

## Your Choice...SF<sub>6</sub> or Vacuum Now Available in Two-High Switchgear Construction

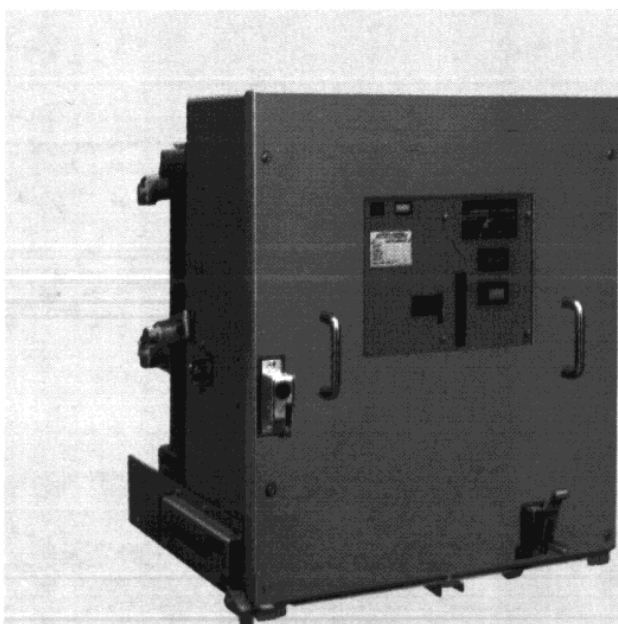
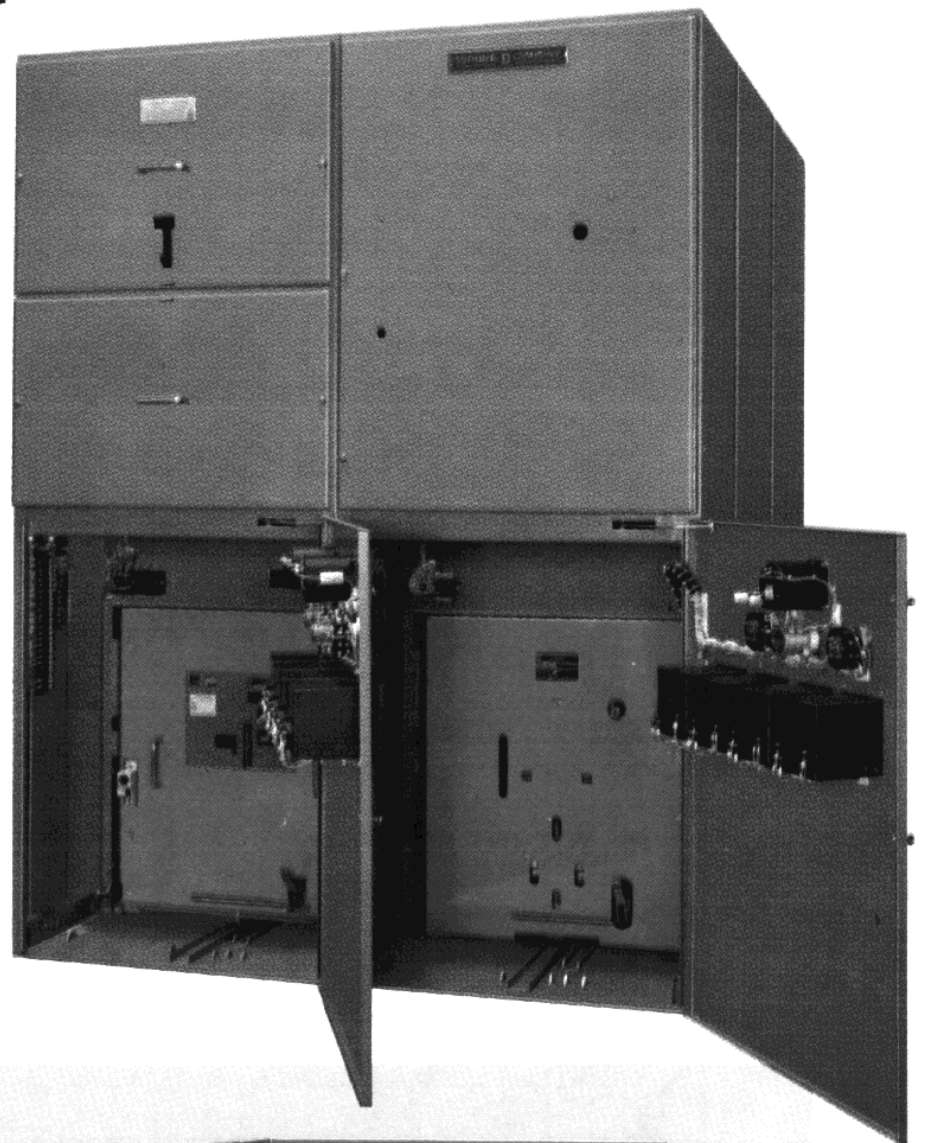
The new 5-15kV two-high metal-clad switchgear is the latest addition to Square D Company's existing line of Solenarc air-magnetic metal-clad switchgear.

