

## G-Opzel™ Collecting Surfaces

Korea Cottrell's G-Opzel collecting surfaces are designed to provide maximum accelerations normal to the collecting surface with minimum rapper energy input. The surfaces have aerodynamically designed baffles which provide quiescent zones to aid particulate collection and reduce re-entrainment. These baffles also provide the necessary structural rigidity to prevent bellying and bowing of the collecting surface.

### PRINCIPAL DESIGN FEATURES:

#### SHOP ASSEMBLY

Cold rolled sheet steel is roll-formed into panel plates. Panels are then shop-welded together into full field assemblies.

#### GAS BAFFLES

Vertical, triangular baffles provide plate rigidity and quiescent zones.

#### TOP SUSPENSION

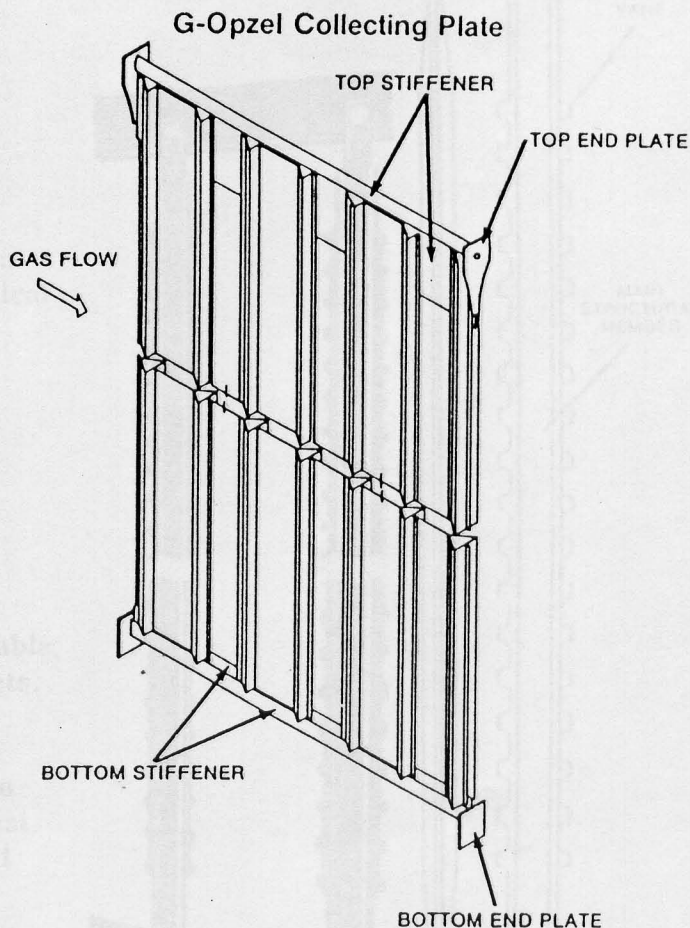
Bolted and welded to collecting surface hanger channel.

#### ALIGNMENT

Alignment guides provided at all four corners.

#### SPARK SUPPRESSION

The rolled tubes, attached to the top and bottom edges of the collecting surface, provide increased rigidity and suppress sparking at these edges by eliminating sharp corners.



## Dura-Trode™ Rigid Discharge Electrodes

The Dura-Trode rigid discharge electrode is comprised of two roll-formed steel sections welded together along their emitting edges with provisions for rigid attachment to the high voltage structural framework. The configuration provides uniform corona distribution while maximizing equipment reliability. Completely shop fabricated, no field assembly of the electrode is required.

### PRINCIPAL DESIGN FEATURES:

#### INHERENTLY RIGID

No wires, thin metal strips or framework; the design incorporates electrical energization and mechanical integrity into a single member.

