- SF₆ gas insulation and current interruption - No fire hazard
- Maintenance free and sealed for life contact system
- Outdoor installation
- Robust construction
- Tee-off circuit breaker with integral protection system
- Low cost cable termination
- Fully extensible options
- Internal arc-fault proven
- Motorised (*optional*)
- Protection Relay (*optional*)
- Remote control box (*optional*)
- SCADA ready (*optional*)



CONSTRUCTION

The type GR1 range includes extensible and non-extensible Ring Main Units suitable for outdoor or indoor installations. Various switch-board configurations can be built up using 8 basic building blocks.

- 1x circuit breaker (GR1-01)
- 1x ring switch (GR1-10)
- 2x ring switch (GR1-20)
- 2x ring switch + 1x circuit breaker (GR1-21)
- 2x ring switch + 2x circuit breaker (GR1-22)
- 3x ring switch + 1x circuit breaker (GR1-31)
- 3x ring switch (GR1-30)
- 1x ring switch + 1x circuit breaker (GR1-11)
- 3x ring switch + 2x circuit breaker (GR1-32)

The GR1-21 model is the principal unit in which two ring switches and a tee-off circuit breaker are contained in a common tank. It may be non-extensible, or extensible to one side.

The thick-walled gas tank provides rigidity, and state-of-the-art welding and sealing techniques ensuring the integrity of gas seals over a long service life.

The ring switches are fault-make load-break in SF₆ gas, with 3 operating positions: ON, OFF and EARTH. The circuit breaker operates on the proven rotating arc principle and also has 3 operating positions: ON, OFF and EARTH.

Mechanisms are independent spring assisted. They are mounted outside the gas tank and therefore readily accessible. Access is protected by a hinged weatherproof and lockable door.

All cable terminals are positioned not less than 850mm above ground level, and are designed for use with inexpensive heat-shrink cable termination kits (although the terminals will also accept optional plug-on elbows).

Integral cable test facilities are incorporated in the ring switches.

Neon potential indicators are provided on all circuits as standard.

The type GR1 range is suitable for outdoor installation without the need for additional, often expensive, weatherproof enclosures. Ingress protection is IP54.

Operating out of Malaysia, TAMCO has unsurpassed experience making switchgear for the harsh tropical climate.



BUATAN MALAYSIA

CONSTRUCTION

GR1 FOR SCADA INTEGRATION



TAMCO's GR1 type RMU also comes with optional remote control box (RCB) for remote supervisory operation of multiple RMUs. RCB along with motorised operation makes TAMCO GR1 ready for SCADA integration



OPERATION & SAFETY

All operations are from the front of the units.

All operations are in the vertical plane, and a single operating handle operates the ring switches, the tee-off circuit breaker, and the integral earthing switches. Each of the switches can be padlocked in the ON, OFF or EARTH position. A single line diagram and position indicators are provided on the operating facia to assist the operator.

Full interlocking is provided to ensure operation in the correct sequence. The ring switches cannot be operated from ON to EARTH without first stopping at the OFF position. A time delay to prevent the operator attempting an instinctive opening operation following closure into the ON or EARTH position is incorporated.

SAFETY

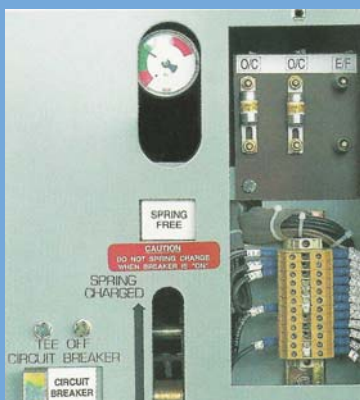
TAMCO regards safety as the most important aspect of switchgear design and operation, and the following proven features have been built into the type GR1

- No exposure to live parts
- Passive interlocks to prohibit unintended operations
- Comprehensive padlocking facilities
- Mimic diagram and position indicators to guide the operator
- Full fault rated earthing switches
- Arc fault tested

Access to the test terminals is achieved by moving the appropriate ring switch to the EARTH position and opening the interlocked hinged cover, which can be padlocked. After connecting the test cables, testing can take place. The switch cannot be moved to the ON position until the test cables have been removed and the test access cover put back in place.