This new metal-clad switchgear offers the flexibility of utilizing FG-2 (sulphur hexafluoride, SF<sub>6</sub>) or VAD-2 (vacuum) circuit breakers.

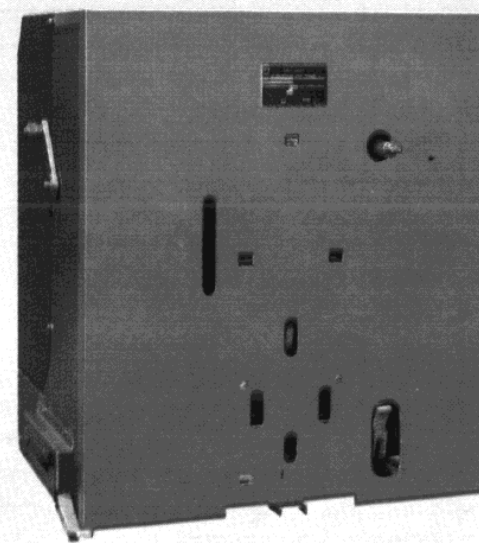
The switchgear and circuit breakers are tested in accordance to the latest ANSI, NEMA and IEEE standards and meet or exceed the applicable standards.

Some of the benefits and features of this new and ruggedly constructed switchgear are as follows:

- Versatility - SF<sub>6</sub> or Vacuum.
- Floor Space Economy.
- Minimum Maintenance.
- Long Life.
- Fast and Quiet Operation.
- Reduced Size and Weight.
- Gas Pressure or Vacuum Checks.
- High Performance.