#### SELF-ALIGNING

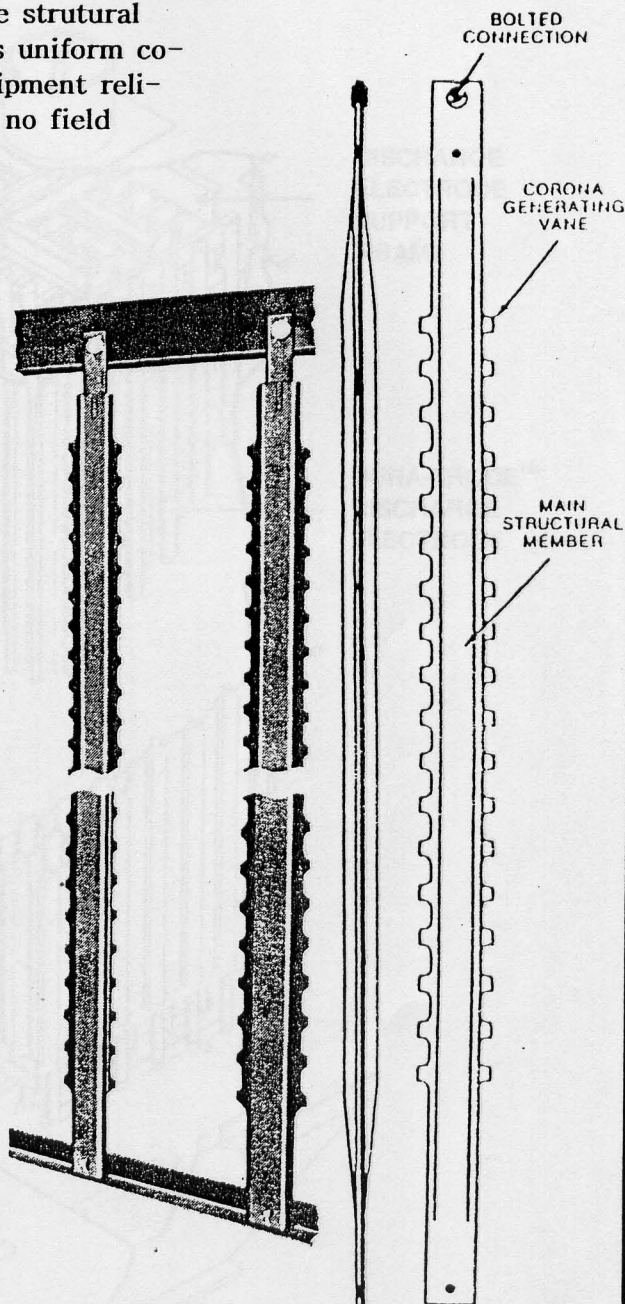
Each electrode is individually supported from a single bolt, and guided at the bottom by a lower alignment frame.

#### MAINTENANCE-FREE

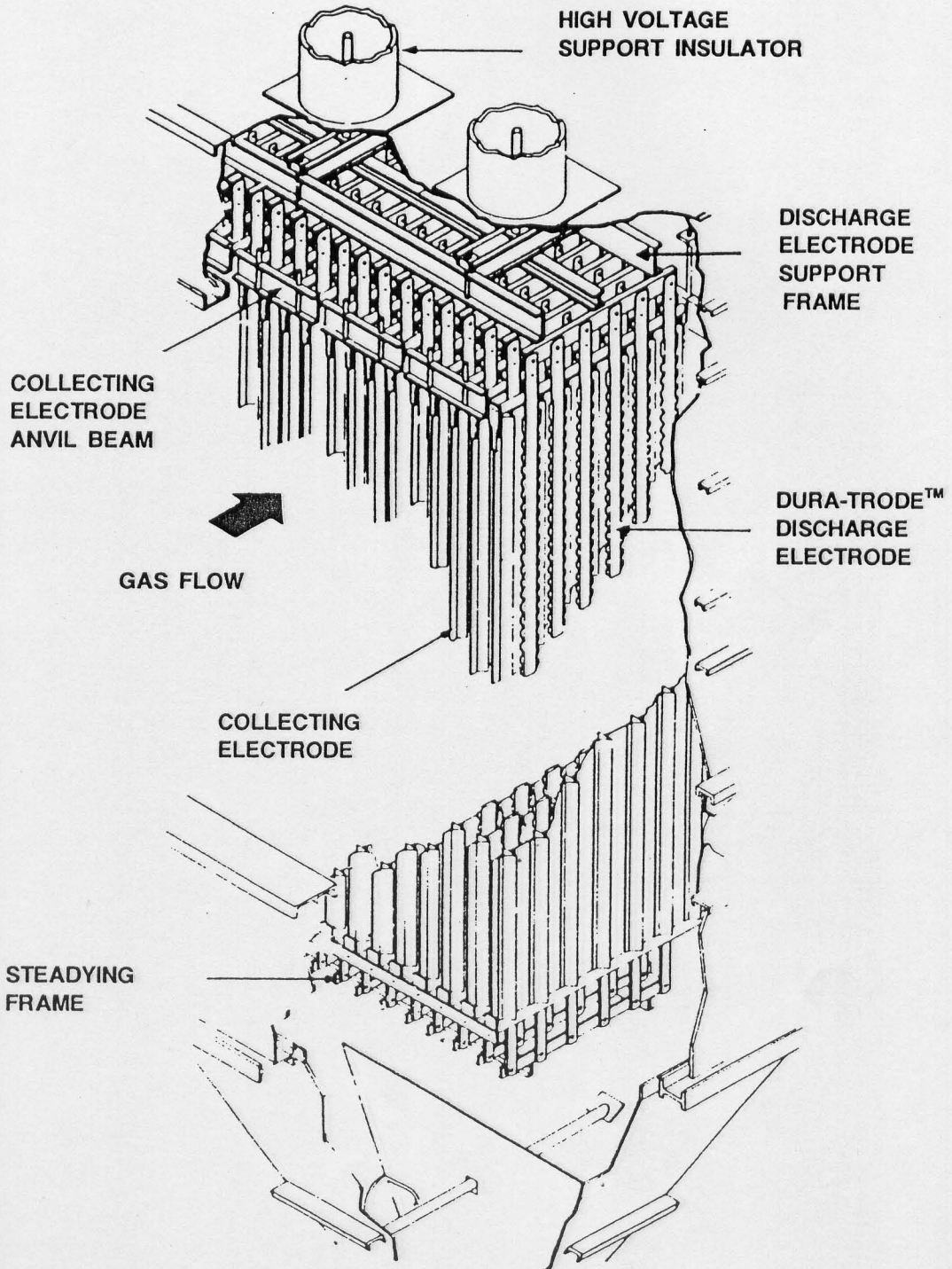
The electrode is virtually unbreakable, and is resilient to operational upsets.

