

Product Data

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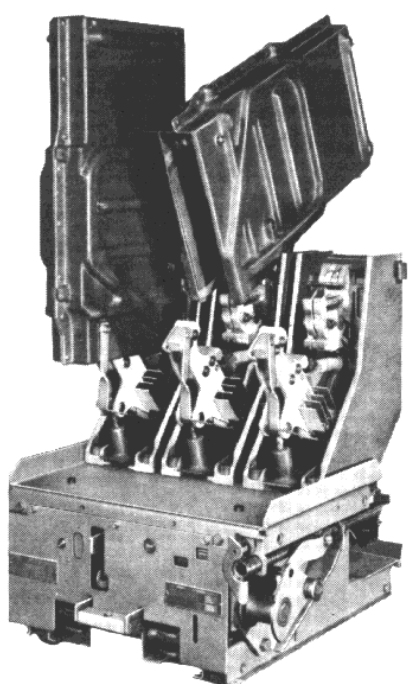
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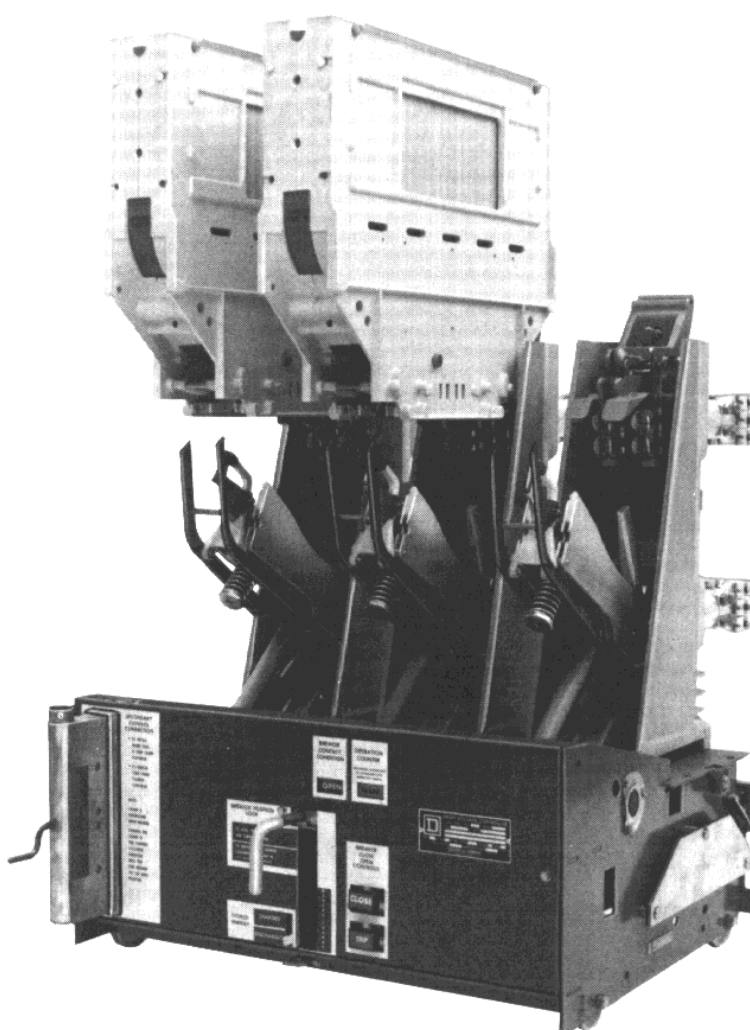
Date 10/22/75