Type FG-2 (SF<sub>6</sub>) Circuit Breaker



Type VAD-2 (Vacuum) Circuit Breaker

TWO-HIGH METAL-CLAD 5-15kV SWITCHGEAR

FG-2 (SF<sub>6</sub>) CIRCUIT BREAKER DATA

Type of Breaker	Nominal Rating		Rated Cont. Current 60 Hertz Amps.—RMS	Rated Voltages			Insulation Level Rated Withstand		Interrupting Ratings† Amps.—Symmetrical			Asymmetrical Rating Factor *	Short Time Rating 3 Sec. Amps.—RMS	Close & Latch Rating Amps.—RMS	Inter-rupting Time Cycles
	Three Phase MVA	Voltage kV—RMS		Maximum Voltage kV—RMS	K—Factor Max. kV Min. kV	Minimum Voltage kV—RMS	Low Frequency kV—RMS	△ Impulse 1.2x50MS kV—CREST	Maximum kV Amps.—RMS	Nominal kV Amps.—RMS	Minimum kV Amps.—RMS				
FG-2-05025-12	250	4.16	1200	4.76	1.24	3.85	19	60	29,000	33,200	36,000	1.1	36,000	58,000	5
FG-2-05025-20	250	4.16	2000	4.76	1.24	3.85	19	60	29,000	33,200	36,000	1.1	36,000	58,000	5
FG-2-05025-30	250	4.16	3000 ■	4.76	1.24	3.85	19	60	29,000	33,200	36,000	1.1	36,000	58,000	5
FG-2-08050-12	500	7.20	1200	8.25	1.25	6.6	36	95	33,000	37,800	41,000	1.1	41,000	66,000	5
FG-2-08050-20	500	7.20	2000	8.25	1.25	6.6	36	95	33,000	37,800	41,000	1.1	41,000	66,000	5
FG-2-08050-30	500	7.20	3000 ■	8.25	1.25	6.6	36	95	33,000	37,800	41,000	1.1	41,000	66,000	5
FG-2-15050-12	500•	13.8	1200	15.0	1.30	11.5	36	95	18,000	19,500	23,000	1.1	23,000	37,000	5
FG-2-15050-20	500•	13.8	2000	15.0	1.30	11.5	36	95	18,000	19,500	23,000	1.1	23,000	37,000	5
FG-2-15050-30	500•	13.8	3000 ■	15.0	1.30	11.5	36	95	18,000	19,500	23,000	1.1	23,000	37,000	5
FG-2-15075-12	750•	13.8	1200	15.0	1.30	11.5	36	95	28,000	30,400	36,000	1.1	36,000	58,000	5
FG-2-15075-20	750•	13.8	2000	15.0	1.30	11.5	36	95	28,000	30,400	36,000	1.1	36,000	58,000	5
FG-2-15075-30	750•	13.8	3000 ■	15.0	1.30	11.5	36	95	28,000	30,400	36,000	1.1	36,000	58,000	5

†—For interrupting current ratings at operating voltages other than those listed, use the following formula:

$$I_{op} = \frac{V_{max}}{V_{op}} \times I_{V_{max}}$$

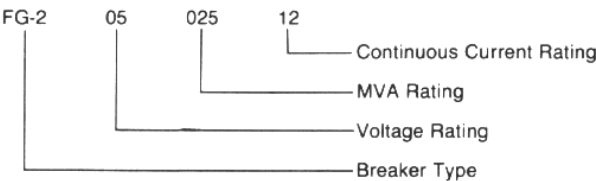
The calculated current should not exceed the maximum interrupting current rating.

$$I_{max} = K \times I_{V_{max}}$$

\* —Rating factor is based on breaker speed from initiation of trip signal to contact parting, allowing for 1/2 cycle relay time. To obtain the asymmetrical current interrupting capability of the breaker, multiply the symmetrical current by 1.1.

■ —Availability to be announced.

BREAKER IDENTIFICATION:



△—These values apply with circuit breaker in or out of enclosure.

• —Available with ratings exceeding ANSI requirements—Contact Square D Plant.

TABLE 1

FG-2 INTERRUPTER

The FLUARC system of arc interruption provides a soft high speed interruption with quiet operation.

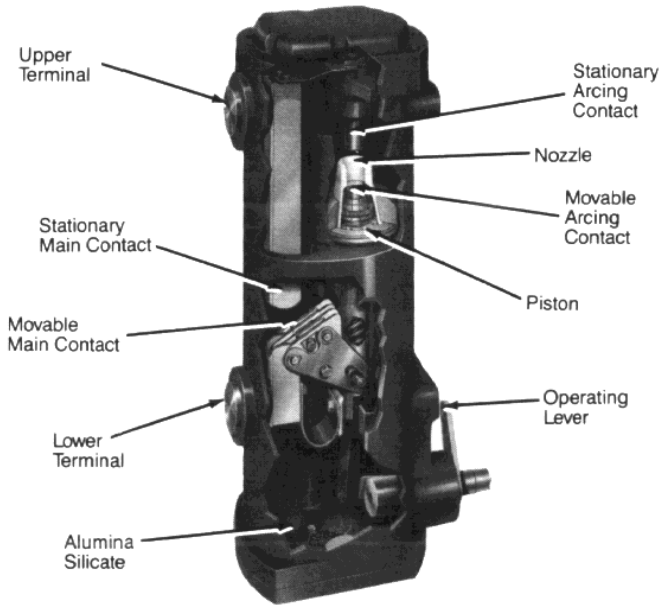
Sulphur hexafluoride gas used in the FG-2 circuit breaker is a nonflammable, colorless, odorless, nontoxic gas which is extremely stable and has a dielectric strength of 2.5 times that of air at atmospheric pressure.