#### UNIIFORM CORONA

The scalloped vanes, which tend to force corona to form at the sharpest points, combined with the flattened ellipsoidal shape, simultaneously provide well distributed corona and high field strength.



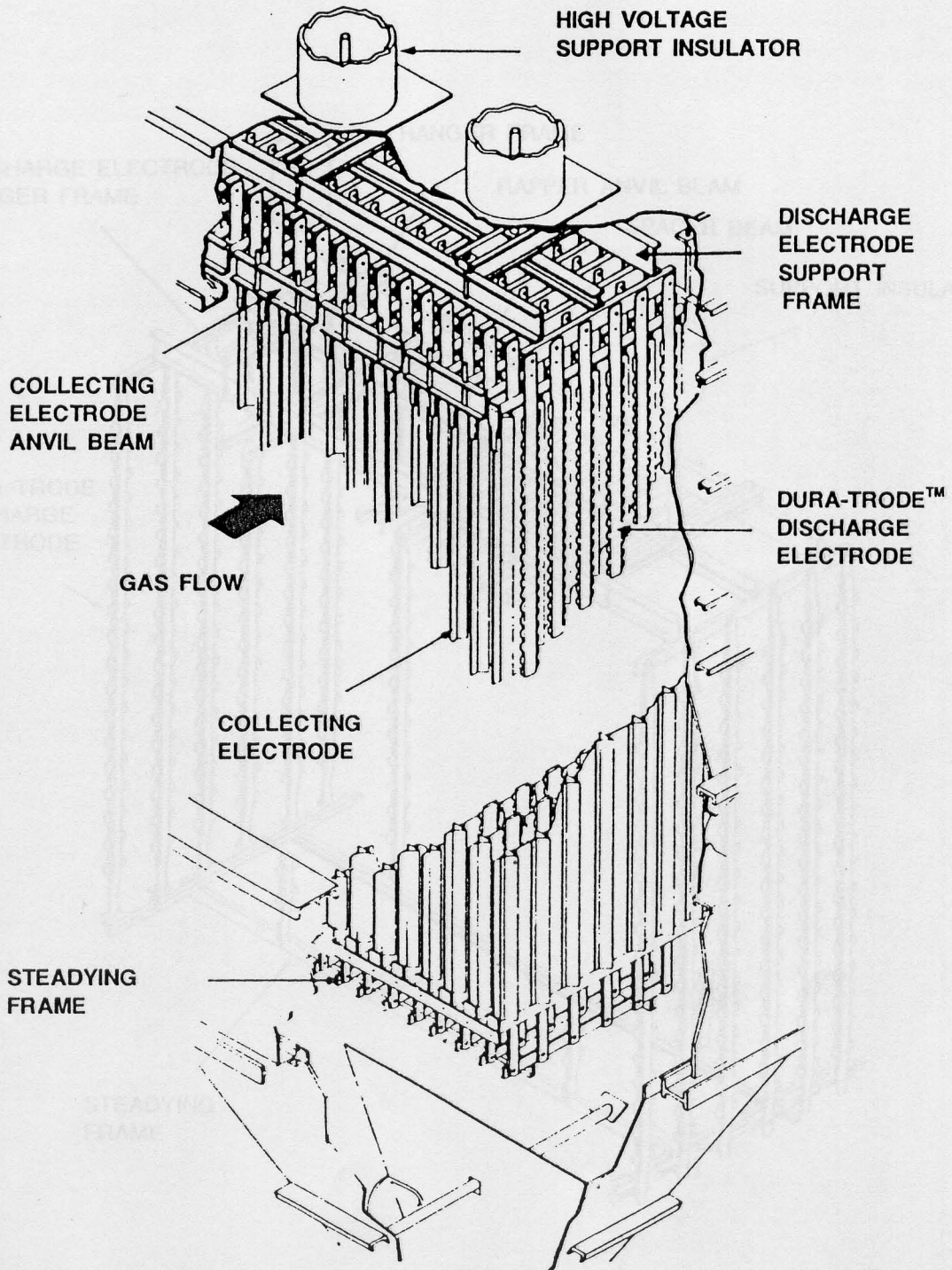
## Dura-Trode™ Precipitator



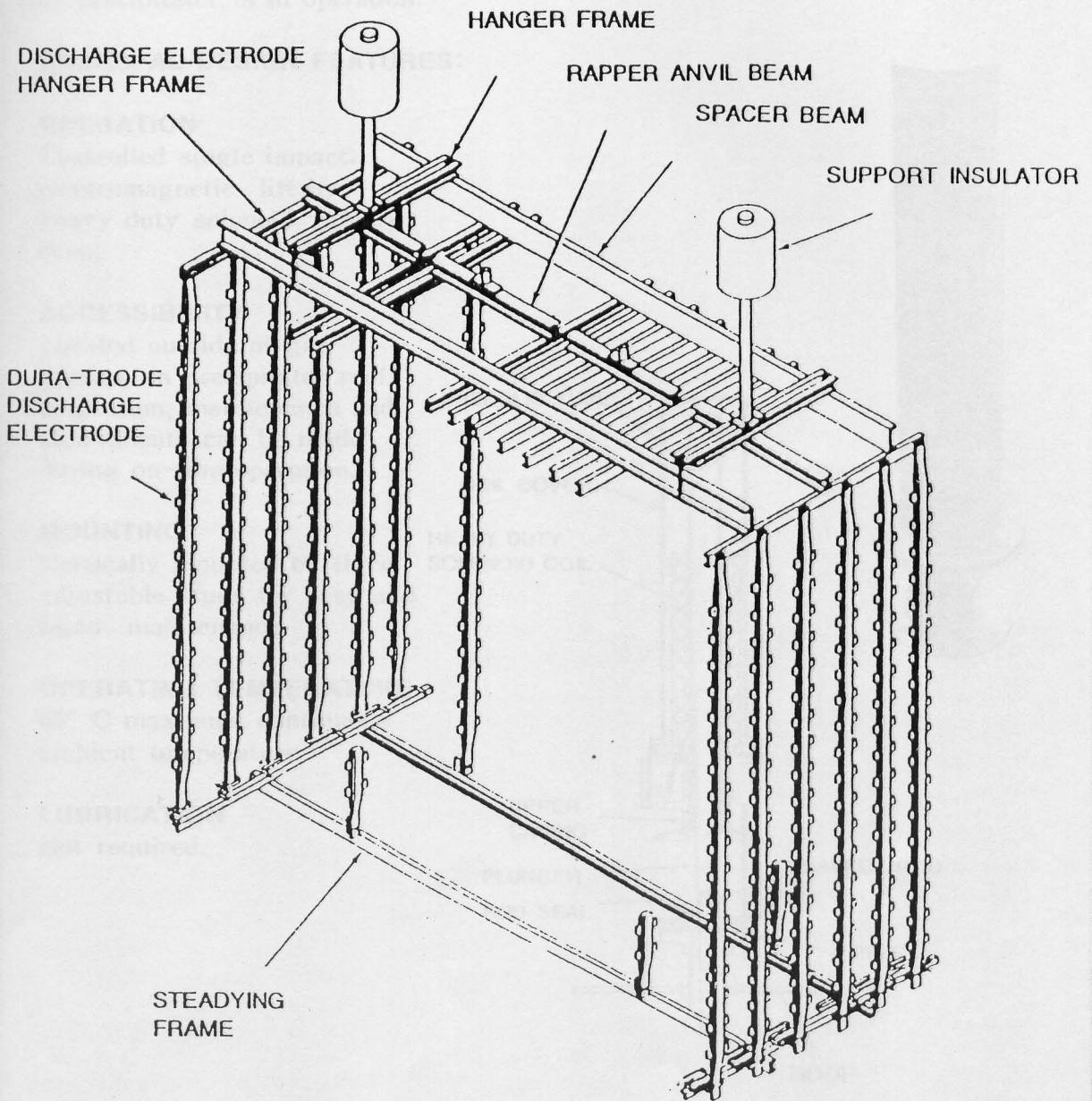


# Dura-Trode™ Precipitator

Bus Section - Centerline Suspension



## Dura-Trode™ Rigid Discharge Electrode Bus Section - Centerline Suspension



## MIGI™ Drop-hammer Rappers for collecting Surfaces and Discharge Electrode

The Magnetic Impulse Gravity Impact (MIGI) rapper is an electromagnetic device utilizing only one moving part. Intensity, sequence and cycle time of the rapping blows are electrically controlled from a central cabinet, enabling adjustment while the precipitator is in operation.