Subject **SOLENARC SWITCHGEAR
COMPETITIVE CROSS REFERENCE**

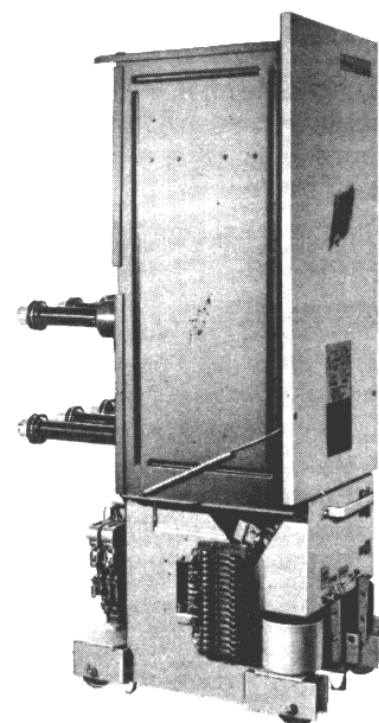
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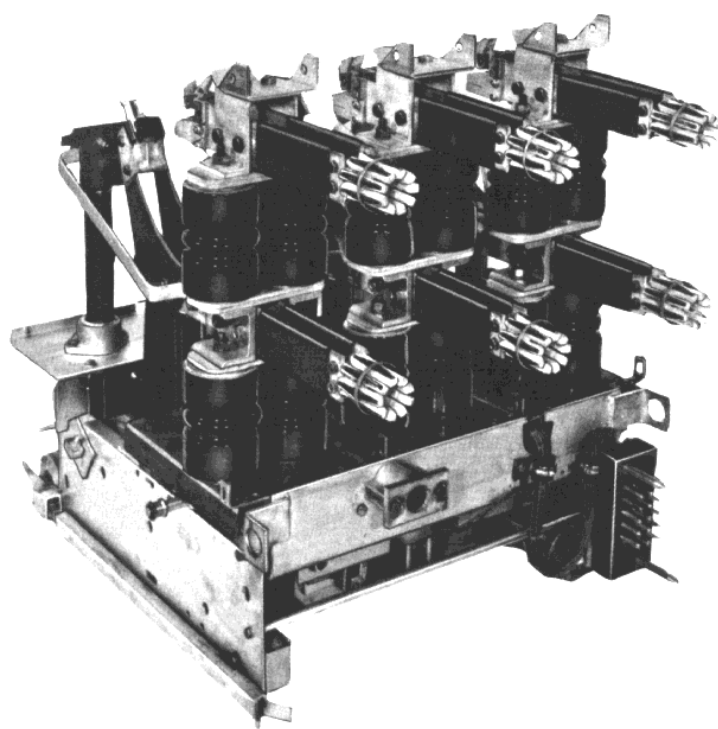
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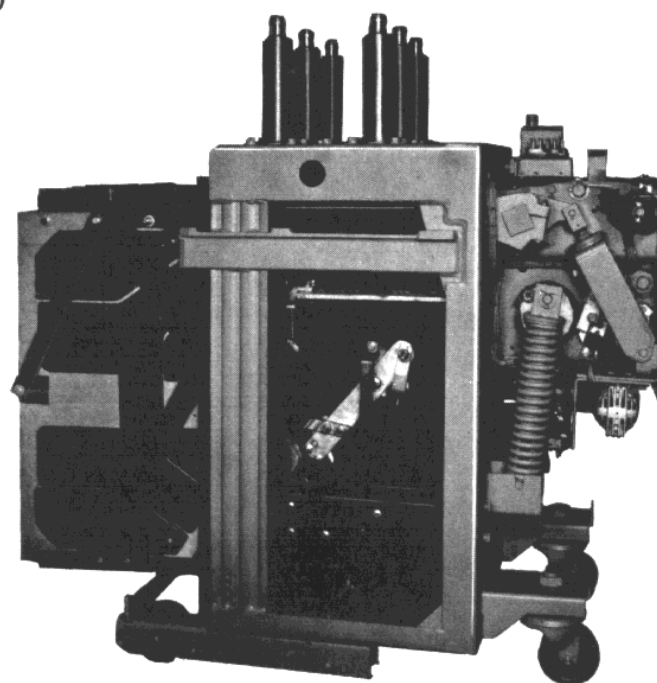
SQUARE D



ALLIS-CHALMERS



WESTINGHOUSE



GENERAL ELECTRIC

SQUARE D COMPANY
RESTRICTED

PRINTED
IN
U.S.A. 1M 11/76 PS

5-15 KV METAL-CLAD SWITCH GEAR CROSS REFERENCE

Voltage Class, Interrupting Capacity Amperage	Square D	General Electric	Westinghouse	ITE	Allis-Chalmers
5KV 75MVA 1200A	DSE21-1	AM-4.16-75	50DHP-75	5HK75	MA-75B
5KV 150MVA 1200A	DSE23-1	N.A.	N.A.	N.A.	N.A.
5KV 150MVA 2000A	DSE23-2	N.A.	N.A.	N.A.	N.A.
5KV 250MVA 1200A	DSE23B-1	AM-4.16-250	50DHP-250	5HK-250	N.A.
5KV 250MVA 2000A	DSE23B-2	AM-4.16-250	50DHP-250	5HK-250	N.A.
5KV 250MVA 1200A (78KA)	DSE23BH-1	AM-4.16-250B	H50DHP-250	5HK-250 (60KA)	MA250C
5KV 250MVA 2000A (78KA)	DSE23BH-2	AM-4.16-250B	H50DHP-250	5HK-250 (80KA)	MA250C
5KV 350MVA 1200A	DSE25B-1	AM-4.16-350	50DHP-350	5HK-350	MA-350C
5KV 350MVA 2000A	DSE25B-2	N.A.	50DHP-350	5HK-350	N.A.
5KV 350MVA 3000A	DSE25B-3	AM-4.16-350	50DHP-350	5HK-350	FA-350A
7.5KV 250MVA 1200A	DSE23BU-1	N.A.	N.A.	N.A.	N.A.
7.5KV 250MVA 2000A	DSE23BU-2	N.A.	N.A.	N.A.	N.A.
7.5KV 500MVA 1200A	DSE25BU-1	AM-7.2-500	75DHP-500	7.5HK-500	FB-500A
7.5KV 500MVA 2000A	DSE25BU-2	AM-7.2-500	75DHP-500	7.5HK-500	FB-500A