The gas maintenance is assisted by a molecular sieve of dehydrated alumina silicate located at the bottom of each interrupter.

- The arcing contacts and main contacts provide a parallel path for the current. On closing, the arcing contacts make first. On opening, the arcing contacts break last.
- As the arcing contacts part, gas is compressed by the piston and is forced through the nozzle into the arc region and across the arc.
- During the arcing and ionization of the gas, a great amount of arc energy is absorbed and evacuated due to the high specific heat rating of SF<sub>6</sub>.
- As the arc is cooled radially, the action of the fluorine becomes more dominant, absorbing electrons from the arc and aiding the dielectric recovery across the contacts.
- Due to special chemical property and high heat transfer characteristics of the SF<sub>6</sub>, the gas rapidly cools and de-ionizes the arc reduc-

ing its conductance to practically zero, allowing total extinction at first current zero.

The gas that is forced through the nozzle also serves to damp out the physical motion of the breaker, providing a highly reliable mechanism that lends itself well to the minimum maintenance concept of these breakers.



FG-2 INTERRUPTER

TWO-HIGH METAL-CLAD 5-15kV SWITCHGEAR

VAD-2 (VACUUM) CIRCUIT BREAKER DATA

Type of Breaker	Nominal Rating		Rated Cont. Current 60 Hertz Amps.—RMS	Rated Voltages			Insulation Level Rated Withstand		Interrupting Ratings† Amps.—Symmetrical			Asymmetrical Rating Factor*	Short Time Rating 3 Sec. Amps.—RMS	Close & Latch Rating Amps.—RMS	Inter-rupting Time Cycles
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VAD-2-05025-12	250	4.16	1200	4.76	1.24	3.85	19	60	29,000	33,200	36,000	1.2	36,000	58,000	3
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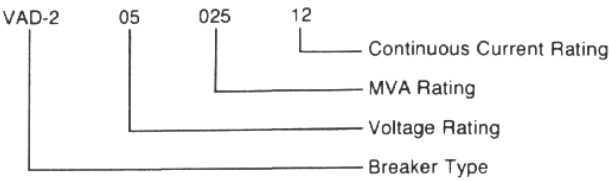
The calculated current should not exceed the maximum interrupting current rating.

$$I_{max} = K \times I_{V_{max}}$$

\* —Rating factor is based on breaker speed from initiation of trip signal to contact parting, allowing for 1/2 cycle relay time. To obtain the asymmetrical current interrupting capability of the breaker, multiply the symmetrical current by 1.2

■ —Availability to be announced.