The rotating arc circuit breaker is equipped with current transformer operated series trip coils which will provide overcurrent and earth-fault protection. The standard current transformers will adequately protect distribution transformers of 200-3000kVA rating at 11kV.

There is no need to hold an expensive inventory of medium voltage fuses.



Fuse limit fuse protection.

QUALITY

TAMCO operates as Quality System in line with ISO 9001.

In addition to in-house routine and type tests, all switchgear products are short-circuit proven at independent test stations. The type GR1 has been tested and certified by KEMA.

The thread of reliability runs through the entire process of manufacturing. Precision and accuracy in manufacturing are of utmost importance that are noticed in Tamco products performance with facilities like robotic welding, laser cutting, CNC fabrication, epoxy moulding, CED paint line, test lab for salt spray, in-house manufacturing of all critical components, leak test chamber, clean room and an x-ray equipment.

Panels are made of high grade pickled & oiled mild steel sheets, cut and folded on numerically controlled machines. The panel parts are painted by an advanced

Cathode Electro Deposition (CED) process which provides optimum protection against corrosion resistance and weathering.

The paint work is tested to withstand 1000 hours in a 5% salt spray, in accordance with Japanese standard JIS-Z-2371. All welding works on standard RMU tanks are done by robotized welding machines. This ensures consistency and precision in all phases of the welding processes.

RMU and its key components are assembled in environmentally controlled clean room and tested for leakages in a vacuum chamber using helium as the leakage media.

In addition to the in-house routine tests, all switchgear products are type tested at international laboratories as per IEC requirements. The type GR1 has been type tested and certified at KEMA.



TECHNICAL DATA

TRANSFORMER / FUSE RATING

System Voltage : 11kV

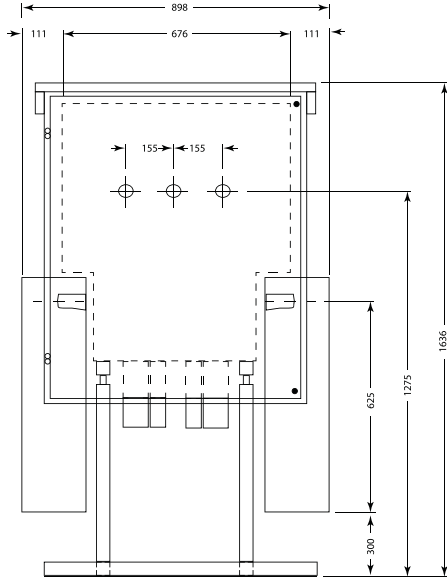
POWER TRANSFORMER RATING	CURRENT TRANSFORMER RATIO			TIME LAG FUSE RATING		
(kVA)	A			A		
	11kV	6.6kV	3.3kV	11kV	6.6kV	3.3kV
200	50/5	50/5	50/5	3	5	10
315	50/5	50/5	100/5	5	7.5	7.5
500	50/5	50/5	100/5	7.5	12.5	12.5
630	50/5	100/5	150/5	10	7.5	10
800	50/5	-	-	12.5	-	-
800	100/5	100/5	150/5	7.5	10	12.5
1000	100/5	100/5	200/5	7.5	12.5	12.5
1250	100/5	150/5	300/5	10	10	10
1600	150/5	150/5	300/5	12.5	12.5	12.5
2000	150/5	200/5	-	10	12.5	-
2500	150/5	300/5	-	12.5	10	-
3000	200/5	300/5	-	12.5	12.5	-

MOTOR RATING (Applicable for motorised RMU only)

