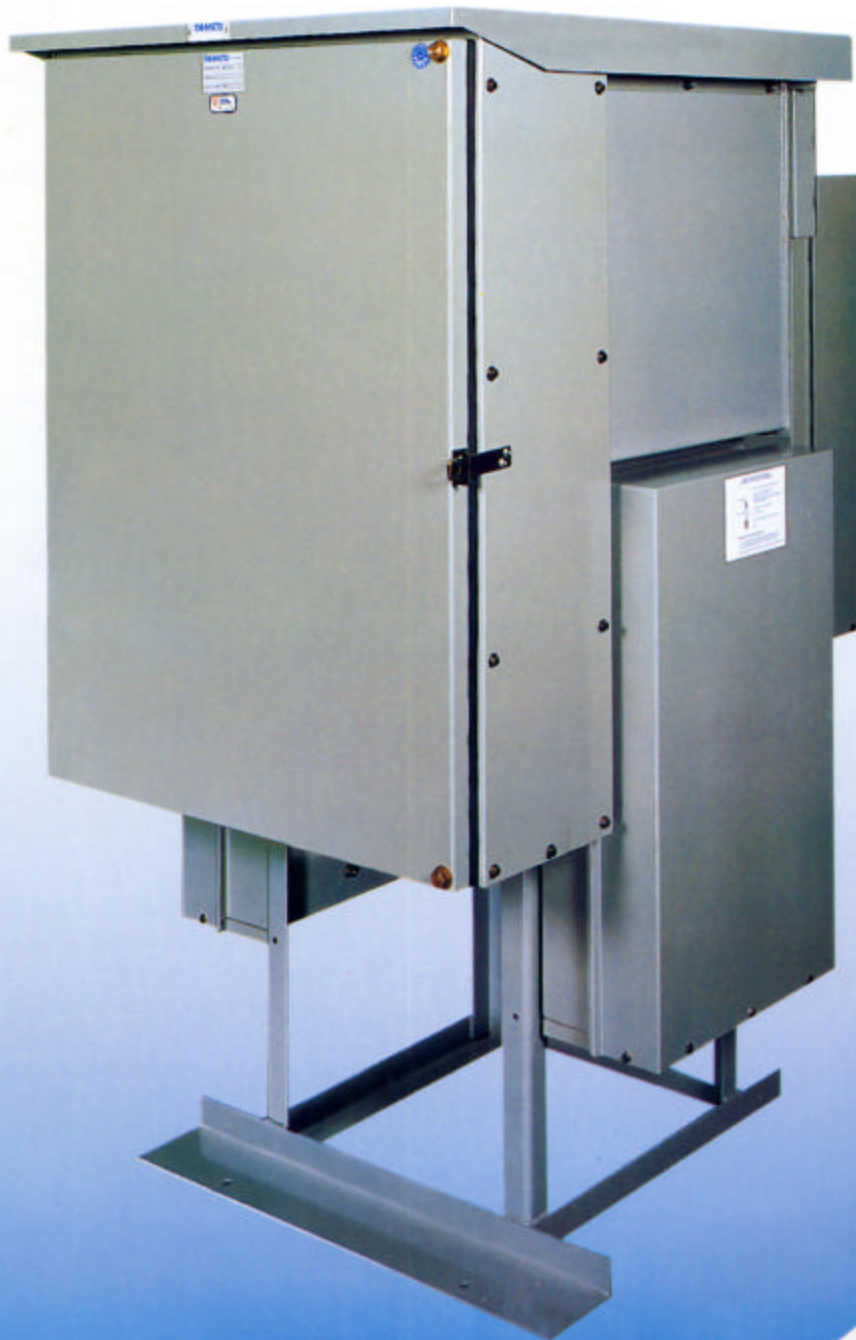


TAMCO RING MAIN UNIT TYPE GR1



NOW FULLY
EXTENSIBLE

TAMCO has been manufacturing medium voltage Ring Main Units in Malaysia since the early 1970's. The type GR1, is the company's latest range of Ring Main Units, the design of which combines tried and tested construction principles with state-of-the-art insulation and current interruption techniques.

