GUARANTEED TECHNICAL PARTICULARS FOR 33 KV DISCONNECTORS (ISOLATORS)

S.NO.	TECHNICAL PARTICULARS	33 KV ISOLATORS
01.	Type/Installation	Double Break outdoor, Banging Horizontal upright .
02.	Manufacturer's Name and Country of Manufacture	M/s. Southern Switchgear Industries Hyderabad, India.
03.	Standards according to which the isolator are manufactured.	IS 9921 & IEC-129
04.	Maximum design voltage at which the Isolator can operate(KV)	36 KV
05.	Frequency (Hz)	50 Hz
06.	Rated voltage(KV)	33 KV
07.	Maximum current that can be safely interrupted by the Isolator	
	Inductive (A & %PF)	0.7 Amps at 0.15 PF
	Capacitive (A & %PF)	0.7 Amps at 0.15 PF
08.	Continuous current rating	
	Nominal (Amps)	800 Amps/1200 Amps
	Under site conditions (Amps)	800 Amps/1200 Amps
09.	Rated short time current	
	i. For 3 Seconds (KA Rms.)	-----
	ii. For 1 Second (KA Rms.)	25 KA (RMS)
	iii. Rated peak short time current (KAP)	62.5 KA (Peak)
10.	Current density at the minimum cross – section of	MAIN
	a) Moving blade (Amps/Sq. mm)	Cu. pipe 2.5 Amps/ Sq.mm
	b) Terminal pad	Al. flat 1.0 Amp / Sq. mm
	c) Contacts	Cu. flat 1.6 Amps/ Sq. mm
	d) Terminal Connector	Al. 1.0 Amp/ Sq. mm
11.	Maximum Temp. rise of current carrying parts when carrying rated current continuously (Deg.C)	With in the specified limits of IS
12.	Derating factor for specified site conditions	Unity
13.	Insulation Levels	
	i. Impulse withstand voltage (KV peak)	
	a. Phase to Earth	170 KV Peak
	b. Across Isolating distance	195 KV Peak
	ii. Switching surge withstand voltage (KVP)	
	a. Phase to Earth	Not Applicable.
	b. Across Isolating Distance	
	iii. Power Frequency withstand voltage (KV rms.)	
	a. Phase to Earth	75 KV (Rms.)
	b. Across Isolating distance	85 KV (Rms.)

Contd., 2..

For M/s. Southern Switchgear Industries

K.K. Kulkarni

14.	Minimum clearance in air :		
	i. Between poles (mm)	1050 mm (Phase to Phase Center of 1300 mm)	
	ii. Between live parts & earth (mm)	508 mm. (Equivalent to Insulator height)	
	iii. Between live parts when switch is open :		
	a. On the same pole (mm)	840 (Center to Center of outer stacks – 915 mm.)	
	b. Between adjacent poles (mm)	1050 mm.	
15.	Rated mechanical terminal load :		
	i. Load long the terminal connector side (Kg.)	Not to be assigned for 33KV Isolator	
	ii. Load across the terminal connector side (Kg.)	Not to be assigned for 33KV Isolator	
16.	Torque required to operate the switch in Kg.M.	25 Kg.M.	
17.	Contact Zone		
	i. Horizontal deflection (mm) ii. Vertical deflection (mm) iii. Total amplitude of longitudinal movement w.r.t conductor supporting fixed contact (mm.)	Not to be assigned for Double Break Isolators & applicable in case of pentograph Isolators only.	
18.	Design and Construction i. No. of Insulators per pole	MAIN 3 Stacks/per Phase	
	ii. No. of breaks per pole	Two	
	iii. Type of closing/ opening Mechanism (Horizontal/vertical break straight etc.)	Horizontal Banging type	
	iv. Contacts	800A	1200A
	a. Material & Grade	HDE Copper flat	HDE Copper flat
	b. Cross – Sectional area (mm).	512 Sq.mm.	768 Sq.mm.
	v. Moving blades	800A	1200A
	a. Material & Grade	HDE Copper Tube	HDE Copper Tube
	b. Cross – sectional area (mm).	329 Sq.mm.	511 Sq.mm.

Contd..3..

For M/s. Southern Switchgear Industries

Authorised Signatory

vi. Contact Support :	
a. Material & size of channel / block	MS IIDG.
b. Material & size of plate. (Bottom)	6mm. MS HDG
vii. Rain hood – Material grade & size	GI sheet
viii. Turn & twist mechanism a. Material & size Of clamps b. Material size of springs c. Whether springs are encased	Not Applicable being banging type ---- DO--- ---- DO---
ix. Nuts & Bolts a. Size, material & grade in live parts	5/8'' and above all hot dip galvanized. and less than 3/8 '' are stain less steel.
b. Size, material & grade in other parts	3/8'' and higher hot dip galvanized.
x. Insulator base plate material & size of plate below Insulators	100 x 50 mm MS Channel HDG & 6 mm. MS plate HDG for centre Insulator
xi. Bearings	
a. Material & size of housing	MSHDG
b. No. of bearings, location & size	2 Nos. (1 No. Thrust bearing + 1 No. Bush bearing) under rotating stack Insulator shaft of 25mm Dia.
xii. Tandem Pipe	
a. Size class & No. of pipes b. Size of shackle, screw c. No. of Bearings/Bush & its material and size	25mm I.D. Class B -1 No. 3.5 Mts. long each. (with intermediate joint)
xiii. Type of interlock	Not Applicable.
xiv. Down pipe size, class & length	38 mm N.B. GI CLASS – B 5575mm long for 800A 2855mm long for 1200A
xv. Type of universal/ swivel joint a). Between bearing & down pipe. b). Between down pipe operating mechanism.	-------- Vernier type flanges.
xvi. Operating mechanism a). Control cabinet material and Thickness Degree of protection Type size and No. of cable glands Whether removal gland plate provided.	Manual operated banging type (handle and lever)
xvii. Base : a. Size of steel sections used b. Overall size c. Total weight	100 x 50 MS Channel 1030 x 100 x 50 mm 8.4 Kgs. (Approx)

Standardised Drawing for 33 kV Isolator
(M/s Southern Switchgear Industries)
STD/GTP-DWG/Approval No. 236-1.03 sheets Revision No. 0
Prepared & Approved during November – 2011
Customer ref : APTRANSCO
Title: GTP for 33 kV Isolators

APPROVED FOR TURNKEY PROJECTS

CHIEF ENGINEER / CONSTRUCTION-I
APTRANSCO/NPDCL SOUDHA/HYD

For M/s. Southern Switchgear Industries

Authorised Signatory

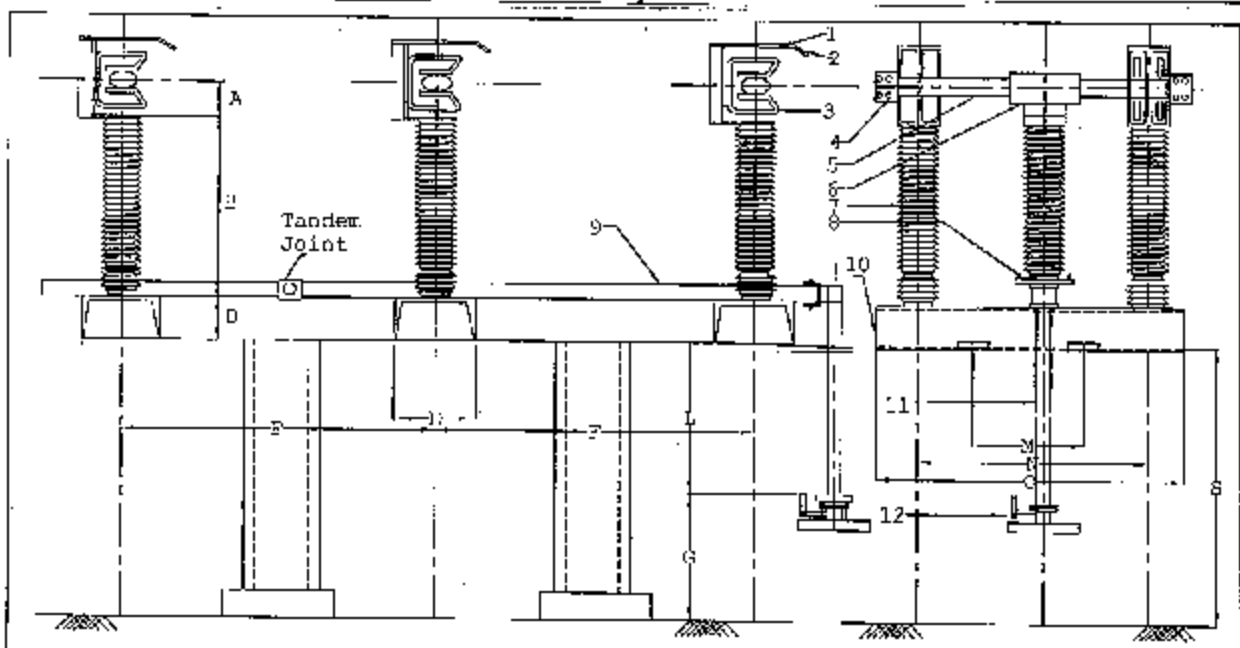
Standardised Drawing for 33 kV Isolator
(M/s Southern Switchgear Industries)