### PRINCIPAL DESIGN FEATURES:

#### OPERATION

Controlled single impact;  
electromagnetic lift by  
heavy duty solenoid, gravity  
drop.

#### ACCESSIBILITY

Located outside of gas  
stream, on precipitator roof.  
Inspection, maintenance and  
adjustments can be made  
during on-line operation.

#### MOUNTING

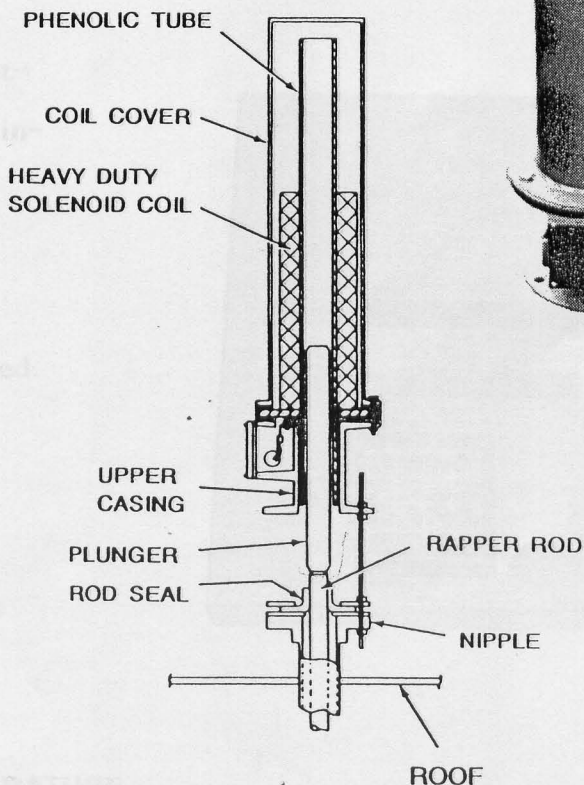
Vertically mounted on three  
adjustable studs for easy and  
rapid maintenance.

#### OPERATING TEMPERATURE

60° C maximum continuous  
ambient temperature.

#### LUBRICATION

Not required.





## MIGI™ Rapper Controller

The MIGI rapper controller is a fully adjustable, fast response, automatic control system employing solid-state, silicon-controlled rectifier circuit. Sectionalization of the control system supplies independent power to different groups of collecting electrode rappers, insuring maximum precipitator performance.