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
- ☛ Protection Relay

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)

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 (5mm) 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 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 *IP45.

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



* higher IP class available on request.

OPERATION

All operations are from the front of the units.

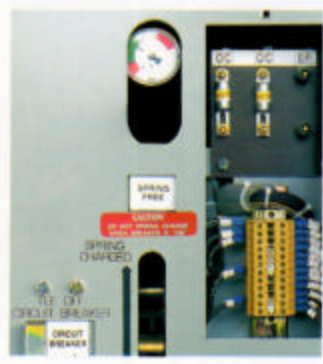
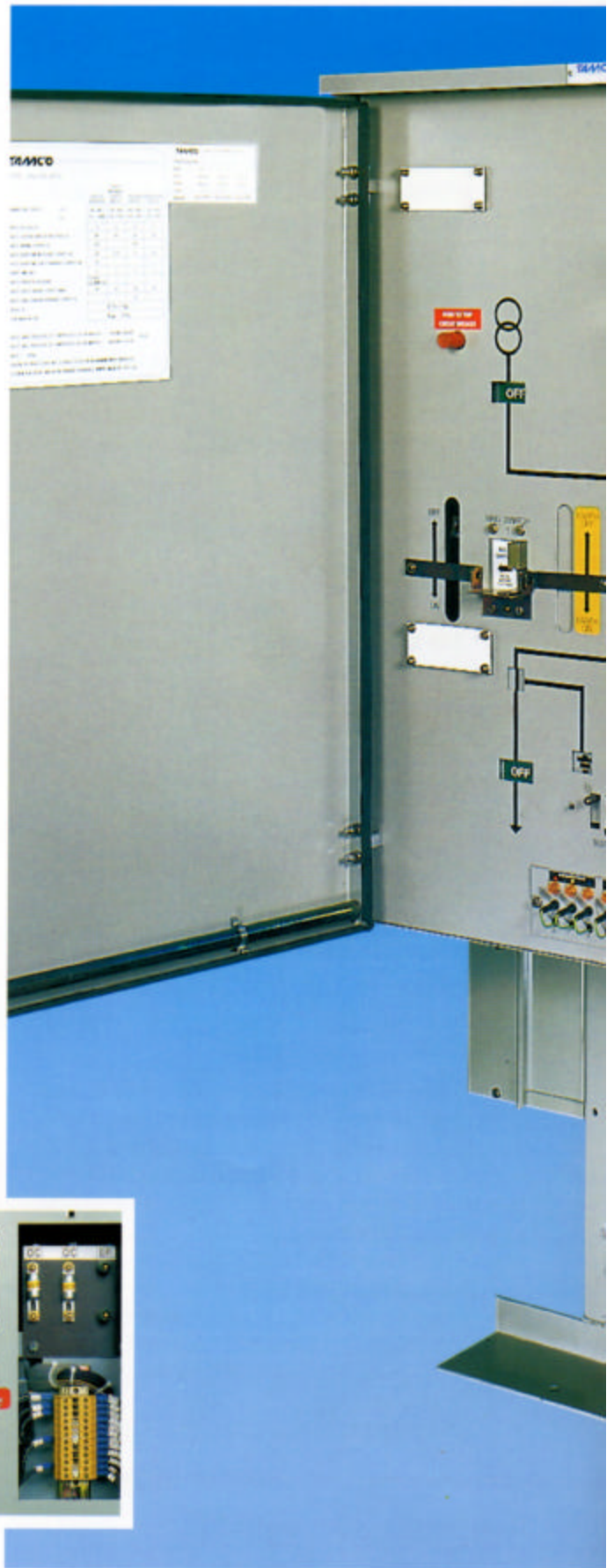
All operations are in the vertical plane, and a single operating handle operates the ring switches, the tee-off circuit breaker, and the integral earthing switches. Each of the switches can be padlocked in the ON, OFF or EARTH position. A single line diagram and position indicators are provided on the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