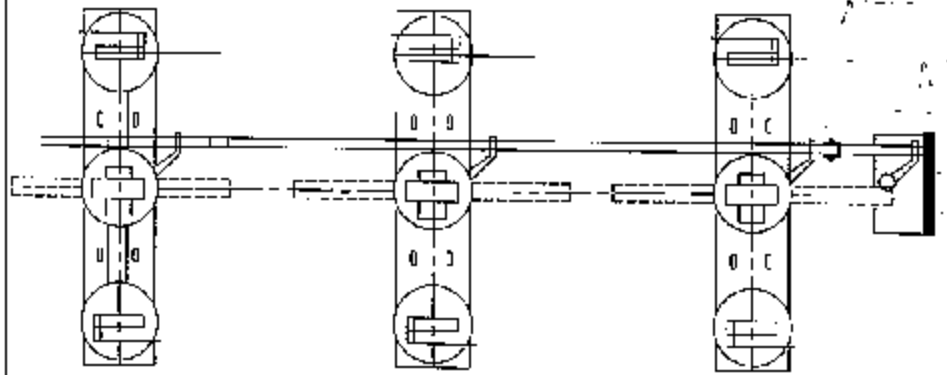
STD/GTP-DWG/Approval No. 236-2 01 sheet Revision No. 0

Prepared & Approved during November 2011

Customer ref : APTRANSCO

Title: GA of 33KV D.B Isolator handle & liver operation.





REFERENCE

1. Main Hook G.I.
2. Arcing Horn 10 mm. DIA G.I. rod
3. Main Switch Fixed Contact HDFC Flat 32x4mm 2Nos.
4. Jumper pad 76x12mm Al.Flat with Bi-metallic strip
5. Moving contact HDFC pipe 38mm. O.D.x32mm I.D.
6. M.S. Support plate
7. Insulator (not in scope of supply)
8. Main switch lever arm with clamp.
9. Main switch tandum pipe 25 dia class B, 3.t mts long with tandum joint.
10. Switch base channel 100 x 50 mm MSHDG
11. Main switch down pipe 38 Dia class B
12. Handle and lever mechanism

NOTES

1. All dimensions are in mm.
2. All ferrous parts hot dip galvanised.
3. All contacts ends silver plated.
4. Base Channel shall be provided with 70 mm P.C.D. holes to accomodate solid core insulators.

APPROVED FOR TURNKEY PROJECTS

CHIEF ENGINEER / CONSTRUCTION-I
APTRANSCO/VIDYUTH SOUDHA/HYD.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
60	508		50	100	1300	1000					5575	400	915	1030				6575

Southern Switchgear Industries
Plot No.13, Phase-II, I...
Jeedimetla, Hyderabad

GENERAL ARRANGEMENT OF 33 KV ... A
D.B. ISOLATOR Handle and Lever Operated HVD-38

SCALE	N.T.S.	DRAWN BY	G.MURTHY
TOLERENCE	+/- 5 MM.	CHECKED BY	K.K
DATE	20-8-11	APPROVED BY	
DRG.NO.	SSI-33-GA-169(UP RIGHT) REV 2		

SOUTHERN SWITCHGEAR INDUSTRIES

Standardised Drawing for 33 kV Isolator
(M/s Southern Switchgear Industries)

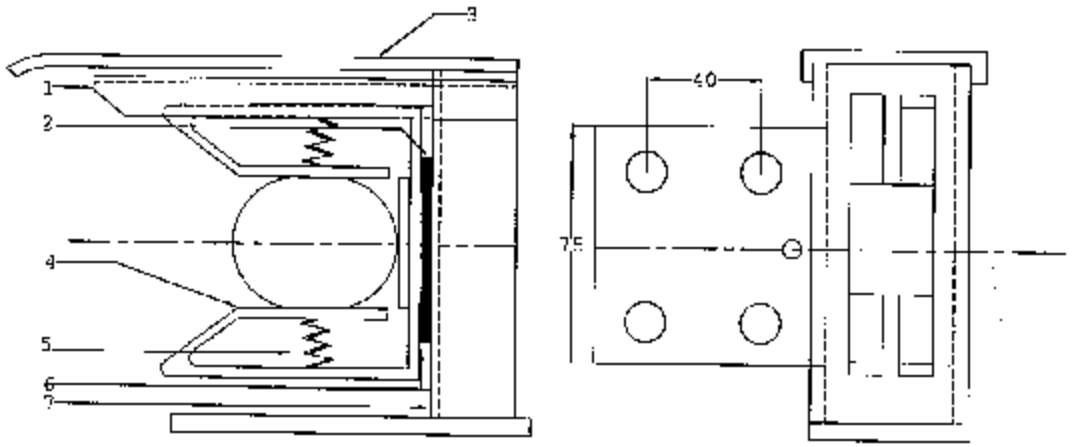
STD/GTP-DWG/Approval No. 236-3 01sheet Revision No. 0

Prepared & Approved during November – 2011

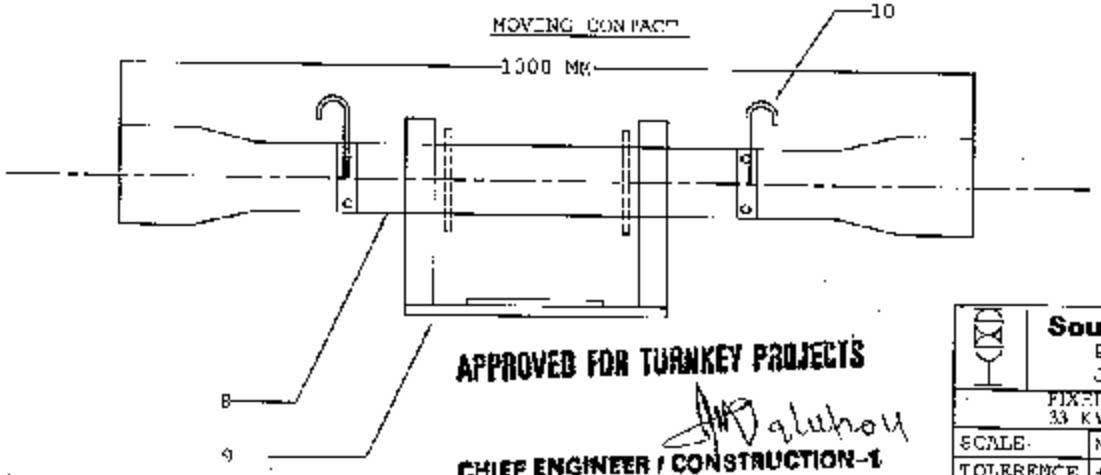
Customer ref : APTRANSCO

Title: Fixed and moving contact for 33kv 800A D.B Isolator

FIXED CONTACT



MOVING CONTACT



R E F E R E N C E

1. G.I.RAIN HOOD
2. JUMPER PAD 75X12 mm AL.FLAT
3. F.C.Arcing horn G.I Rod
4. CAWS-32X4mm HDGC FLAT 2 NOS.
5. SPRING-STAINLESS STEEL
6. CU METALIC STRIP CU+AL
7. F.C. CUP SUPPORT MSHDG
8. MOVING CONTACT - 38mmO.D X 32 mm I.D TDEC PIPE
9. M C Support plate
10. M.C.ARCING HORN G.I. ROD

NOTES

1. ALL DIMENSIONS ARE IN MM
2. ALL FERROUS PARTS ARE HOT DIP GALVANISED
3. ALL CONTACTS ENDS SILVER PLATED.
4. MALE CONTACT BOTH ENDS DULY PINGSED

APPROVED FOR TURNKEY PROJECTS

CHIEF ENGINEER / CONSTRUCTION-I
APTRANSCO/VIDYUTH SOUDHA/HYD.