### PRINCIPAL DESIGN FEATURES:

#### SOLID STATE

Completely automatic, solid-state, electronic control for low voltage magnetic impulse, gravity impact (MIGI)rappers.

#### ENERGY CONTROL

Automatic feedback with phase control SCR's in full-wave configuration.

Adjustable time and sequence  
- Off-time between raps adjustable from 1 to 99 seconds; sequence programmable with an integrated circuit plug-in chip.

#### INTENSITY CONTROL

The intensity, or hammer lift, of each MIGI rapper is controlled by an individual intensity potentiometer. A master intensity control is also provided.

#### PROTECTION

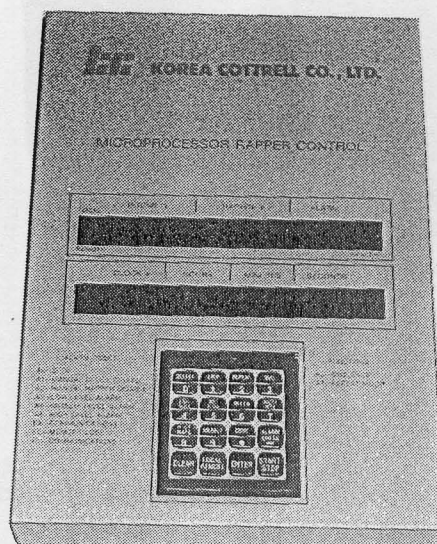
Thermal-magnetic trip line breaker and current-limiting fuses for each SCR.