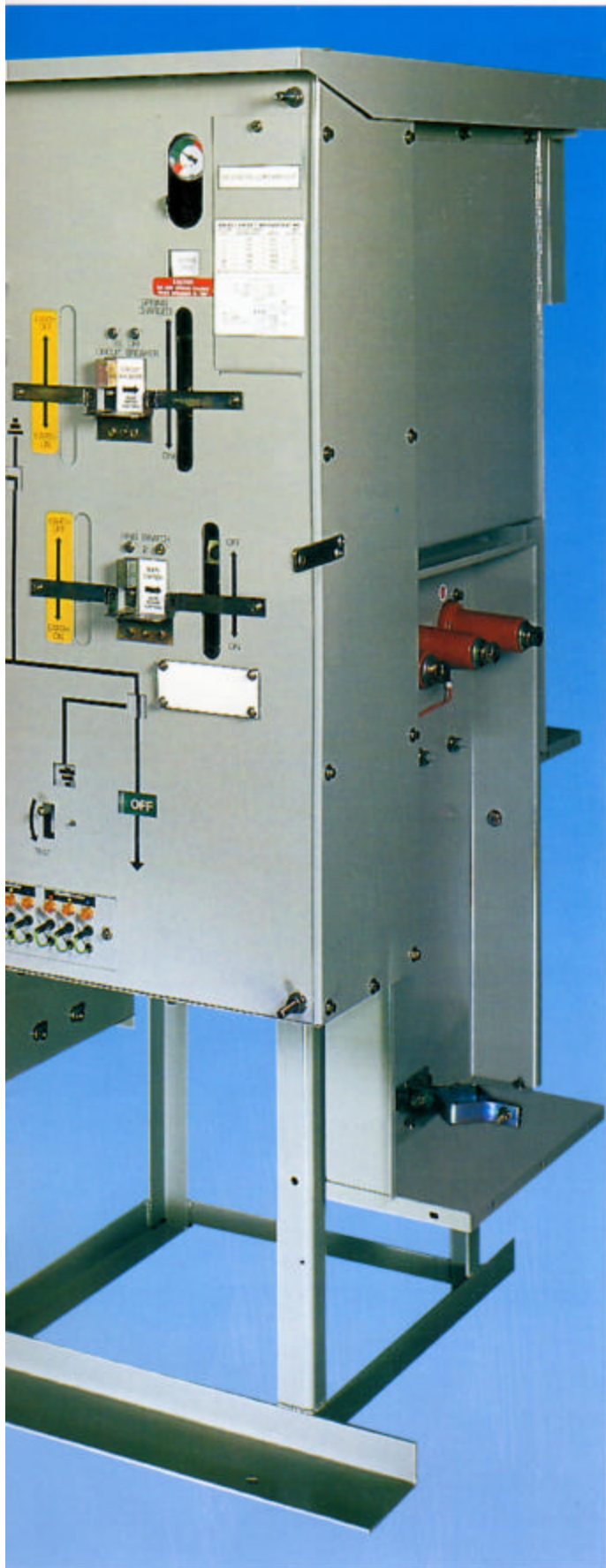
Access to the test terminals is achieved by moving the appropriate ring switch to the EARTH position and opening the interlocked hinged cover, which can be padlocked. After connecting the test cables, testing can take place. The switch cannot be moved to the ON position until the test cables have been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



Time limit fuse protection.