Southern Switchgear Industries
Plot No.13, Phase-II, I.D.A.
Jeedimetla, Hyderabad

FIXED AND MOVING CONTACT FOR 33 KV 800 AMPS D.B. ISOLATOR

SCALE	N.T.S.	DRAWN BY	
TOLERENCE	+/- 5 MM.	CHECKED BY	
DATE	10-8-11	APPROVED BY	
DRG.NO.	GSI - 33 - 81 / R1		

SOUTHERN SWITCHGEAR INDUSTRIES

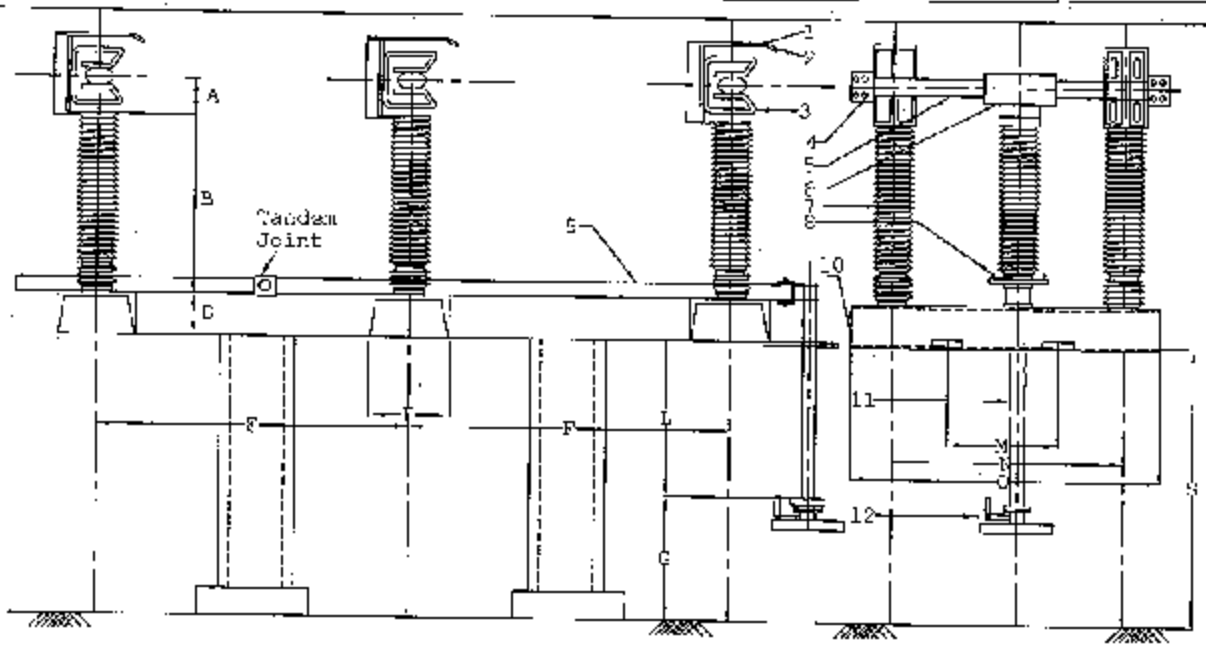
Standardised Drawing for 33 kV Isolator
(M/s Southern Switchgear Industries)

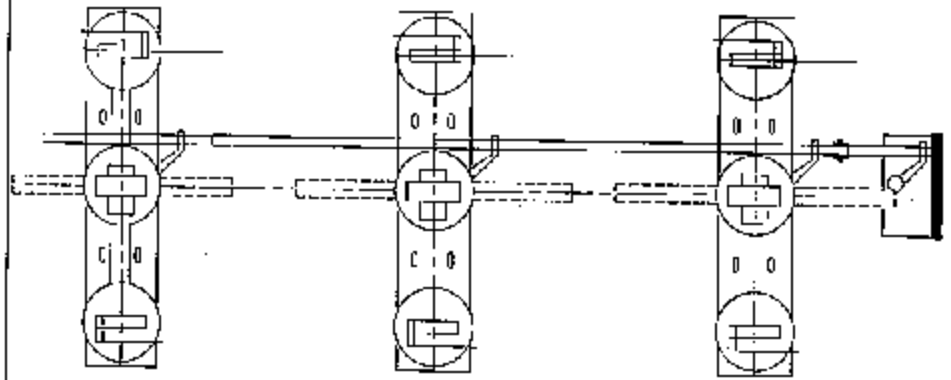
STD/GTP-DWG/Approval No. 236-4 01sheet Revision No. 0

Prepared & Approved during November – 2011

Customer ref : APTRANSCO

Title: GA of 33 kV ,1200A D.B Isolator Handle& Liver operation.





REFERENCE

1. Rain Hood G.I.
2. Arcing Horn 10 mm DIA G.I. rod
3. Main Switch Fixed Contact HDEC Flat 32x9mm 3 Nos.
4. Jumper pad 100 x 12mm Al.Flat with Bi-metallic strip
5. Moving contact HDEC pipe 50 mm O.D.x 43 mm I.D.
6. M.S. Support plate
7. Insulator (not in scope of supply)
8. Main switch lever arm with clamp.
9. Main switch tandum pipe 25 dia class B, 5.5 mts long with tandem joint.
10. Switch base channel 100 x 50 mm MSIDG
11. Main switch down pipe 38 Dia classB
12. Handle and lever mechanism

NOTES

1. All dimensions are in mm.
2. All ferrous parts hot dip galvanised.
3. All contacts ends silver plated.
4. Base Channel shall be provided with 76 mm P.C.D. holes to accomodate solid core insulators.

APPROVED FOR TURNKEY PROJECTS

CHIEF ENGINEER / CONSTRUCTION-1
APTRANSCO/VIDYUTH SOUDHA/HYD.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
80	506		50	100	1300	1000					2855	400	915	1030				3855

Southern Switchgear Industries
Plot No.13, Phase-II, I.D.A.
Jeedimetla, Hyderabad

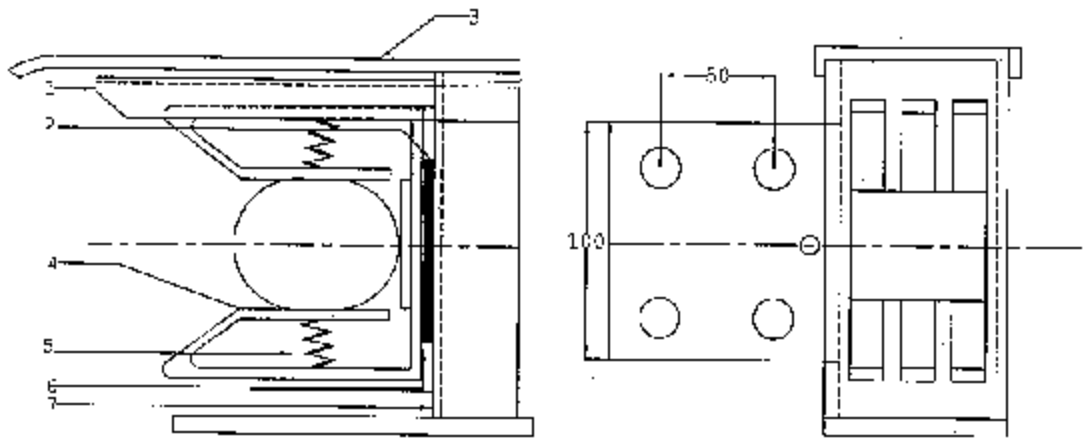
GENERAL ARRANGEMENT OF 33 KV 1200A D.B. ISOLATOR Handle and Lever Operated