() NON-STANDARD HIGH CLOSE AND LATCH RATINGS (NOT ANSI LISTED)

5-15 KV METAL-CLAD SWITCH GEAR CROSS REFERENCE

Voltage Class, Interrupting Capacity Amperage	Square D	General Electric	Westinghouse	ITE	Allis-Chalmers
13.8KV 250MVA 1200A	DSE62-1	N.A.	N.A.	N.A.	N.A.
13.8KV 250MVA 2000A	DSE62-2	N.A.	N.A.	N.A.	N.A.
13.8KV 500MVA 1200A	DSE65-1	AM-13.8-500	150DHP-500	15HK-500	FC-500
13.8KV 500MVA 2000A	DSE65-2	AM-13.8-500	150DHP-500	15HK-500	FC-500
13.8KV 500MVA 3000A	DSE65-3	N.A.	N.A.	N.A.	N.A.
13.8KV 500MVA 1200A (58KA)	DSE65H-1	AM-13.8-500B	H150DHP-500	15HK-500 (60KA)	FC-500
13.8KV 500MVA 2000A (58KA)	DSE65H-2	AM-13.8-500B	H150DHP-500	15HK-500 (60KA)	FC-500
13.8KV 750MVA 1200A	DSE57-1	AM-13.8-750	150DHP-750	15HK-750	FC-750
13.8KV 750MVA 2000A	DSE57-2	AM-13.8-750	150DHP-750	15HK-750	FC-750
13.8KV 750MVA 3000A	DSE57-3	N.A.	N.A.	N.A.	N.A.
13.8KV 750MVA 1200A (78KA)	DSE57H-1	AM-13.8-750B	H150DHP-750	15HK-750	FC-750
13.8KV 750MVA 2000A (78KA)	DSE57H-2	AM-13.8-750B	H150DHP-750	15HK-750	FC-750
13.8KV 1000MVA 1200A	DSE68-1*	AM-13.8-1000	150DH-1000	15HK-1000	FC-1000
13.8KV 1000MVA 2000A	DSE68-2*	N.A.	150DH-1000	15HK-1000	N.A.
13.8KV 1000MVA 3000A	DSE68-3*	AM-13.8-1000	150DH-1000	15HK-1000	FC-1000

*CONSULT FACTORY FOR AVAILABILITY
() NON-STANDARD (NOT ANSI LISTED) HIGH CLOSE AND LATCH RATINGS

DRAWOUT METAL-CLAD SWITCH GEAR SUPERIOR DESIGN FEATURES

Switchgear Features	Square D	General Electric	Westinghouse	ITE	Allis-Chalmers
Introduction Year Latest Model Power Circuit Breakers	1974	1948 1971 (Minor improvements, original design).	1968 1974, reduction in amount of porcelain used.	1970	1968
Rated Interrupting and Closing Time	Open 5 cycles. Close 6.6-9 cycles.	Open 5 cycles. Close 5-7 cycles. Solenoid: Slower, time not available.	Open 5 cycles. Close 3-4 cycles. Solenoid: Slower, time not available.	Open 5 cycles. Close 4.5-7.5 cycles.	Open 5 cycles. Close 5-11.5 cycles. Solenoid: close 17 cycles.
Arc Chute Construction and Operation	Molded shells hold refractory plates. Arc runners and ceramic side cheeks, guide arc into arc chute where it forms electromagnetic loops and becomes self-extinguishing.	Arc chute made of ceramic and asbestos. Arc is pushed by magnetic "blow-out" coil mounted on breaker and on arc chute.	De-ion arc interruption. Magnets for blow-out in side cheeks of arc chutes and blow-out coils in chutes.	Ceramic material, high mechanical and heat-shock. Face wound permanent magnet blow-out coils on each side of arc chute.	Refractory plates, arc runners, and magnetic blow-out coils. Arc pushed by magnetic "blow-out" coils mounted on chutes.
Puffers	Extra large capacity bellows on each pole. Blows air throughout complete opening cycle. Silicone rubber.	Small piston (on each phase) compresses air and releases it into arc chute only during initial contact parting. Mounted on moving contact arm. Rubber plunger.	One puffer chamber with one metal piston compressing air for release into tubes at each pole at instant of contact parting.	Large puffer on each pole. Blows air throughout complete opening cycle. Rubber.	2 pistons total, blowing air through tube system only at time of initial contact parting. Mounted on operating shaft. Rubber plunger.
Trip Free in Any Position	No! Not during closing stroke. Breaker closes solidly with full charge on opening springs to insure full arc interruption. Trip free in all other positions.	Yes! Breaker closing mechanism collapses at any point during closing stroke.	No, not during closing stroke.	No, not during closing stroke.	Yes! Breaker closing mechanism collapses at any point during closing stroke.