#### INDICATORS

Meter indicator provides visual observation of percent hammer lift. Digital sequence readout provides identification of each operating rapper.

#### AMBIENT OPERATING TEMPERATURE

From 0° C to 45° C

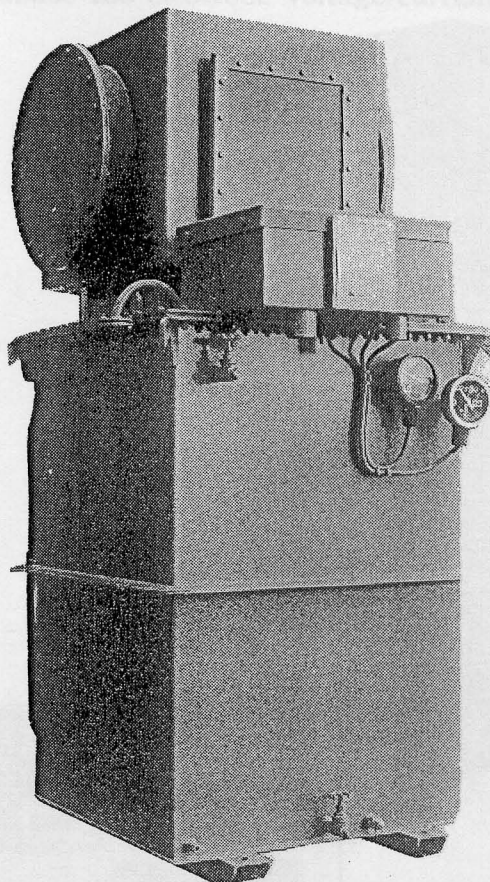


## Transformer-Rectifier Units

Korea Cottrell manufactures its own transformer-rectifier sets and control units, designed specifically for the precipitator's application. This unique capability allows Korea Cottrell to establish its own standards of quality, and to exercise complete control during every step of the manufacturing process. The end result of this high degree of in-house control is an outstanding record of operating reliability. All units, tested prior to shipment, are conservatively rated to insure high reliability and low failure rate.

Korea Cottrell has produced over 4000 silicon diode rectifier units used throughout the world. Over 2000 of these sets are used for fly ash collection systems. An outstanding record of service and reliability has been achieved.

Where full-wave-half-wave switching is required, an air switch external to the T-R assembly is furnished in lieu of "under oil switching." This eliminates arcing under the oil, which leads to oil contamination and early component failure.



### TRANSFORMER - RECTIFIER UNIT

<b>Type Transformer</b>	Liquid immersed, air-cooled, suitable for outdoor installation.
<b>Insulating Fluid</b>	Dielectric Liquid Transformer oil.
<b>Type Rectifier</b>	Double half-wave bridge circuit. Silicon diode rectifiers immersed with transformer. Two half wave outputs. May be connected for single full-wave output if desired.



## MICROPROCESSOR CONTROL SYSTEM(M.C.S)

In the past, control of the HT supply to the precipitator has traditionally been fulfilled by an automatic analogue controller. We consider the advantages of the new concept are. Determination of the flashover level within the precipitator and utilising the computer memory to maximise the electrode voltage/current characteristic.

### PRINCIPAL DESIGN FEATURES :

#### PRESET PROGRAMME

Operator friendly with up to ten preset programmes. These preset programmes can be automatically linked to process changes.

#### ENERGY MANAGEMENT

The control algorithm automatically reduces output to an agreed programme.

#### COMPUTER CONTROL

Either alpha numeric display or colour graphics.

#### FAULT DIAGNOSIS

The liquid crystal display identifies up to ten specific fault locations.

Back Ionisation Detection facility.