SCALE	N.T.S.	DRAWN BY	
TOLERENCE	+/- 5 MM.	CHECKED BY	K.V.K.
DATE	26-4-10.	APPROVED BY	
DRG.NO.	SSI-33-GA (TOP RIGHT)-REV-0		

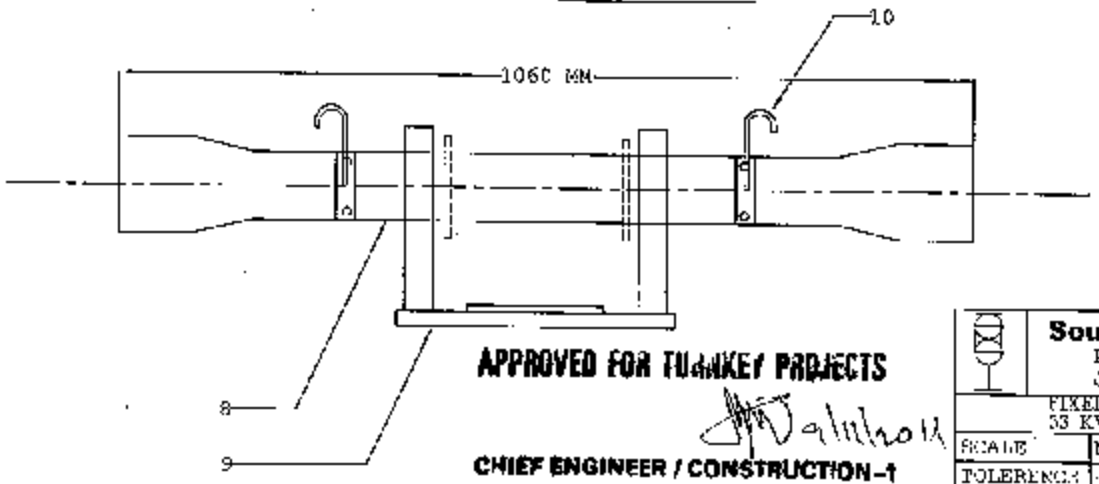
SOUTHERN SWITCHGEAR INDUSTRIES

Standardised Drawing for 33 kV Isolator
(M/s Southern Switchgear Industries)
STD/GTP-DWG/Approval No. 236-5 01sheet Revision No. 0
Prepared & Approved during November – 2011
Customer ref : APTRANSCO
Title: Fixed and moving contact for 33kv, 1200A D.B Isolator.

FIXED CONTACT



MOVING CONTACT



REFERENCE

1.G.I.RAIN HOOD
2.COMPER PLATE 100X12 mm AL.FLAT
3.F.C.Arcing horn G.I Rod
4.CAWS-32X4mm HDEC FLAT 3 NOS.
5.SPRING-STAINLESS STEEL
6.BI METALIC STRIP CU+AL
7.F.C. CUP SUPPORT MSHDG
8.MOVING CONTACT - 50mmO.D X 43mm I.D HDEC PLUG
9.M C Support plate
10.M.C.ARCING HORN G.I. ROD

NOTES
1.ALL DIMENSIONS ARE IN MM
2.ALL FERROUS PARTS ARE HOT DIP GALVANISED
3.ALL CONTACTS ENDS SILVER PLATED.
4.MALE CONTACT BOTH ENDS DULY PRESSED

APPROVED FOR TURNKEY PROJECTS

CHIEF ENGINEER / CONSTRUCTION-I
APTRANSCO/VIDYUTH SOUDHA/HYD.

Southern Switchgear Industries Plot No.13, Phase-II, I.D.A. Jeedimetla, Hyderabad			
FIXED AND MOVING CONTACT FOR 33 KV 1200 AMPS D.B. ISOLATOR			
SCALE	N.T.S.	DRAWN BY	S.[illegible]
TOLERENCE	+/- 5 MM.	CHECKED BY	K.[illegible]
DATE	10-8-11	APPROVED BY	
DRG.NO.	SSI - 33 - 02 / 02		

SOUTHERN SWITCHGEAR INDUSTRIES HYD-38

GUARANTEED TECHNICAL PARTICULARS FOR 132 KV DISCONNECTORS WITH AND WITHOUT EARTH SWITCH (ISOLATORS)

S.NO.	TECHNICAL PARTICULARS	132 KV ISOLATORS	
01.	Type/Installation	Double Break Turn & Twist, outdoor, Horizental upright.	
02.	Manufacture's Name and Country of Manufecture	M/s.Southern Switchgear Industries, Hydembad, India.	
03.	Standards according to which the isolator are manufactured.	IS 9921 & IEC-129	
04.	Maximum design voltage at which the Isolator can operate(KV)	145 KV	
05.	Frequency (Hz)	50 Hz	
06.	Rated voltage(kV)	132 KV	
07.	Maximum current that can be safely interrupted by the Isolator		
	Inductive (A & %PF)	0.7 Amps at 0.15 PF	
	Conacitive (A & %PF)	0.7 Amps at 0.15 PF	
08.	Continuous current rating	MAIN	EARTH
	Nominal (Amps)	800Amps.	---
	Under site conditions (Amps)	800 Amps.	---
09.	Rated short time current		
	i. For 3 Seconds (kA rms.)	---	
	ii. For 1 Second (kA rms.)	– 31.5 KA (RMS) --	
	iii. Rated peak short time current	– 80 KA (Peak) --	
10.	Current density at the minimum cross – section of	MAIN	EARTH
	a. Moving blade (Amps/Sqmm)	CU.2.5	AMP/SQ.MM Cu. Pipes
	b. Terminal pad	AL.1.0	AMP/SQ.MM Al. Flat
	c. Contacts	CU.1.6	AMP/SQ.MM Cu. Flat
	d. Terminal Connector	AL.1.0	AMP/SQ.MM Aluminium
11.	Maximum Temp. rise of current carrying parts when carrying rated current continuously (deg.c)	With in the specified limits of IS	
12.	Derating factor for specified site conditions	Unity	
13.	Insulation Levels		
	i. Impulse withstand voltage (kV peak)		
	a. Phase to Earth	650 KV	
	b. Isolating distance	750 KV	
	ii. Switching surge withstand voltage(kVp)		
	a. Phase to Earth	Not Applicable	
	b. Isolating Distance		
	iii. Power Frequency withstand voltage (kV Rms.)		
	a. Phase to Earth	275 KV (Rms.)	
	b. Isolating distance	315 KV (Rms.)	

Contd.. 2..

For M/s. Southern Switchgear Industries

K.K. Kulkarni

Authorised Signatory

14.	Minimum clearance in air :		
	i. Between poles (mm)	2500 mm (Pase to Phase Centre 3000mm.)	
	ii. Between live parts & earth (mm)	1500 mm. (Equal to Insulator Height)	
	iii. Between live parts when switch is open :		
	a. On the same pole (mm)	1930 mm (Center to Center of outer stacks – 2100 mm)	
	b. Between adjacent poles (mm)	2500 mm	
15.	Rated mechanical terminal load		
	i Load long the terminal connector side (Kg.)	500 (N)	
	ii. Load across the terminal connector side (Kg.)	170 (N)	
16.	Torque required to operate the switch in Kg-m.	Main 35 Kg/m	Earth 40 Kg/m
17.	Contract Zone		
	i. Horizontal deflection (mm)	Not to be assigned for Double Break Isolators & applicable for pentograph Isolators only.	
	ii. Vertical deflection (mm)		
	iii. Total amplitude of longitudinal movement w.r.t conductor Supporting fixed contact (mm).		
18.	Design and Construction	MAIN	EARTH
	i. No. of Insulators per pole	3 Stacks/per Phase	-----
	ii. No. of breaks per pole	Two	Single
	iii. Type of closing/ opening mechanism (horizontal/vertical break straight etc.)	Horizontal Turn & Twist	Vertical Banging
	iv. Contacts		
	a. Material & Grade	HDE Copper Flat	HDE Copper Flat
	b. Cross – Sectional area (mm).	512 Sq.mm.	512 Sq.mm
	v. Moving blades		
	a. Material & Grade	HDE Copper Tube	HDE Copper Tube
	b. Cross – sectional area (mm.)	329 Sq.mm	329 Sq.mm.
	vi. Contact Support :		
	a. Material & size of channel / block	MS HDG	MS HDG
	b. Material & size of plate.	6mm. MS.HDG Plate	

Contd..3..