SAFETY

TAMCO regards safety as the most important aspect of switchgear design and operation, and the following proven safety 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

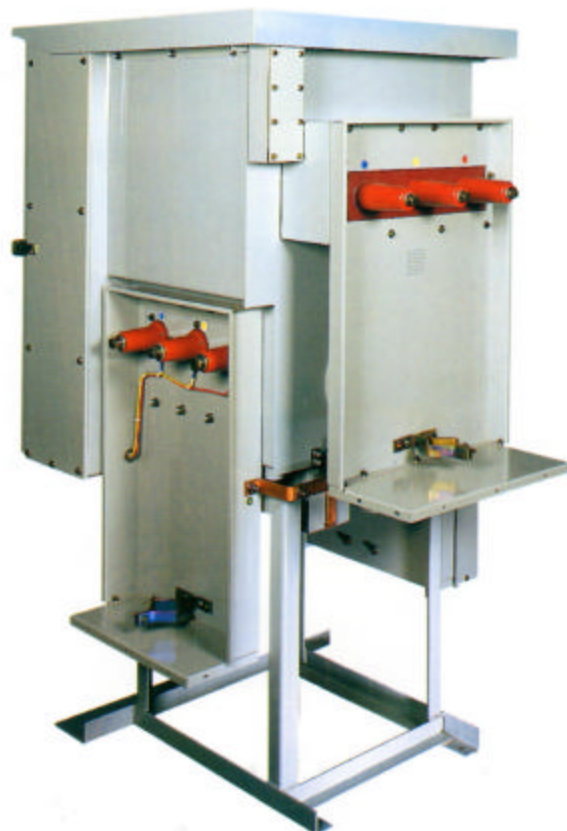
QUALITY

TAMCO operates a Quality System in line with ISO 9001.



MS ISO 9001 REG. NO AR 0435

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.





Robotic welding to ensure weld consistency.

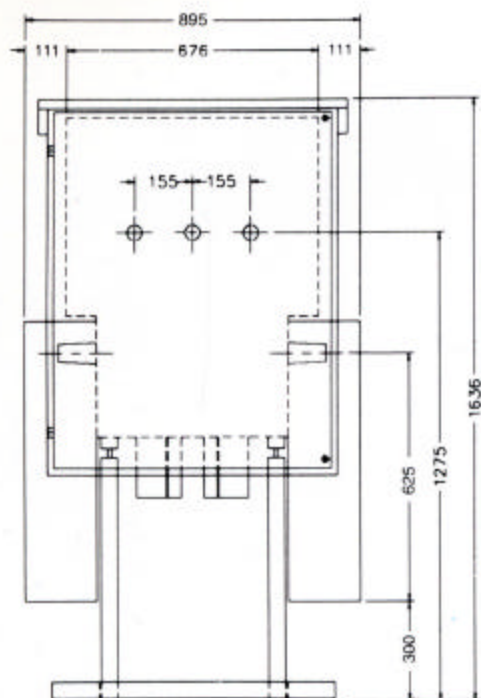
CED paint bath.



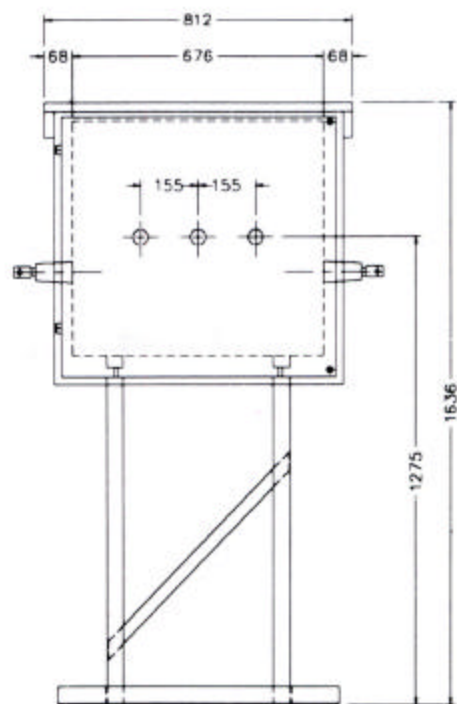
Cathodic electro-deposition painting plant.