DRAWOUT METAL-CLAD SWITCH GEAR SUPERIOR DESIGN FEATURES

Switchgear Features	Square D	General Electric	Westinghouse	ITE	Allis-Chalmers
Spring Charging Time	6 seconds	5-10 seconds depending on voltage applied to universal motor	5 seconds	2 seconds	10 seconds
Circuit Breaker Closing Power VA @ 115VAC 500MVA, 15KV, 1200A	Spring charging motor: 250VA Closing coil: 67VA	Spring charging motor: 1600VA Closing coil: 920VA	Spring charging motor: 450VA Closing coil: 760VA Solenoid closing: 14,875VA @ 125VDC	Spring charging motor: 1150VA Closing coil: 520VA	Spring charging motor: 2185VA Closing coil: 1150VA Solenoid closing: 9775VA
Circuit Breaker Opening Power @115VAC	48 VA	2650 VA	760 VA	520 VA	1265 VA
Operating Speed	(Arcing Zone Speeds) Open: 5KV—7.2 ft./sec. 15KV—10.9 ft./sec. Close: 5 KV—3.6 ft./sec. 15KV—5.45 ft./sec.	(Arcing Zone Speeds) Open: 15 ft./sec. Close: 11 ft./sec.	(Arcing Zone Speeds) Open: 5KV—8.75 ft./sec. 15KV—13.75 ft./sec. Close: 5KV—7 ft./sec. 15KV—9-11 ft./sec.	N.A.	(Average Speeds) Open: 6.5-9.3 ft./sec. Close spring: 3.2-6.5 ft./sec. Close solenoid: 2.2-2.7 ft./sec.
Closing Stroke	5KV—.396 ft. 15KV—.599 ft.	.438 ft.	5KV—.333 ft. 15KV—.510 ft.	N.A.	.542-.775 ft.

DRAWOUT METAL-CLAD SWITCH GEAR SUPERIOR DESIGN FEATURES

Switchgear Features	Square D	General Electric	Westinghouse	ITE	Allis-Chalmers
Control Voltage Closing and Tripping Percent @ 115VAC	Close: 65-109% Open: 65-109%	Close: 82-109% Trip: 82-109%	Close: 82-109% Trip: 82-109%	Close: 83-109% Trip: 83-109%	Close: 83-109% Trip: 83-109%
@ 48VDC	Close: 58-104% Open: 44-125%	Close: 71-104% Trip: 58-125%	Close: 71-104% Trip: 55-125%	Close: 73-104% Trip: 58-125%	Close: 73-104% Trip: 58-125%
@ 125VDC	Close: 58-105% Open: 32-112%	Close: 73-105% Trip: 55-114%	Close: 73-105% Trip: 55-114%	Close: 72-104% Trip: 56-112%	Close: 72-104% Trip: 56-112%
Auxiliary Contacts 1200A, 500MVA, 15KV	6-A and 6-B as standard. 3-A and 2-B used in normal breaker operation. Mounted behind front panel. Total of 20 breaker mounted contacts available.	4-A and 4-B as standard. 3-A and 2-B used in normal breaker operation. Mounted behind front panel.	4-A and 4-B as standard. 3-A and 2-B used in normal breaker operation. Mounted behind front panel.	4-A and 4-B as standard. 3-A and 2-B used in normal breaker operation. Contacts mounted in rear of truck. Breaker must be removed from cell to service.	4-A and 4-B as standard. 3-A and 2-B used in normal breaker operation. Mounted behind front cover.
Charging Mechanism AC, DC	AC or DC charging motor with different voltage motors. Manual charging tool.	Universal AC-DC charging motor. Manual charging tool.	Universal AC-DC charging motor. Manual charging tool.	AC or DC motor. Manual charging tool.	AC or DC motor. Different motors used for different voltages. Manual charging tool.

DRAWOUT METAL-CLAD SWITCH GEAR SUPERIOR DESIGN FEATURES

Switchgear Features	Square D	General Electric	Westinghouse	ITE	Allis-Chalmers
Circuit Breaker Closing	Electrically or manually closed through stored energy springs.	Electrically or manually closed through stored energy springs. Solenoid closing option.	Electrically or manually closed through stored energy springs. Solenoid closing option.	Electrically or manually closed through stored energy springs.	Electrically or manually closed through stored energy springs. Solenoid closing option.
Method to Manually Close and Open Breaker	Mechanical close and open pushbuttons.	Must insert finger through front plate opening and press open and close levers.	Covers must be lifted and plungers pushed to manually close and trip breakers.	Trip pushbutton. Lever handle must be pulled to close. Not accessible with door closed.	Push rod to open and pull a small lanyard ring attached to wire to close.
Springs Charged Indication	Lever indicates charged or discharged.	Flag indicator shows "discharged" or "charged."	Flag indicator shows "discharged" or "charged."	Flag indicator shows "discharged" or "charged."	Flag indicator shows springs charged "and remove."
Manual Slow-Close Mechanism	Manual charging handle is slow close tool. Cannot be done with breaker in cell.	Special extra cost "manual charging wrench" required. Cannot be done with breaker in cell.	Manual charging handle is slow close tool. Possible to slow close in connected position with breakers in cell.	Special tool must be used along with charging handle. Cannot be done with breaker in cell.	Special spring charging tool used for slow close. Cannot be done with breakers in cell.
Charging Spring Condition Between Test and Connected Positions	If springs are charged in test position, they remain charged, while breaker is pushed to the fully connected position. Breaker cannot close however until locking pins are engaged.	Springs are discharged 1/4 inch above fully lowered position when raising or lowering.	If springs are charged in test position, they remain charged, while breaker is racked to the fully connected position.	If springs are charged in test position, they must be discharged before breaker can be racked to the fully connected position.	If springs are charged in test position, they remain charged, while breaker is jacked to the fully connected position.