For M/s. Southern Switchgear Industries

Authorised Signatory

	vii. Rain hood – Material grade & size	GI sheet
	viii. Turn & twist mechanism a. Material & size Of clamps b. Material size of springs c. Whether springs are encased	 MS HDG SS GRADE 16 SWG YES, encased with grease.
	ix. Nuts & Bolts a. Size, material & grade in live parts b. Size, material & grade in other parts	 5/8" and above all hot dip galvanized &. less than 3/8" are stainless steel 3/8"and above all hot dip galvanized
	x. Insulator base plate material & size of plate below Insulators (Elavator Plate)	10mm Thick MS HDG
	xi. Bearings a. Material & size of housing b. No. of bearings, location & size	 MS HDG 2 Nos. Bearings under rotating Insulators stack sheft of 40 mm. dia.
	xii. Tandem Pipe a. Size class & No. of pipes b. Size of shackle, screw c. No. of Bearings/Bush & its material and size	 32mm I.D Class B 7 Mts, Long 2 Nos. (with inter mediate joint) for main switch and 1 No 7 Mts long (with inter mediate joint) for Earth switch 5/8" DIA 5/8" DIA
	xiii. Type of interlock	Electromagnet type interlock between Isolators & breaker. Electrical & Builtin constructional type mechanical Interlock between Isolator & earth switch.
	xiv. Down pipe size & class	--- 50mm I.D. CLASS B ----
	xv. Type of universal swivel joint a. Between bearing & down pipe. b. Between down pipe operating mechanism.	 ---- Swivel type Fork joint ---- --- Vernier type flange type ---
	xvi. Operating mechanism a. Control cabinet material and Thickness Degree of protection Type size and No.of cable glands Whether removal gland plate provided.	Manualy operated through Worm and Reduction gear M.S. Sheet 12 SWG. Enamel Painted IP 55 Provision for Double compression type brass nickel coated 20mm dia cable glands – 2Nos. YES
	xvii. Base : a. Size of steel sections used b. Overall size c. Total weight	 Composite frame fabricated out of 2 Nos. of 125 x 65 x 4.0 mm thick M.S. formed Channel 2320 x 255 x 125 55 Kg (Approx)

Standardised Drawing for 132 kV Isolator
(M/s Southern Switchgear Industries)
STD/GTP-DWG/Approval No. 237-1 03 sheets Revision No. 0
Prepared & Approved during November – 2011
Customer ref : APTRANSCO
Title: GTP of 132KV, Isolator.

APPROVED FOR TURNKEY PROJECTS

CHIEF ENGINEER / CONSTRUCTION-1
APTRANSCO/VIDYUTH SOUDHA/HYD.

For M/s. Southern Switchgear Industries

Authorised Signatory

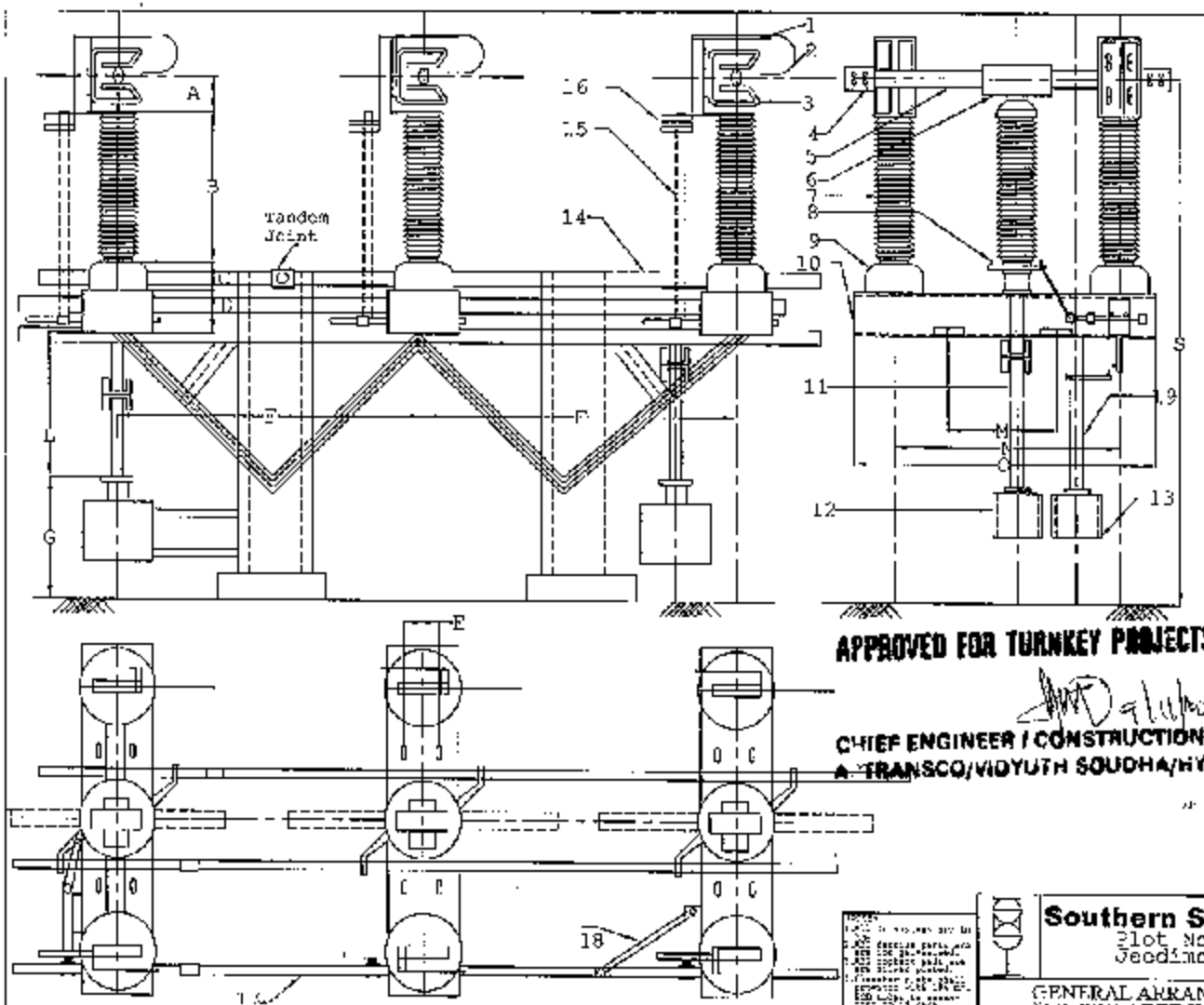
Standardised Drawing for 132 kV Isolator
(M/s Southern Switchgear Industries)

STD/CTP-DWG/Approval No. 237-2 01 sheet Revision No. 0

Prepared & Approved during November – 2011

Customer ref : APTRANSCO

Title: GA of 132KV,800A D.B Isolator with earth switch



REFERENCE

1. Rain Hood G.I.
2. Arcing Horn 10 mm DIA G.I. rod
3. Main Switch fixed Contact HDEC flat 32x4mm 2Nos.
4. Jumper pad 75x12mm Al. Flat with Bi-metallic strip
5. Moving contact HDEC pipe 38mm O.D.x32 mm I.D.
6. Rotating Blade Mechanism.
7. Insulator (not in scope of supply)
8. Main switch lever arm with clamp.
9. Elevator plate 10mm Thick MSHDG
10. Switch base formed channel 125x65x4.0 mm MSHDG
11. Main switch down pipe 50Dia class B
12. Main switch BOM box
13. Earth switch BOM box
14. Main switch tandem pipe 32Dia.classB 3M long(in 2lengths)
15. Earth switch moving contact 38 mm O.D. X 32 mm I.D.
16. Earth switch fixed contacts HDEC flat 32x4 2Nos.
17. B/B tandem pipe 32mm dia class B 3 mts long(in 2 lengths)
18. Auxiliary tandem pipe
19. Earth Switch down pipe 80mm dia.