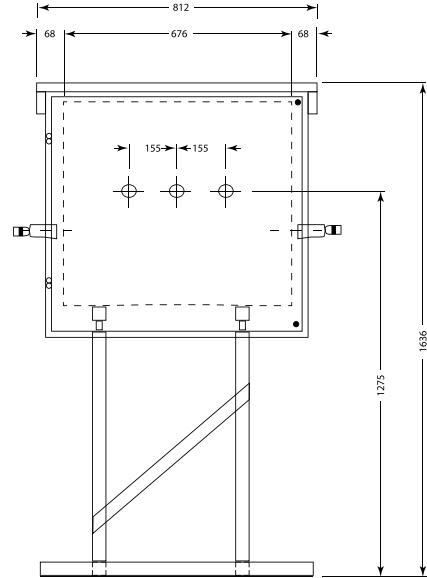
CIRCUIT BREAKER MOTOR SPECIFICATION	
Voltage	DC 30V
Current	8.0A (Max.)
R.P.M	10±10%
Torque	176.5 Nm
Output	180W
Class	F' Class
Insulated Resistance	500V 10M ohms

RING SWITCH MOTOR SPECIFICATION	
Voltage	DC 30V
Current	3.0A (Max.)
R.P.M	4±10%
Torque	60 Nm
Output	150W
Class	F' Class
Insulated Resistance	500V 10M ohms

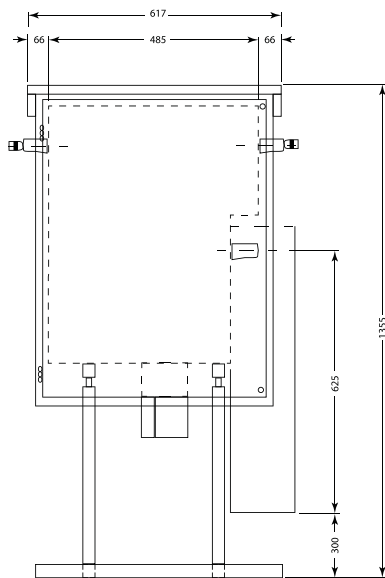
PRODUCTS VARIANTS



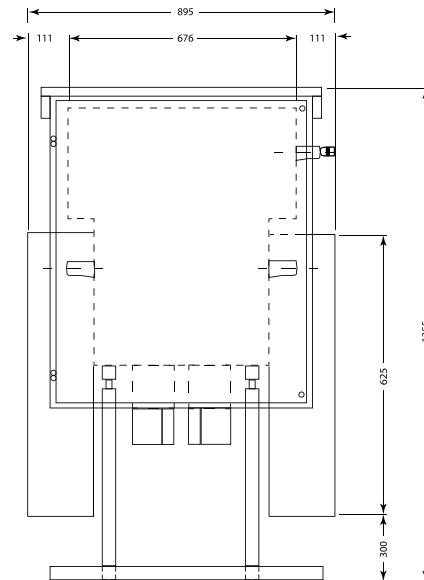
BASIC 2 - SWITCH + 1-CB
TYPE GR1 - 21



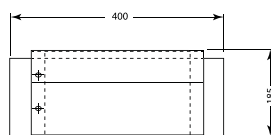
EXTENSIBLE SINGLE CB
TYPE GR1 - 01



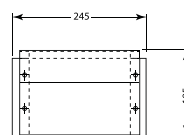
EXTENSIBLE SINGLE SWITCH
TYPE GR1 - 10



EXTENSIBLE 2 - SWITCH
TYPE GR1 - 20

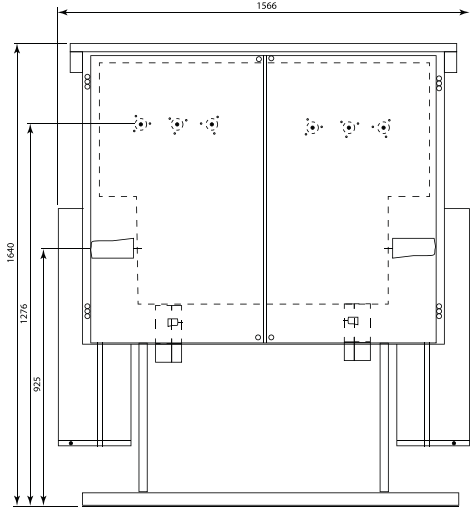


BUSBAR JOINT CHAMBER (Elevation)