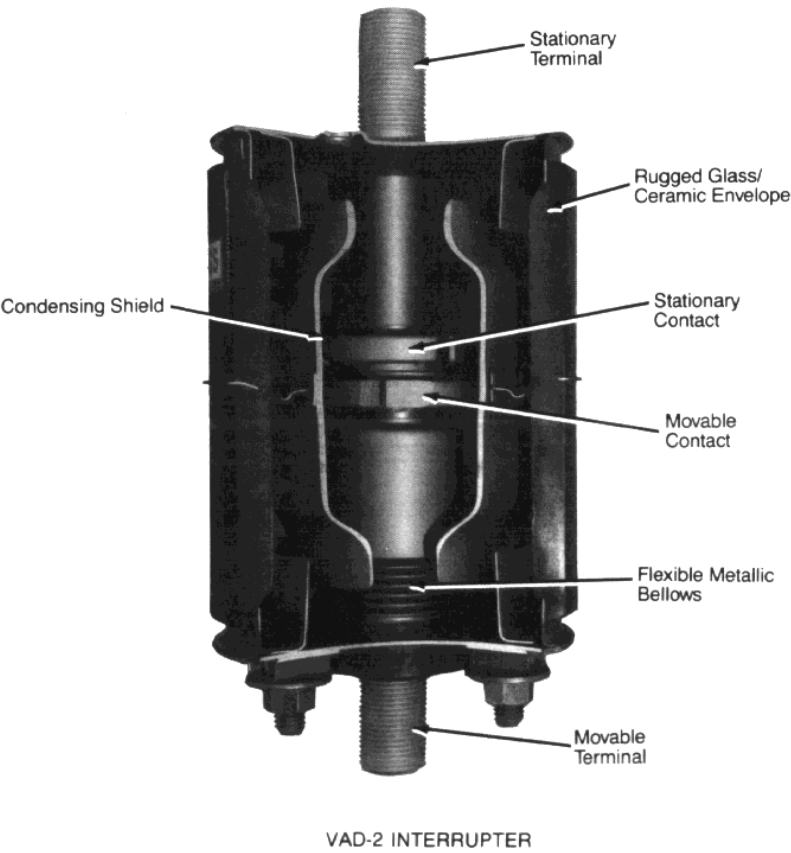
BREAKER IDENTIFICATION:



△—These values apply with circuit breaker in or out of enclosure.

• —Non-standard ANSI rating.

TABLE 2



VAD-2 INTERRUPTER

The modern vacuum interrupters utilized in VAD-2 circuit breakers are designed for high speed operation, rapid dielectric recovery, quiet operation, minimum maintenance and long life.

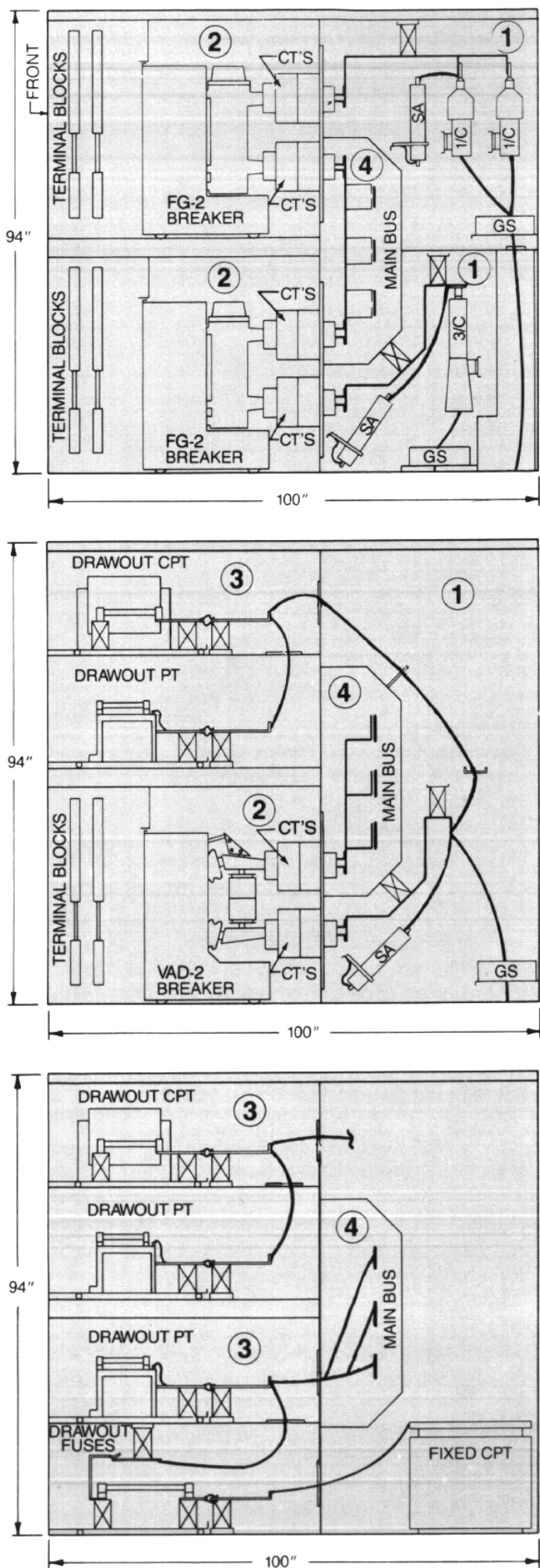
- As the contacts part, the arc develops a plasma of metallic ions released by the contacts.
- This plasma provides transfer media for electron flow until the arrival of the first current zero.
- The condensation of the metallic vapor on the condensing shield is rapid and the dielectric recovery rate is much faster than the rate of rise of the transient recovery voltage (TRV).
- This metallic vapor provides a gettering action which removes gas molecules from the evacuated space, therefore assisting in maintaining the high vacuum.