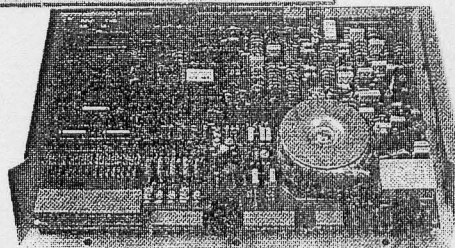
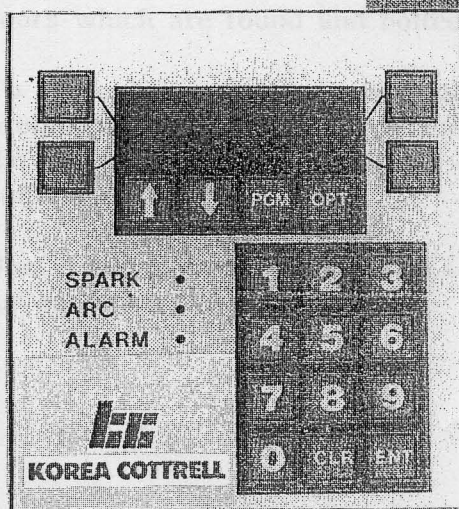
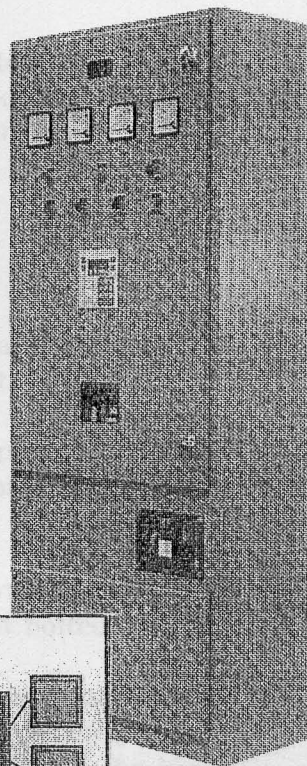
Intermittent Energisation Option.

#### RAPPING TIMERS

Three intergated rapping timers are provided as stanard for each HT controller. Each individual circuit is programmable over the range 0 - 9999 minutes for the rapping interval and 0 - 9999 seconds for the duration. Additional optimisation of the rapping cycle can be initiated by the computer process control.

#### POWER CONTROL

Power Off/Power Reduced Rapping is available as a standard feature.