APPROVED FOR TURNKEY PROJECTS

CHIEF ENGINEER / CONSTRUCTION-I
A.TRANSCO/VIDYUTH SOUDHA/HYD.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
120	1500	60	125	190	3000	1240					1605	1220	2100	2350				4050

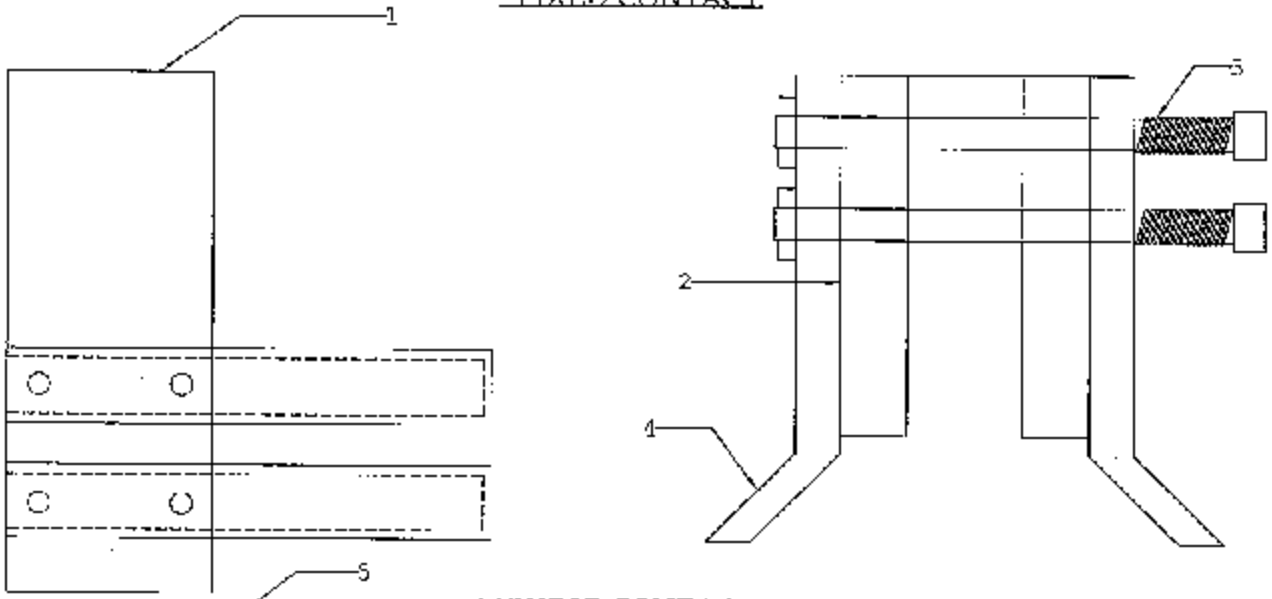
Southern Switchgear Industries
Plot No.13, Phase-II, I.D.A
Jeedimetla, Hyderabad

GENERAL ARRANGEMENT OF 132 KV 800A D.B. ISOLATOR WITH EARTH SWITCH

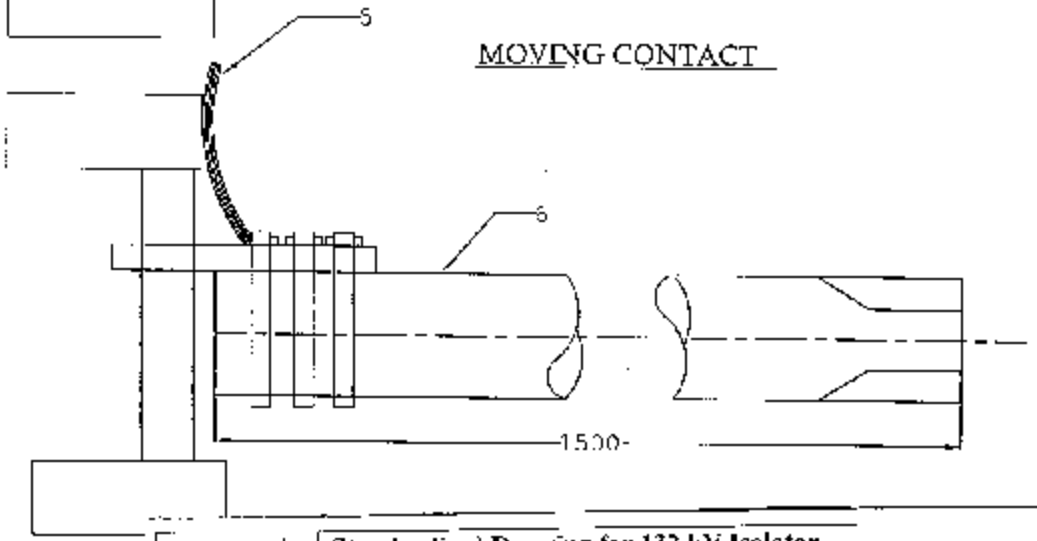
SCALE	N.T.S.	DRAWN BY	[illegible] MURTHY
TOLERENCE	+/- 5 MM.	CHECKED BY	M.K
DATE	10 8 11	APPROVED BY	
DRG.NO.	SSI - 132 - GA - 109/01		

SOUTHERN SWITCHGEAR INDUSTRIES

FIXED CONTACT



MOVING CONTACT



REFERENCE

1. JUMPER PAD 75x12mm AL. FLAT WITH 31 METALIC STRIP(CU+AL)
2. JAWS 32x4 2NOS.HDEC FLAT
3. SPRINGS STAINLESS STEEL
4. JAWS SUPPORTING CLAMP
5. FLEXIBLE 25x3 COPPER
6. MOVING CONTACT 38MM O.D.x 32 MM I.D. HDEC PIPE.

NOTES

1. ALL DIMENSIONS ARE IN MM ONLY
2. ALL CONTACT ENDS ARE SILVER PLATED.
3. ALL FERROUS PARTS HOT DIP GALVANIZED.

APPROVED FOR TURNKEY PROJECTS

9/11/2011

CHIEF ENGINEER / CONSTRUCTION-1
APTRANSCO/VIDYUTH SOUDHA/HYD.

Southern Switchgear Industries
Plot No.13, Phase-II, I.D.A.
Jeedimetla, Hyderabad

132 KV 800 AMPS EARTH SWITCH FIXED & MOVING CONTACTS

SCALE	N.T.S.	DRAWN BY	[illegible]
TOLERENCE	+/- 5 MM.	CHECKED BY	K.K
DATE		APPROVED BY	
DRG.NO.	SSI - 132-82		

SOUTHERN SWITCHGEAR INDUSTRIES

Standardised Drawing for 132 kV Isolator
(M/s Southern Switchgear Industries)
STD/GTP-DWG/Approval No. 237-3 01 sheet Revision No. 0
Prepared & Approved during November – 2011
Customer ref : APTRANSCO
Title: 132KV,800A earth switch fixed & moving contacts