Transformer / Fuse ratings System Voltage: 11kV

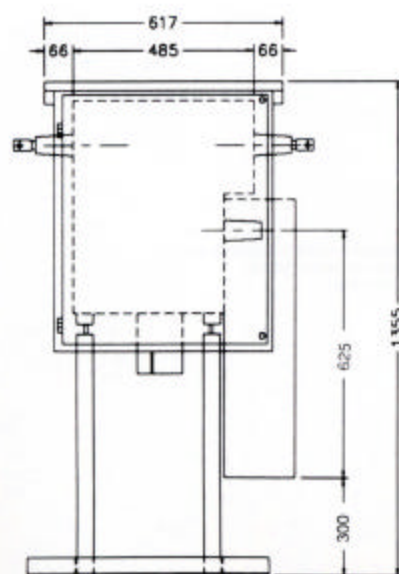
POWER TRANSFORMER RATING	CURRENT TRANSFORMER RATIO			TIME LAG FUSE RATING		
(kVA)	A			A		
	11kV	6.6kV	3.3kV	11kV	6.6kV	3.3kV
200	50/5	50/5	50/5	3	5	10
315	50/5	50/5	100/5	5	7.5	7.5
500	50/5	50/5	100/5	7.5	12.5	12.5
630	50/5	100/5	150/5	10	7.5	10
800	50/5	-	-	12.5	-	-
800	100/5	100/5	150/5	7.5	10	12.5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



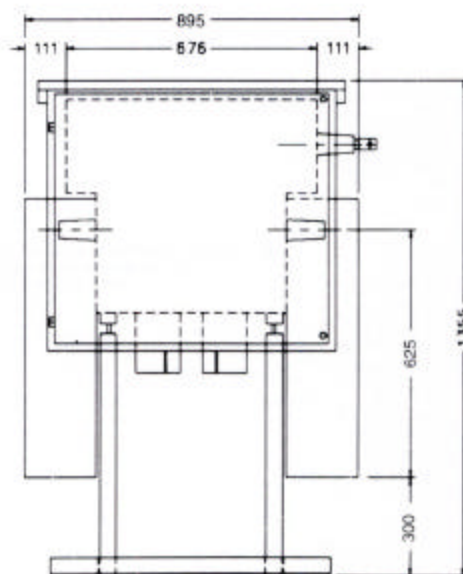
BASIC 2 - SWITCH + 1-CB
TYPE GR1 - 21



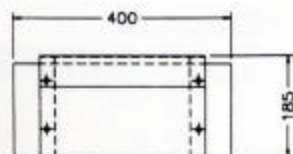
EXTENSIBLE SINGLE CB
TYPE GR1 - 01



EXTENSIBLE SINGLE SWITCH
TYPE GR1 - 10



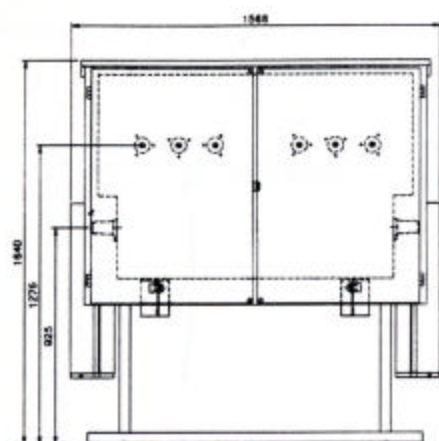
EXTENSIBLE 2 - SWITCH
TYPE GR1 - 20



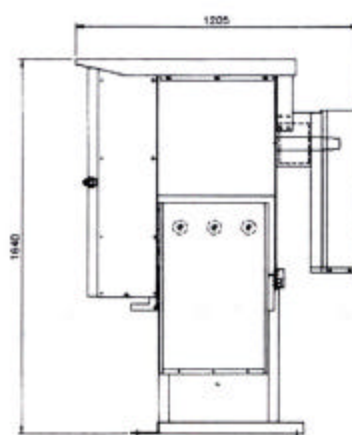
BUSBAR JOINT CHAMBER (Elevation)