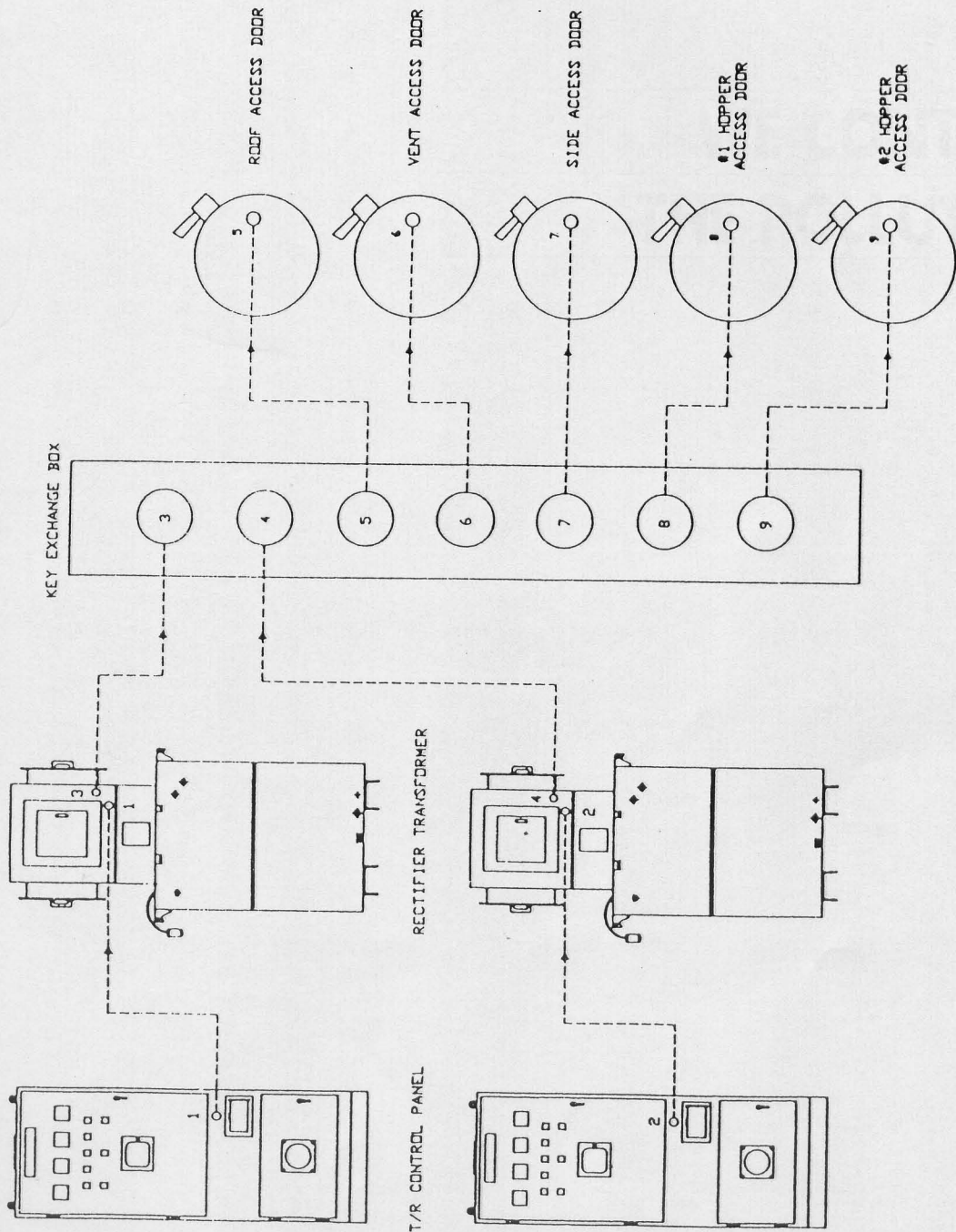
## Key Interlock System

A safety interlock system is provided with the equipment to prohibit entry into a precipitator or high voltage transformer rectifier enclosure unless all electrical energization systems have been de-energized and grounded.

The interlock system consists of a series of keys and locks located and sequenced to prevent personnel from coming in direct contact with any energized high voltage part. This concept is illustrated on the next page, typical key interlock sequence.

Type	Key type interlocks with a sequential key arrangement, non-unitized.
Location	On all precipitator and hopper access doors, high voltage switching and control unit circuit breakers, inlet and outlet diffuser access doors. Including insulator compartment inspection doors which are round and bolted.
Function	To prevent access to any high voltage equipment without properly locking out the power supply and grounding the high voltage equipment.
Number	One(1) complete separate set of interlocks for operation of the precipitator.

### TYPICAL KEY INTERLOCK SEQUENCE



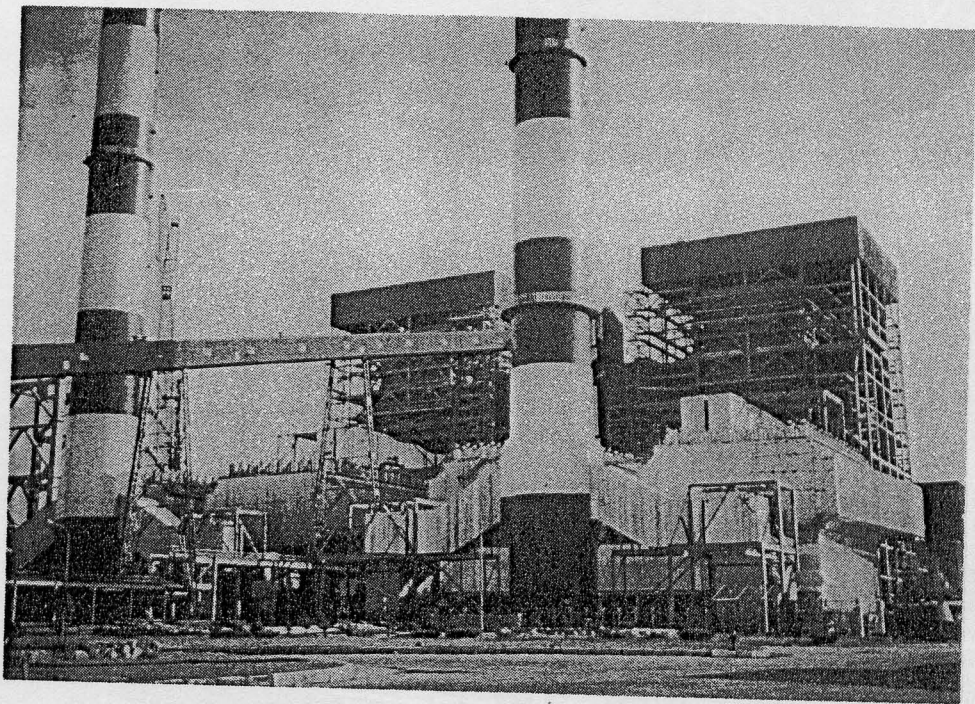


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**WE CONTROL  
THE POLLUTION**

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Poryong Thermal Power Station No. 1 & 2 ESP, Korea Electric Power Corp.