DRAWOUT METAL-CLAD SWITCH GEAR SUPERIOR DESIGN FEATURES

Switchgear Features	Square D	General Electric	Westinghouse	ITE	Allis-Chalmers
Contact Position Indicator	Indicator (green-open) red-closed contacts. Also red and green pilot lights.	Flag indicator shows "open" or "closed" contacts.	Lever indicator for breaker contacts. Lights show when open or closed.	Flag indicator shows position of breaker contacts when outer door closed.	Flag indicator shows position of breaker contacts. Also red and green pilot lights.
Control Circuit Connections	Control circuit cord and plug receptacle on breaker. Cord in heavy nylon flexible tubing. Cast aluminum plug housing Jones connectors. Plug must be engaged before breaker will operate.	Male pin plug mounted on top left side of circuit breaker. Females on underside of shutter. Shutters open before control circuits are made.	Male pin plug on lower left rear of circuit breaker. Female on rear of cell mounted in phenolic.	Male sliding strips mounted on rear of cell and female contacts with fingers mounted on breaker truck. Fingers and strips mounted on bakelite.	Male fingers mounted on left side of circuit breaker. Flat strip contact on side of cell. Fingers and strips mounted on bakelite and extend from test to connected positions.
Secondary Control Contacts Maintained From Test to Connected Positions	Control plug can remain installed while changing positions.	Control plug must be removed. Control circuits not maintained.	Secondary contacts not maintained from test to connected positions. They must be returned to normal position on breaker truck.	Male portion of contacts holding slide strips extends far enough to engage in both positions.	Long sliding strips mounted on side of cell maintain connections in both positions.
Portable Circuit Breaker Levering Device and Racking Method	Breaker levered in and out of connected position by simple lever handle. Breaker manually pushed and pulled to other positions.	Vertical lift breaker. Raising and lowering performed by portable gear motor and chain drive.	Breaker levered from connected to disconnect position with jack-screw through outer closed door.	Circuit breaker wheeled into interference (disconnected) position. Moved from disconnected to connected position with jack-screw through outer closed door.	Breaker levered in and out by lever handle engaging notched strip on floor of cell. Must use special tool.
Circuit Breaker Position Indicator	Pointer on breaker truck lines up with markers on cell floor.	No positive indicator of "connected" position. Breaker cannot be operated unless fully in position.	Spring position indicator.	Indicator mounted on floor of cell and viewed through cranking cover.	Automatically stops and locks in three positions. Manual release pedal is pressed to change positions. No flags.

DRAWOUT METAL-CLAD SWITCHGEAR SUPERIOR DESIGN FEATURES

Switchgear Features	Square D	General Electric	Westinghouse	ITE	Allis-Chalmers
Interlock to Prevent Circuit Breaker Levering if Contacts Closed	One inch locking pins hold the breaker in connected position. To lever breaker pins must be withdrawn, which mechanically trips breaker.	End of travel limit switches with contacts in motor drive circuit keep breaker in connected position. No mechanical interlock.	Mechanical interlock engages guide rail in connected position to prevent levering of breaker from this position when contacts are closed.	Racking release lever cannot be released from racking screw when breaker is in connected and closed position. Release lever manually operated, not automatic and could be easily removed from breaker.	Breaker release lever mechanically engages slots in guide rail. To move breaker release lever must be depressed manually which automatically trips breaker.
Connected Position Extra Safety Provisions	Breaker locking handle prevents circuit breaker removal when contacts are closed in connected or test position. If handle is rotated breaker opens but truck is still locked in cell by one inch pins.	Mechanical interlock prevents vertical move.	Mechanical interlocks hold circuit breaker and prevent levering. If levered too hard shear pin will break to indicate breaker closed.	Racking release lever held mechanically and prevents racking if breaker is closed.	Interlock holds circuit breaker, manual release pedal.
Safety shield	Safety shield cannot be removed with breaker in cell.	No safety shield. Arc chutes on rear side of circuit breaker.	Safety shield cannot be removed with breaker in cell.	Safety shield cannot be removed with breaker in cell.	Safety shield cannot be removed with breaker in cell. Shield held by two small spring clips.
Primary Disconnecting Devices	Knife blade and double jaw design. Reinforcing springs are close to heat sink run backs. Line contact principle used on jaws.	Tube and socket design. Tube mounted on cell utilizes a garter spring in tension. Socket insulated with craft paper and epoxy resin. Springs in bushings mounted in cell (bus and cable side power must be off before inspection).	Tube and socket design with multiple fingers each held by one leaf spring and retained by outer ring. Located on breaker.	Tube and socket design with multiple garter springs on breaker tubes.	Multiple finger tube and socket type. Individual springs in compression on each pair of fingers. Fingers on breaker.