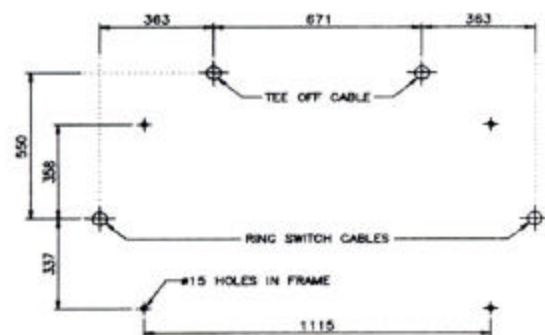
END CHAMBER (Elevation)



Front View

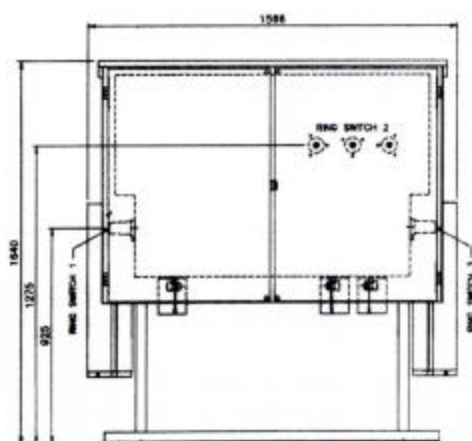


Side View

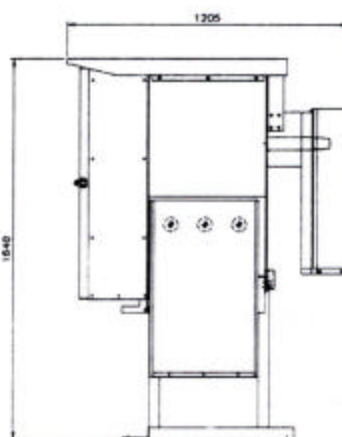


Foundation Layout

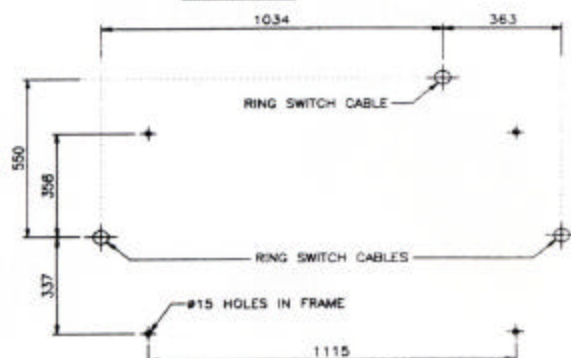
TYPE GR1 - 22
(COMMON TANK)