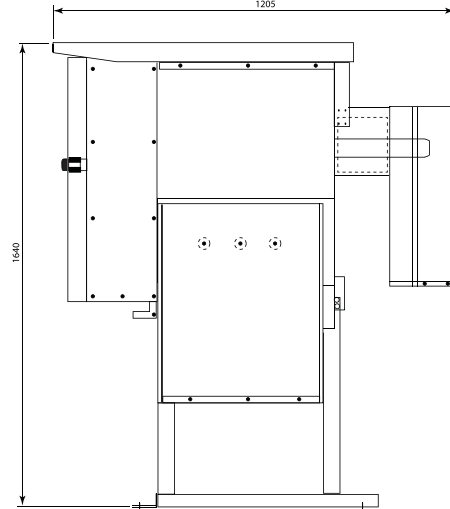


END CHAMBER (Elevation)

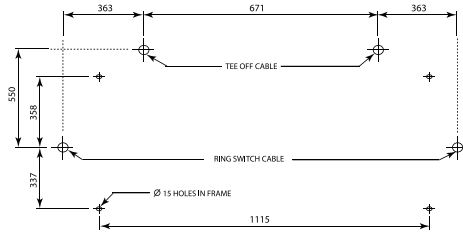
PRODUCTS VARIANTS



Front View

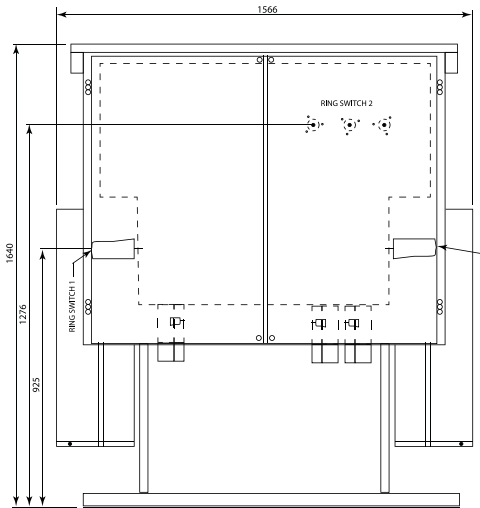


Side View

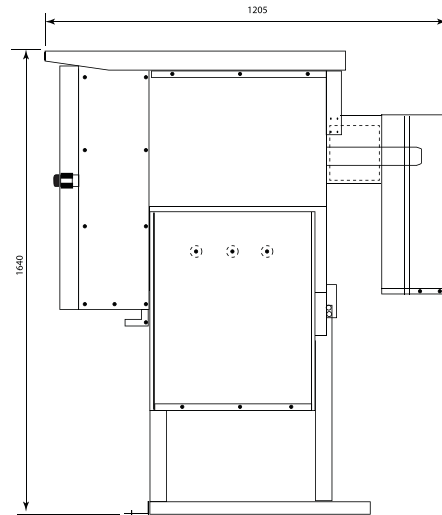


Foundation Layout

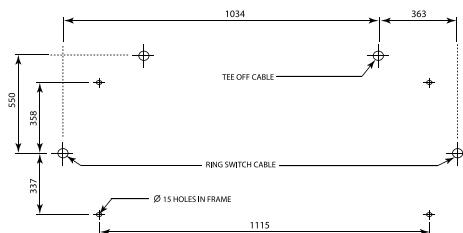
TYPE GR1 - 22
(COMMON TANK)