DRAWOUT METAL-CLAD SWITCH GEAR SUPERIOR DESIGN FEATURES

Switchgear Features	Square D	General Electric	Westinghouse	ITE	Allis-Chalmers
Breaker Guide Rails	Two center guide rails.	Floor pan guides for circuit breaker alignment only.	Two guide rails.	Two guide rails align breaker into cell.	One center guide rail aligns breaker into cell.
Primary Contact Guides on Breaker and in Cell	Contact alignment pins on each pole assure perfect primary contact mating into pin sockets in rear of cell.	Primary contact alignment by steel guides as breaker is being raised.	No primary contact guide.	No primary contact guide.	No primary contact guide.
Arc Chute Removal Typical: 1200A, 500MVA, 15KV	78 pounds and can be removed by one man.	Requires overhead hoist and special "arc chute lifter."	Requires overhead hoist to remove. Requires special tool to tilt chutes.	Must use arc chute lifting plates and arch chute tilting support for inspection.	Phase barriers and safety shield must be unbolted and overhead hoist used for lifting.
Breaker Front Shields	Safety shield with view windows. Breaker must be out of cell to remove shield.	Vertical lift magneblast breaker; no front shield.	Front shield which may be removed when breaker is in cell.	Front shield can not be removed when breaker is in cell.	Front shield can not be removed when breaker is in cell.
Interphase Barriers	Inter-phase barriers on outer poles. Removed separately.	Individual pole barriers mounted on sides of arc chutes. No separate barriers.	Phase barriers attached to safety shield. Remove whole assembly.	Inter-phase barriers on outer poles. Safety shield must be removed first before inspection.	Separate shield is attached to individual pole barriers and must be removed before contact inspection. Shield held in place by two small 1/4 turn fasteners.

DRAWOUT METAL-CLAD SWITCH GEAR SUPERIOR DESIGN FEATURES

Switchgear Features	Square D	General Electric	Westinghouse	ITE	Allis-Chalmers
Breaker Connected Through Closed Door	Safety shield in front of arc chutes.	No safety door or front safety shield on circuit breaker.	Breaker cranked from connected to disconnected position through closed safety door.	Breaker cranked from connected to disconnected position through closed safety door.	Safety shield in front of arc chutes.
Breaker Positions	1. Connected 2. Disconnected 3. Test (same as disconnected position but control cord and plug must be connected.) 4. Remove (cell may be padlocked and breaker stored in this position.)	1. Connected 2. Disconnected (full down or lowered position.) 3. Test (door open, separate control cord must be connected.) Breaker must be withdrawn from cell 2 1/4 inch to install plug. 4. Remove: cell interlock operated and breakers rolled beyond test position. Front door may be closed.	1. Connected 2. Disconnected 3. Test (same location as disconnected position) but secondary contacts must be extended by operating lever on front of breaker. Remove (front door must be opened.)	1. Connected 2. Disconnected 3. Test (same location as disconnected position.) 4. Remove (front door must be opened.)	1. Connect 2. Disconnect (separate position from test.) 3. Test 4. Remove (front door may be closed.)
Test Position	One inch pins lock into welded sockets on each side of the enclosure. Arrow and indicating strip show breaker position.	Breaker must be lowered to full down position and withdrawn 2 1/4 inch. Separate test plug and control cord must be installed.	Pin drops into notch in rail. Control terminals on breaker must be manually extended toward rear of cell to engage stationary terminals.	Lever drops onto cranking screw and locks in test and connected position. Screw held by two 10 gauge brackets. Control circuit connections made.	Locking bar engages slot in floor guide. Control circuit connections made.
Shutter	Circuit breaker roller mechanism operates top and bottom steel shutters. Requires two distinct operations to open shutters.	Steel shutters are chain operated (in horizontal plane) can not be operated manually.	Made of glass polyester operated by circuit breaker roller mechanism. Can be operated with one hand. Shutter OPEN-CLOSED indicator on front of breaker.	Glass polyester shutters operated by circuit breaker roller mechanism. Can be manually operated with one hand.	Steel shutters are operated by the circuit breaker roller mechanism. Top and bottom shutters can be operated manually by a single motion.