Front View



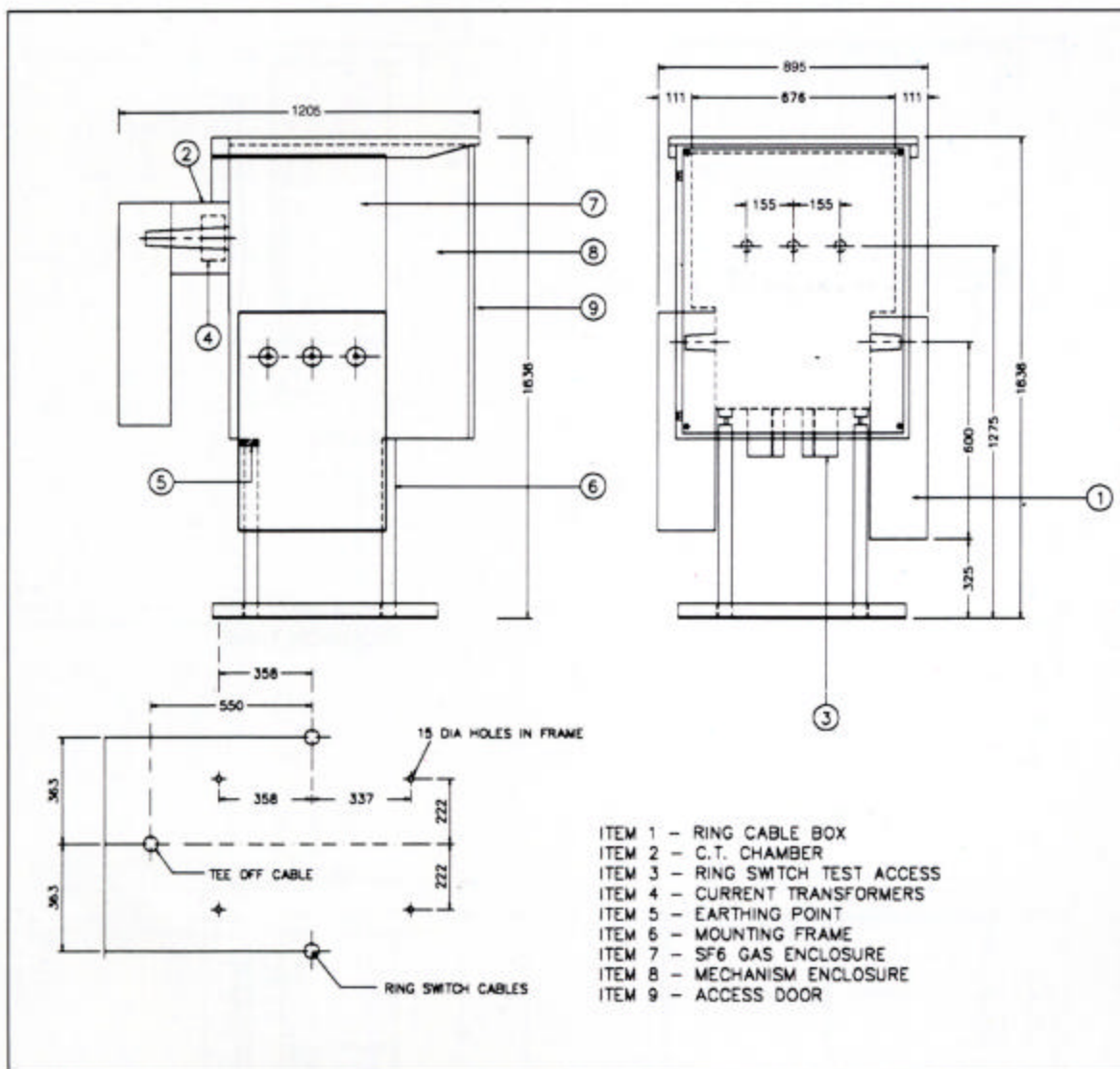
Side View



Foundation Layout

SWITCH ASSEMBLY
TYPE GR1 - 30

* Other configurations available on request.



SPECIFICATION

Rated Voltage:	12kV
Impulse Withstand Voltage:	95kVp
Frequency:	50Hz
Normal Current, Ring Switch:	630A
CB:	630A
Short-circuit Breaking Current, CB:	20kA
Short-time Withstand Current:	20kA, 3 Seconds
Short-circuit Making Current, Ring Switch:	50kAp
CB:	50kAp

COMPLIANCE WITH

IEC60056:1987, BS5311:1988	Tee-off Circuit Breaker
IEC60265:1983, BS5463:1977	Ring Switch
IEC60129:1984, BS5253:1975	Earthing Switch
Temperature Range	+40°C to -25°C

The information contained herein is correct at the time of going to press, but as the product and its manufacturing processes are being developed continuously, this information is subject to change without notice, and the company cannot be held liable for any alleged misrepresentation howsoever arising.



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