Because the vacuum interrupters are small in size and weight and utilize a short operating stroke, there is minimum physical shock to the mechanical system during operation. This makes an ideal situation for long life and low maintenance.



DIMENSIONS

TYPICAL SECTION VIEWS (36" WIDE)



AVAILABLE OPTIONS

①CABLE COMPARTMENT

- Bottom or top cable entry
- Ground sensor current transformer (zero sequence)
- Space for stress cone termination
- 1/C or 3/C pothead
- Surge arresters, if required
- Fixed mounted CPT, with no cable entry at the bottom

②BREAKER COMPARTMENT

- 1200/2000A SF<sub>6</sub> or Vacuum circuit breaker in two high construction
- Side space available for terminal block connections
- Maximum 4 CT's per phase (two on either side of breaker pole)

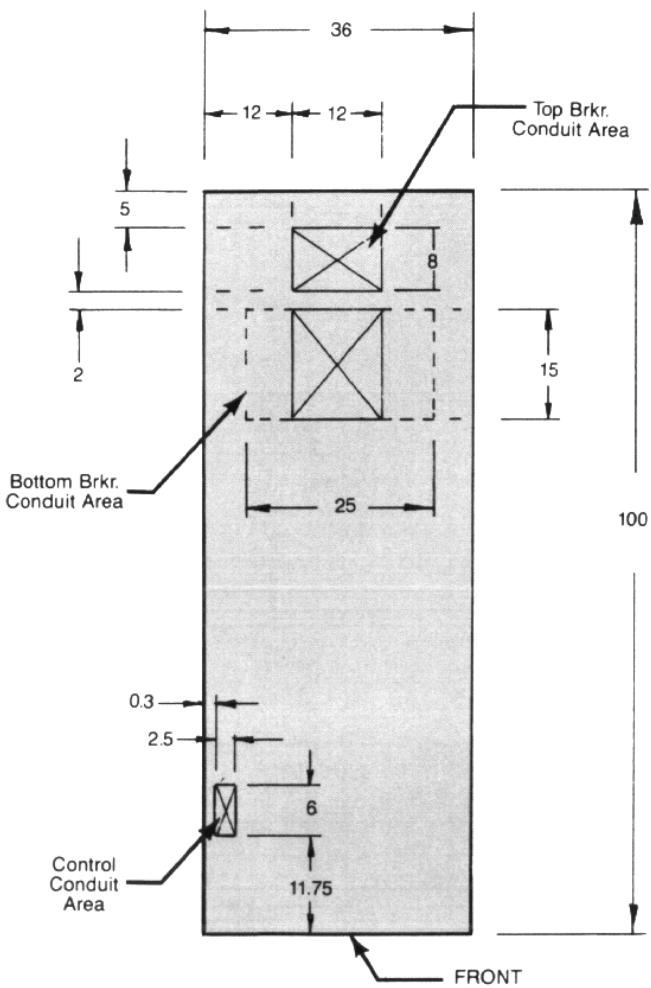
③AUXILIARY COMPARTMENT

- Fused drawout PT's or single phase CPT (15 kVA maximum)
- Drawout fuses

④MAIN BUS COMPARTMENT

- 1200/2000 ampere insulated aluminum (copper optional) main bus

FLOOR PLAN  
(Typical two breaker combination)



ALL DIMENSIONS IN INCHES