

Railway...

...Catenary Switchgear



High Speed Rail > Light Rail > Commuter Rail >

- 25 Hertz & 60 Hertz
- 12 kV to 52 kV
- 12 kV, 24 kV, 25/25 kV Systems
- Single Pole & Two Pole
- Metalclad Drawout switchgear
- Indoor & Outdoor Enclosures
- Trolley & Feeder Switchgear
- Trackside Switchgear
- Station Type Catenary Breakers

Available as **PACSafe** Arc Resistant



PACS Industries, Inc.

The Experienced Company

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IEC

ANSI/IEEE

ISO 9001-2000

PACS Industries, Inc. manufactures and provides medium voltage switchgear for trackside use to energize Catenary lines. We have provided well over 300 such switchgear units since 1992 for customers such as AMTRAK, NJT, SEPTA, and others. Switchgear is provided with state-of-the-art vacuum traction circuit breakers in single pole or two pole construction. Metalclad Drawout or Fixed Station Class switchgear available.

25 Hertz and 60 Hertz Catenary Switchgear are standard PACS' products. PACS is the sole leader in providing 25 Hertz switchgear as used in the lines from Washington D.C., to New York City, and has equipment in successful, reliable operation since the early 1990's.

PACS switchgear is manufactured in our 240,000 square foot factory in Ohio. We can provide indoor switchgear, or we can provide factory fabricated outdoor metal Power and Control Centers (PCC's) in which the Catenary switchgear is installed. PCC's are available with battery, control, office and restroom facilities.

Arc Resistant switchgear is available in **PACSafe** construction for maximum operator safety as described in **NFPA 70E-2009**, and has been designed and tested to **IEEE C37.20.7** Arc Resistant standards. Arc Resistant Type Testing is generally performed at KEMA Labs.

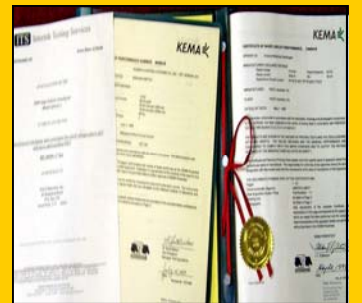
All required protective relaying unique to electric railways is available as are required controls.

BUY AMERICAN ACT. Where contracts need to comply with Buy American Act requirements, PACS switchgear includes an average of 80% American content.

OPERATING CHARACTERISTICS	12 kV Swgr		24 kV Swgr		52 kV Swgr	
Nominal or Operating Voltage	12+	kV	24+	kV	25/25+	kV
Basic Voltage Rating (BIL)	150	kV	150 200	kV	250	kV
Maximum Voltage. Three Phase Equivalent	38	kV	38	kV	52	kV
Number of Phases. Specify 1 or 2 Poles	1-2		1-2		1-2	
Frequency	25 Hertz or 60 Hertz					
Power Frequency Withstand Voltage (Hi-Pot)	80	kV	95	kV	105	kV
Continuous Current	1200 Amps to 2500 Amps					
Interrupting Time	40	mS	40	mS	40	mS
Standard Operating Duty	Close-Open-15 Sec-Close-Open					
Interrupting Current	12 kA, 25 kA, 40 kA, 50 kA (depending on voltage)					
Short Circuit Withstand Current (2 sec)	12 kA, 25 kA, 40 kA, 50 kA (depending on voltage)					
Momentary Withstand Current (10 Cycles)	31 kA, 65 kA, 108 kA, 130 kA (respectively)					
Interruptions at Continuous Current	10,000		10,000		10,000	
Interruptions. Maximum Short Circuit Phase to Gnd	100		100		50	
Interruptions. Maximum Short Circuit Phase to Ph.	100		100		50	
Control Operating Voltage	125V	DC	125V	DC	125V	DC

**Why Purchase.....
.... PACS Products?**

As an independent company we concentrate on providing products and services to our customers that are not always available to them these days. After-order service is very important, and our customers can directly contact the engineering team working on their order. After-shipment, PACS maintains the same high level of service, as needed.



Above Ratings For Metalclad Switchgear or Outdoor Station Class Breakers.. Operating voltages are Phase to Ground.