DRAWOUT METAL-CLAD SWITCH GEAR SUPERIOR DESIGN FEATURES

Switchgear Features	Square D	General Electric	Westinghouse	ITE	Allis-Chalmers
Door for Instrument and Circuit Breaker Compartment	Two doors (1) instrument (1) circuit breaker compartment. Full height door for additional relaying is optional.	Single door for instrument and circuit breaker compartment on indoor units. Outdoor non-walk-in has outside full door and inside door over instrument compartment.	Two doors (1) instrument (1) circuit breaker compartments.	Two doors (1) instrument (1) circuit breaker compartments.	Single door for instrument and circuit breaker compartments.
Visible Blade Viewing and Inspection Windows	Yes! Contact position, contact condition, and basic arc chute condition may be inspected without removing breaker from service.	No	No	No	No
Circuit Breaker Insulation System	Most parts are epoxy. Polyester glass pole mounting supports. Cast epoxy operating rods.	Breaker bushings: kraft paper impregnated with epoxy resin. Polyester operating rods.	Breaker bushings, mountings, and operating rods are porcelain.	Polyester glass pole mounting supports. Other parts polyester except for operating rods—wound paper impregnated with epoxy.	Polyester glass pole mounting supports. Other parts polyester glass except for porcelain primary breaker bushings on 15KV.
Main Bus Insulation	Bars—Fluidized bed epoxy (epoxy molded to bus bars) Joints—PVC boots form fitting	Bars—polyester glass Joints—vinyl boots	Bars—Micarta with epoxy tubing as optional Joints—PVC boots	Bars—molded epoxy tubing slipped onto bars Joints—air filled molded PVC boots	Bars—Phenolic tubing with a conductive coating on the inside. Joints—5KV-glass polyester caps 15KV—PVC boots
Main Bus Insulation Support Material and Barrier Between Cubicles	5KV—epoxy supports (no barrier) 15KV—epoxy supports (no barrier) Epoxy barrier available as option.	5KV—polyester molding 15KV—polyester molding Porcelain optional	5KV—polyester glass 15KV—porcelain	5KV—polyester glass 15KV—porcelain	5KV—polyester glass 15KV—porcelain

DRAWOUT METAL-CLAD SWITCH GEAR SUPERIOR DESIGN FEATURES

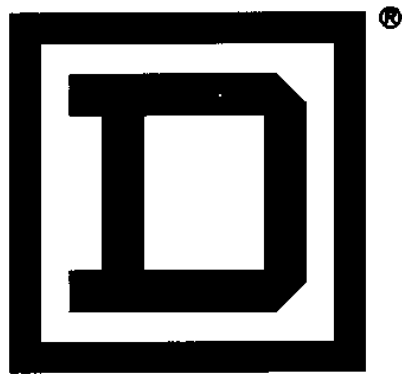
Switchgear Features	Square D	General Electric	Westinghouse	ITE	Allis-Chalmers
Main Bus Location	Lower center, accessible by removing rear plate in cable compartment, or through front by removing plate in breaker compartment.	Center portion of top directly behind instrument compartment. Accessible from front only through instrument compartment.	Upper portion of center section accessible for inspection and maintenance from rear or front through cable compartment or breaker compartment.	Upper portion of center section accessible for inspection and maintenance from rear or front through cable compartment or breaker compartment.	Lower portion of center section accessible for inspection and maintenance from rear only through cable compartment by removing barrier plate.
Main Bus Type	Aluminum standard. Copper optional.	Aluminum standard. Copper optional.	Aluminum standard. Copper optional.	Aluminum standard. Copper optional.	Aluminum standard. Copper optional.
HV Cable Entrance and Exits	Rear top or rear bottom (if bottom the cables are open to floor.) (No lower cable compartment).	Rear, bottom or top accessible through rear plates.	Rear, bottom or top accessible through rear plates.	Rear, bottom or top accessible through rear plates.	Rear, bottom or top accessible through rear plates.
Current Transformers Location and Voltage Rating	Cable side only. 600V, using an electric field compensated bushing with zero potential barrier. Bus side c/t's availability 3rd qtr '77.	Cable side only. 600V as standard.	Bus and cable sides. 5 or 15KV.	Bus and cable sides. 5 or 15KV.	Bus and cable sides. 5 or 15KV.
Number of Current Transformers Available as Standard	3 per pole including one as a multi-ratio unit.	3 per pole on cable side. Special bus side female bushing available with one built in low burden c/t.	1 per pole on bus side and 2 per pole on cable side.	One on bus side. One on cable side. Special mounting could adapt two additional cable side c/t's per pole.	1 on each side per pole.

DRAWOUT METAL-CLAD SWITCH GEAR SUPERIOR DESIGN FEATURES

Switchgear Features	Square D	General Electric	Westinghouse	ITE	Allis-Chalmers
Control Power and Potential Transformers	Roll out (control power transformer.) Dump out with fully counter-balanced tray and door (potential transformer.)	Roll-out.	Trunnion mounted dump-out.	Trunnion mounted dump-out.	Trunnion mounted dump-out.
Cubicle Size 5KV	Width—26 inches Height—90 inches (with instrument compartment—60 inches without.) Depth—88 inches	Width—26 inches Height—90 inches Depth—79½ inches	Width—26 inches Height—90.4 inches Depth—70 inches	Width—26 inches Height—90 inches Depth—64 inches	Width—26 inches Height—72 inches Depth—74 inches
Cubicle Size 15KV	Width—36 inches Height—90 inches (with instrument compartment—60 inches without.) Depth—88 inches	Width—36 inches Height—90 inches Depth—79½ to 97 inches	Width—36 inches Height—90.4 inches Depth—78 inches	Width—36 inches Height—90 inches Depth—79¼ inches	Width—36 inches Height—92 inches Depth—94 inches
Basic Breaker Structure	Welded frame members. Bolted components.	Jig welded steel frame. Bolted components.	Jig welded steel frame. Bolted components.	Jig welded steel frame. Bolted components.	Jig welded steel frame. Bolted components.
Alignment Fixtures	Master stationary jig for breaker. Fixtures for bell and rear contact assembly. Dummy truck for cell alignment.	Master dummy truck and master cell.	Master dummy truck and master cell.	Master dummy truck and master cell.	Master dummy truck and master cell.