Front View



Side View

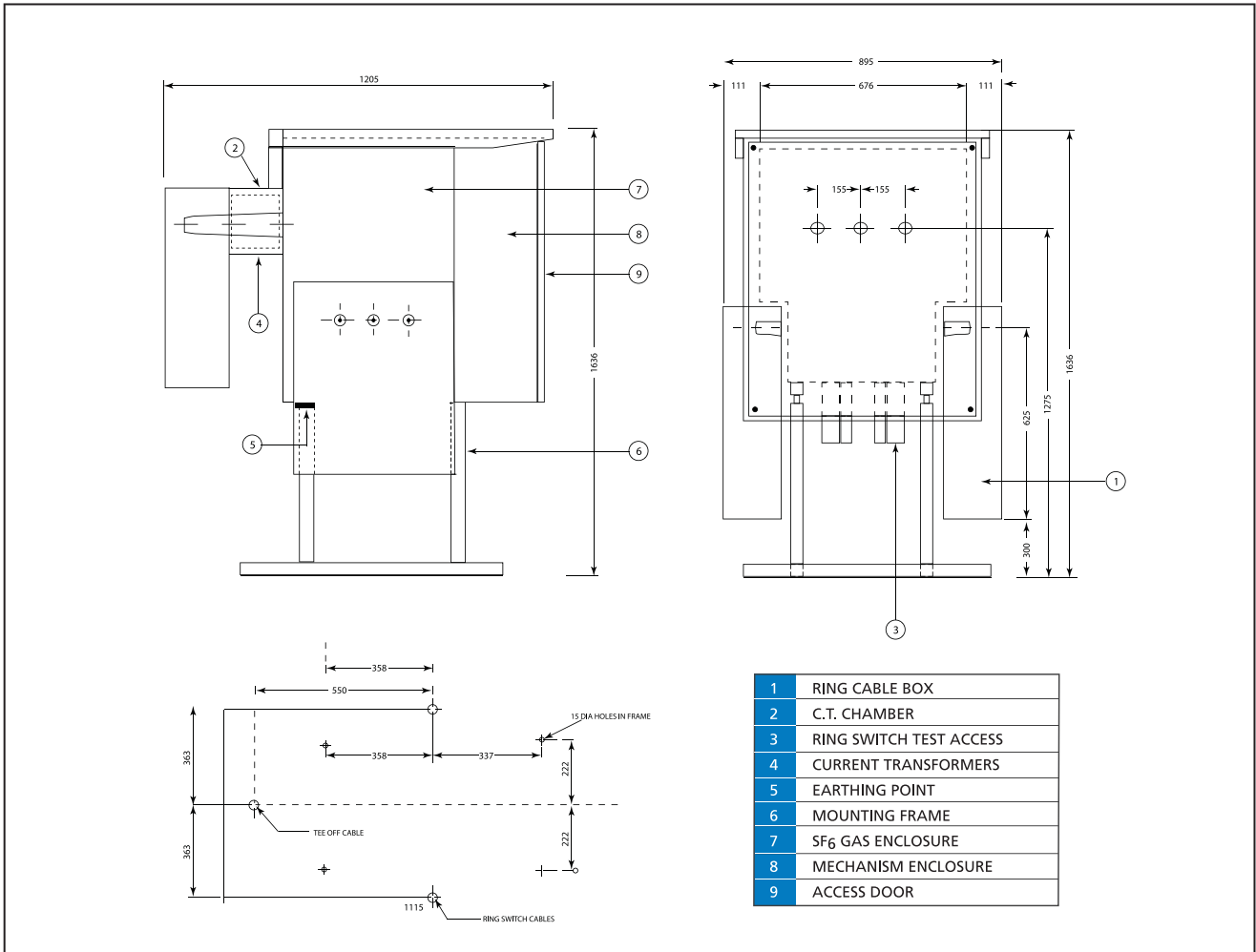


Foundation Layout

SWITCH ASSEMBLY
TYPE GR1 - 30

*Other configurations available on request

PRODUCTS VARIANTS

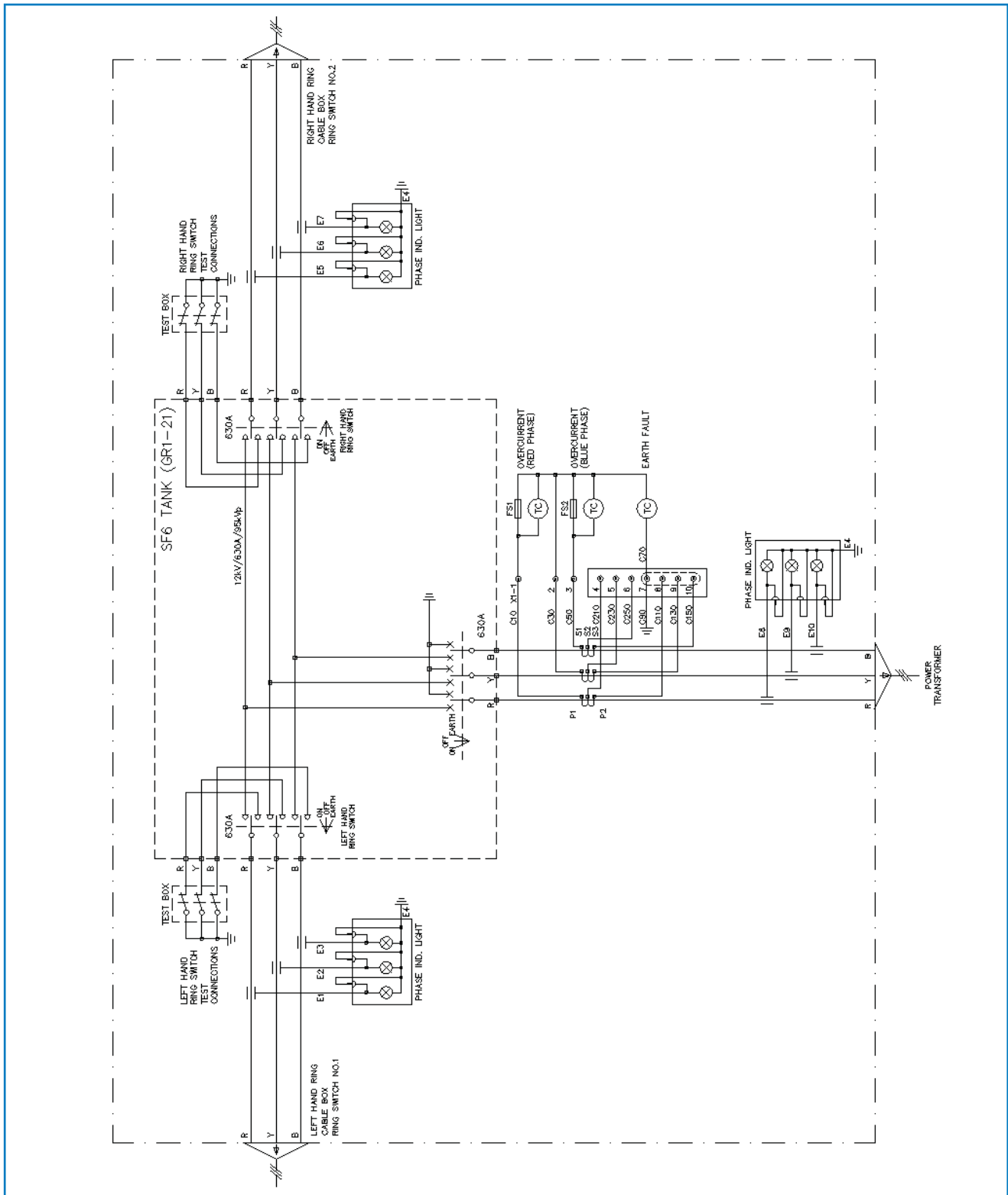


SPECIFICATION

Rated Voltage	12kV
Impulse Withstand Voltage	95kVp
Frequency	50Hz
Normal Current, Ring Switch	630A
CB	630A
Short-circuit Breaking Current, CB	20kA
Short-circuit Making Current, Ring Switch	50kAp
CB	50kAp
Earthing Switch	50kAp

PRODUCTS VARIANTS

TYPICAL SLD for 2 + 1 RMU



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TAMCO

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