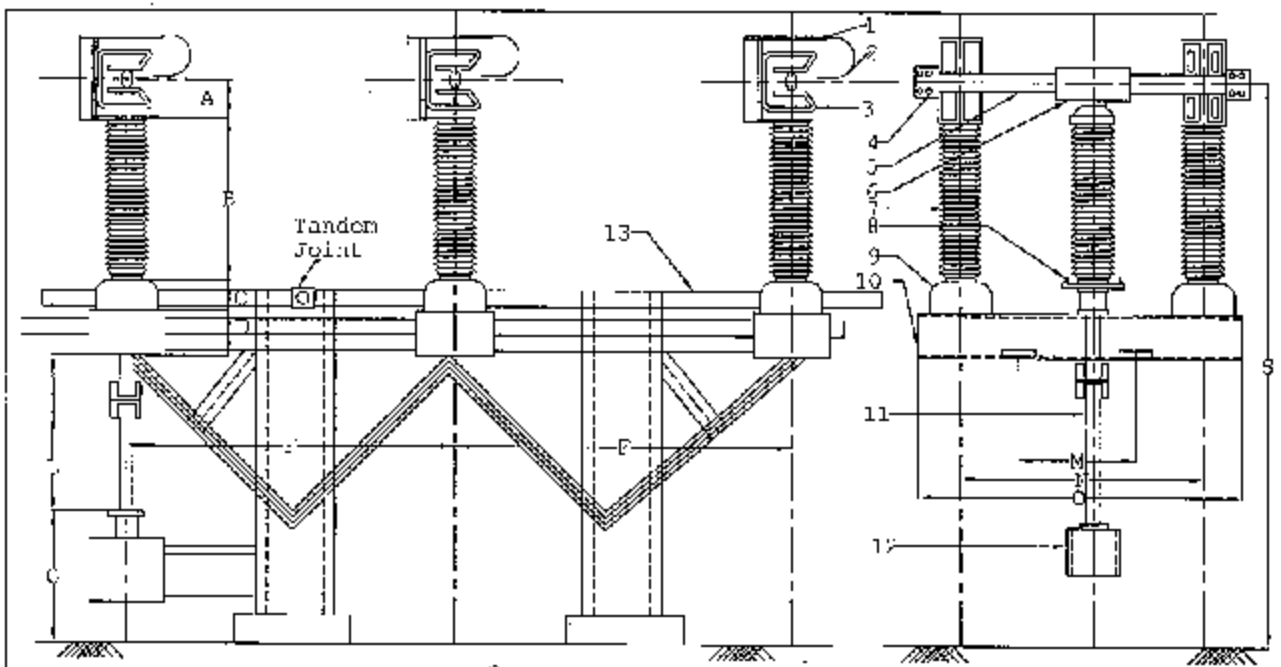
Standardised Drawing for 132 kV Isolator
(M/s Southern Switchgear Industries)

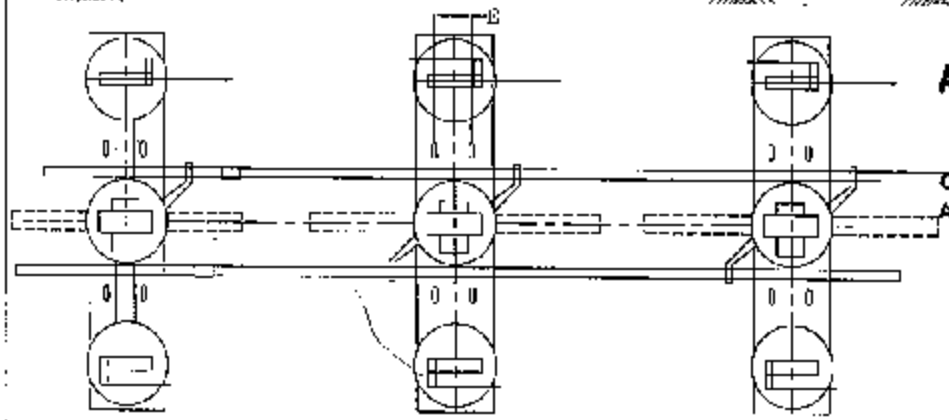
STD/GTP-DWG/Approval No. 237-4.01 sheet Revision No. 0

Prepared & Approved during November – 2011

Customer ref : APTRANSCO

Title: GA of 132KV, 800A D.B Isolator without earth switch.





REFERENCE

1. Rain Hood G.I.
2. Arcing Horn 12 mm DIA G.I. rod
3. Main Switch Fixed Contact HDZC Flat 52x6mm 2Nos.
4. Jumper pad 75x12mm Bl.Flat with Bi-metallic strip
5. Moving contact HDZC pipe 38mm O.D.x 32 mm I.D.
6. Rotating Blade Mechanism.
7. Insulator (not in scope of supply)
8. Main switch lever arm with clamp.
9. Elevator plate 10mm Thick MSHDG
10. Switch base formed channel 125x65x6.0 mm MSHDG
11. Main switch down pipe 50Dia class8
12. Main switch BCM box
13. Main switch tandem pipe 32Dia.class8 7M long(in 2lenghts)

NOTES

1. All dimensions are in mm.
2. All ferrous parts hot dip galvanised.
3. All contacts tenge silver plated.
4. Elevator plate shall be provided with 184mm P.C.D. holes to accomo date solid core insulators.

APPROVED FOR TURNKEY PROJECTS

CHIEF ENGINEER/ CONSTRUCTION-I
APTRANSCO/VIDYUTH SOUDHA/HYD.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
120	1500	60	125	150	3000	1240					1605	1220	2100	2320				4650

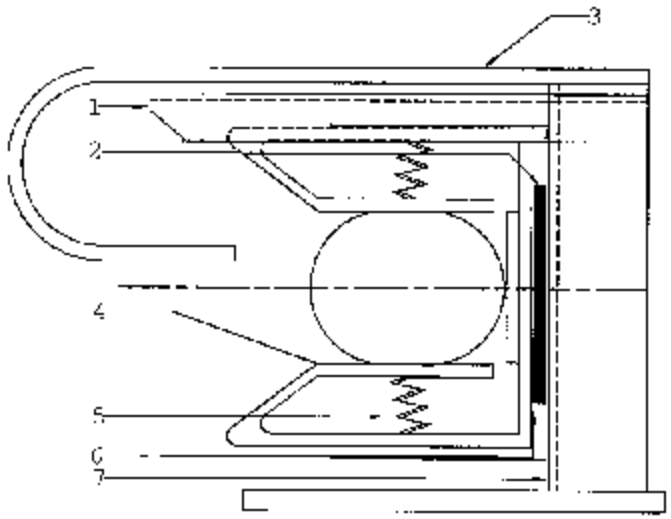
Southern Switchgear Industries
Plot No.13, Phase-II, I.D.A
Jeedimetla, Hyderabad

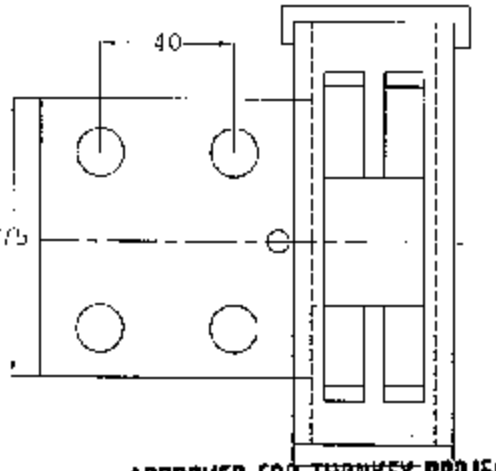
GENERAL ARRANGEMENT OF 132 KV SI
D.B. ISOLATOR WITHOUT EARTH SWITCH

SCALE	N.T.S.	DRAWN BY	SUMANTHY
TOLERENCE	+/- 5 MM.	CHECKED BY	K
DATE	10-8-11	APPROVED BY	
DRG.NO.	SSI - 132 - GA - WOES-169/R1		

SOUTHERN SWITCHGEAR INDUSTRIES

FIXED CONTACT

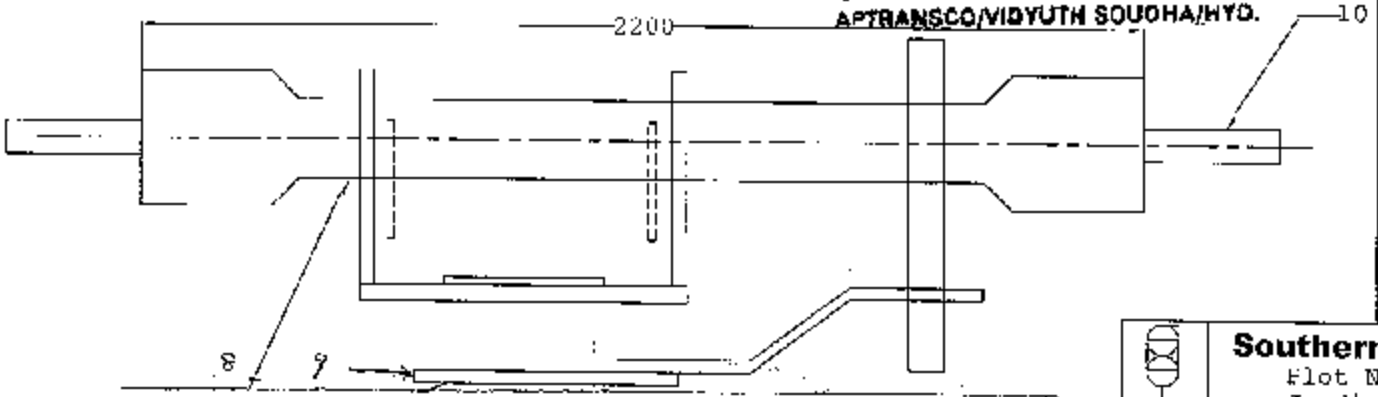




APPROVED FOR TURNKEY PROJECTS

CHIEF ENGINEER / CONSTRUCTION-1
APTRANSCO/VIDYUTH SOUDHA/HYD.