DRAWOUT METAL-CLAD SWITCH GEAR SUPERIOR DESIGN FEATURES

Switchgear Features	Square D	General Electric	Westinghouse	ITE	Allis-Chalmers
Types of Finishes	Square D blue-gray. ASA No. 49	Indoor, light grey paint ASA No. 61. Outdoor, dark grey enamel ASA No. 24. Berkshire green ASA No. 45 no extra charge.	Indoor, light grey paint ASA No. 61. (Munsell notation 8.3 G6.10/0.54). Outdoor, dark grey enamel ASA No. 24.	Indoor, light grey paint ASA No. 61. Outdoor, dark grey enamel ASA No. 24. Berkshire green ASA No. 45 no extra charge.	Indoor, light grey paint ASA No. 61. Outdoor, dark grey enamel ASA No. 24. Berkshire green ASA No. 45 no extra charge.
Methods of Handling Cubicle	Shipped on padded wood platform. Hoisting provisions provided.	Heavy wooden platform under (4) sections per unit. Cables and cable spreaders to lift platform.	Each unit shipped on welded steel channels shelter-form aisle portion, shipped in sub-assemblies.	Shipped on platform, with heavy wooden support skids.	Shipped on wooden platform channels bolted on sides for cables and hooks.
Shipping of Circuit Breaker and Arc Chutes	Circuit breaker removed and crated separately. Arc chutes crated and shipped separately.	Circuit breaker removed and crated and shipped separately.	Circuit breaker removed and crated separately. Arc chutes crated and shipped separately.	Circuit breaker removed and crated and shipped separately.	Circuit breaker removed and crated and shipped separately.
Breaker weight including: arc chutes, breaker, barriers 1200A: 2000A: 500MVA, 15KV	610 lb. 698 lb.	1500 lb. 1650 lb.	1400 lb. 1420 lb.	965 lb. 1005 lb.	1400 lb. 1425 lb.
Structure weight (without relays)	1700 lb.	2600 lb.	2000 lb.	2260 lb.	1900 lb.



SQUARE D COMPANY

RESTRICTED TO SQUARE D PERSONNEL

D. W. Selby

MIDDLETOWN HEADQUARTERS SALES DEPT.



Product Data

RESTRICTED TO SQUARE D PERSONNEL

Bulletin D-384S
(Supplement to D-384)

Page 1

Date 3/15/78

File 6150

Subject: **VACUUM TYPE CIRCUIT BREAKERS —**
Solenarc® Switchgear —
Competitive Cross Reference

General Electric Type "V-B" breaker
Westinghouse "DVP"
Siemens/Allis Chalmers "FCV" 15 kV only
Gould (ITE) "HKV" 15 kV only

All of the above except General Electric replaced their air magnetic interrupters with vacuum bottles. Thus, their vacuum breakers will interchange with their air magnetic breakers. They all still produce air magnetic breakers. However, General Electric took this opportunity to redesign their metal-clad switchgear for the first time since 1928.

Some of the advantages of vacuum circuit interruption are:

- a) High speed interruption
- b) Quiet operation
- c) Light weight
- d) Reduced maintenance
- e) Fewer operating parts
- f) Longer contact life

The one highly discussed characteristic of vacuum interruption is the forcing of a premature current zero by chopping. This briefly causes a high transient recovery voltage which could exceed the BIL of the connected equipment.

General Electric "Power/Vac" lists three chief benefits to the metal-clad user.

- 1) Two-tier breaker stacking
- 2) Modular construction
- 3) Pre-engineered protection, instrumentation and control packages

A very limited space between the breaker front panel and the outer front door of the cell is used for relays and instruments which can be door mounted. If a larger quantity is required (particularly required by most utilities) the upper level of the cell cannot be used for a second breaker. However, for industrial applications this "2 high" capability certainly gives a big advantage to General Electric.

General Electric has finally given up on the proverbial tulip type (primary) main contacts. They now use self-aligning multiple copper fingers. They also use this new type on their secondary contacts.

Two current transformers per phase can be accommodated on both the line and load side of the breaker. These current transformers are accessible from the front only after the removal of the shutter barriers.

It is necessary to use a racking crank to move the breaker between the connected and disconnected positions.

All in all they have done quite a job. However, care should be used as their standards do not always comply with the customer needs.

J.T.

Middletown Headquarters Sales Department

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