>>Ask for our complete catalog<<

Tel: 516-829-9060 Fax:

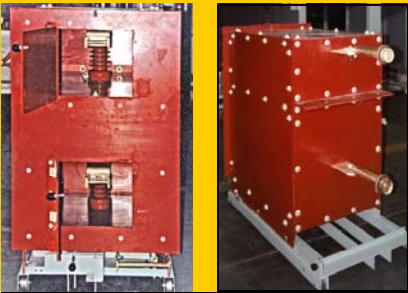
516-829-9557 e-mail:

PACS manufactures single phase Catenary Switchgear and circuit breakers in single pole or two pole construction.

Suitable for Trolley and Feeder circuit breakers, Bus Tie, Main and autotransformer service.

Designed, manufactured and tested in accordance with IEEE C37.20.2 for metalclad switchgear. Included are standard features such as automatic shutter mechanisms, required safety interlocks, etc.

Switchgear Available One or Two High In Ratings to 38 kV, 150 kV BIL.



Ground and Test Devices



Grounding Switch



PACsafe Catenary switchgear typical for 12 kV (150 kV BIL) & 24 kV (200 kV BIL).

PACsafe

PACS has developed, tested, and provided Arc Resistant switchgear for Catenary Switchgear. Designs and type tests are per IEEE C37.20.7, Type 1 and Type 2.

Electrical Safety in the Workplace is being promulgated by NFPA 70E-9000/NEC and is being enforced by OSHA.

It becomes imperative that new Catenary Switchgear installations be Arc Resistant for improved safety. Below illustrates an Arc Blast being diverted from the operator by **PACsafe**.

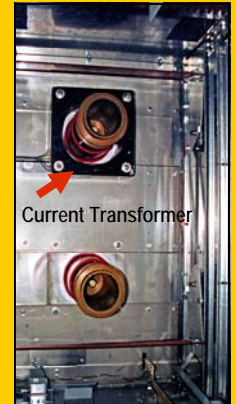


Front view of drawout circuit breaker. Single pole or two pole.



Typical for 12 kV or 24 kV

Rear view of single pole drawout circuit breaker.

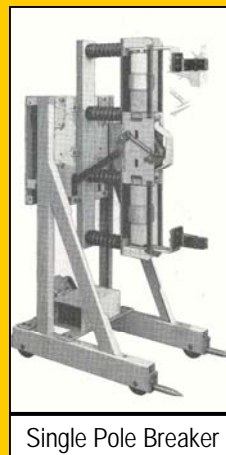


Current Transformer

View of drawout cubicle with shutters open.



Two Pole Breaker



Single Pole Breaker

52 kV Switchgear

PACS manufactures drawout metalclad switchgear rated 52 kV, 250 kV BIL. For 25/25 kV systems.

Two pole breakers are available for both the Feeder line and the Catenary line.

Single pole breakers are available for either the Feeder line or the Catenary line (or both).

Ask for our **PACsafe** Bulletins for Additional Technical Information.

PACS Industries, Inc. manufactures Power and Control Centers (PCC'S) in the same 240,000 Sq Ft facility as the Catenary Switchgear is manufactured. Consequently the complete assembly is tested as a coordinated assembly. Initial engineering and design is also accomplished at a single PACS' location. PCC construction can be designed to meet site dimensional requirements.

The advantage of specifying PCC building assemblies is that the building arrives as a completed and tested assembly, saving a considerable amount of time and cost over a field constructed building. PCC's can be provided with separate rooms for offices, storage, toilets, controls, batteries, etc.

As required by final dimensions, PCC's are manufactured in single or multiple shipping sections, subject to over-the-road requirements.

When multiple shipping splits are required, the PCC is first assembled and tested as a complete assembly at our factory. It is then disassembled for shipping splits. Reassembly instructions are included. PACS service engineers are available for field supervision.



Group of PCC PHOTOGRAPHS SHOWING VARIOUS STAGES



PACS manufactures Protective Relay boards using railway relays from Areva, Siemens, ABB, or others.



Backfeed Safety Indication
High Voltage Indicator uses capacitive insulators and does not require PT's. Phase voltage indication. Relay and 4-20ma output.

OUTDOOR STATION TYPE CIRCUIT BREAKERS & SUBSTATIONS

PACS provides 1 & 2 pole outdoor Station Class Circuit Breakers in ratings up to 34.5 kV (to 200 Kv BIL) or 52 Kv (250 Kv BIL). PACS can also provide required substation structures with switches, fuses, bus bars, etc.



Station Class Trolley Breakers



Typical Structural Substation