MOVING CONTACT



R E F E R E N C E

1. G.I.RAIN ROD
2. JUMPER PAD 75X12 mm AL.FLAT
3. FC ARCING HORN GI ROD
4. JAWS-32X4mm HDEC FLAT 2 NOS.
5. SPRING-STAINLESS STEEL
6. BL METALIC STRIP CU+AL
7. F.C. CUP SUPPORT MSHDG
8. MOVING CONTACT - 38mm O.D X 32 mm I.D HDEC PIPE
9. TURN & TWIST MECHANISM
10. M.C.ARCING HORN G.I. ROD

NOTES
1. ALL DIMENSIONS ARE IN MM
2. ALL FERROUS PARTS ARE HOT DIP GALVANISED
3. ALL CONTACTS ENDS SILVER PLATED.
4. MOVING CONTACT BOTH ENDS SLIGHTLY PRESSED

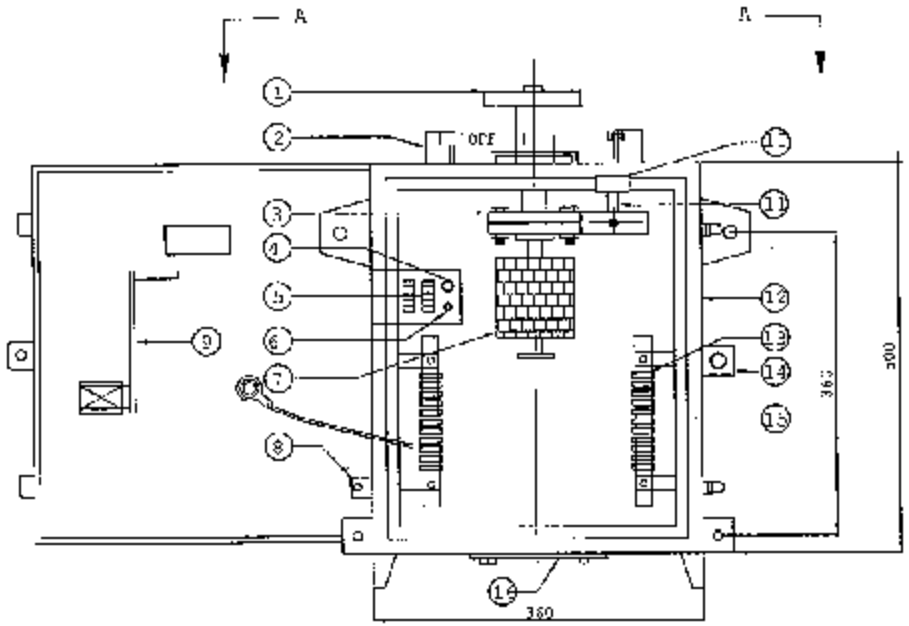
Southern Switchgear Industries
Plot No.13, Phase-II, I.D.A.
Jeedimetla, Hyderabad

FIXED AND MOVING CONTACT FOR 132KV 800 AMPS D.B. ISOLATOR

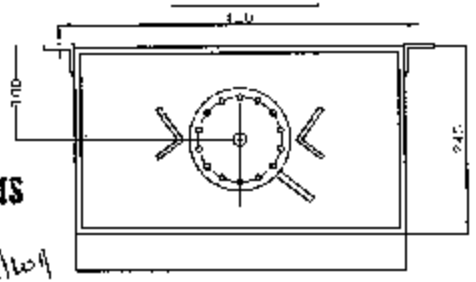
SCALE	N.T.S.	DRAWN BY	N.MURTHY
TOLERENCE	+/- 5 MM.	CHECKED BY	K.S.
DATE		APPROVED BY	
DRG.NO.	SST 132 - 01		

SOUTHERN SWITCHGEAR INDUSTRIES HYD-38.

Standardised Drawing for 132 kV Isolator
(M/s Southern Switchgear Industries)
STD/GTP-DWG/Approval No. 237-5 01 sheet Revision No. 0
Prepared & Approved during November – 2011
Customer ref : APTRANSCO
Title: Fixed &moving contact for 132KV, 800A D.B Isolator.



ELEVATION



VIEW AT A A

S.NO	DESCRIPTION
1.	FLANGE
2.	ON\OFF STOPPER
3.	REDUCTION GEAR BOX
4.	PUSH BUTTON
5.	FUSES 5A
6.	INDICATION LAMP
7(a)	AUXILLARY SWITCH 3NO+3NC FOR MAIN SWITCH
7(b)	AUXILLARY SWITCH 3NO+3NC FOR EARTH SWITCH
8.	EARTH TERMINAL
9.	OPERATING HANDLE
10	SOLONOID 220 VOLTS D.C.
11.	PLUNGER
12.	CUBICAL (12G M.S.SHEET)
13.	CAT M3 TERMINALS (STUD)
14.	PROVISION FOR PAD LOCK (WITH OUT LOCK)
15.	RUBBER GASKET FOR DUST\WEATHER PROOF
16.	DETACHABLE CABLE GLAND FIXING PLATE WITH OUT GLANDS

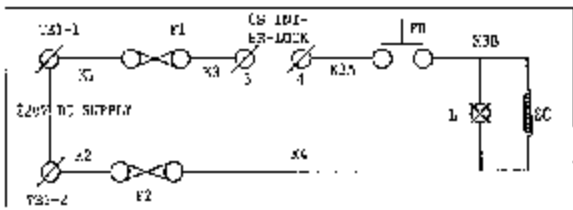
APPROVED FOR TURNKEY PROJECTS

CHIEF ENGINEER / CONSTRUCTION-1
APTRANSCO/VIDYUTH SOUDHA/HYD.

Standardised Drawing for 132 kV Isolator
(M/s Southern Switchgear Industries)
STD/GTP-DWG/Approval No. 237-6 01 sheet Revision No. 0
Prepared & Approved during November – 2011

Customer ref : APTRANSCO

Title: Bottom operating mechanism box (Reduction Gear).



LEGEND
F1,F2 - FUSES
S3-PUSH BUTTON
L-INDICATOR LAMP
SC-SOLENOID COIL

NOTES:
1. ALL DIMENSIONS ARE IN MM
2. ENGRAVING MARKS WILL BE DONE WITH 2.5 SQ.MM 2D. STANDARD OPERATION AND 2/A SIGNS WILL BE PROVIDED
3. DEGREE OF PROJECTION IP-55
4. CUBICAL IS PAINTED DOUBLE SIDES WITH SHADE NO.631
5. WEATHER DUST & VERMIN PROOF.

Southern Switchgear Industries
Plot No.13, Phase-II, I.D.A.
Jeedimetla, Hyderabad

Bottom Operating Mechanism Box (Reduction Gear).

SCALE	N.T.S.	DRAWN BY	N.MURTHY
TOLERENCE	+/- 5 MM.	CHECKED BY	K.K
DATE	19-11-2010	APPROVED BY	
DRG.NO.	SSI - BOM - RG - 10		

SOUTHERN SWITCHGEAR INDUSTRIES HYD-38.

GUARANTEED TECHNICAL PARTICULARS FOR 220 KV WITH EARTH SWITCH DISCONNECTORS (ISOLATORS)

S.No.	CHRACTERISTICS	220 KV DISCONNECTORS
01.	Type/Installation	Double Break Turn & Twist, outdoor, Horizontal upright.
02.	Manufacturer's Name and Country of Manufacture	M/s. Southern Switchgear Industries, Hyderabad, India.
03.	Standards according to which the isolator are manufactured.	IS 9921 & IEC-129
04.	Maximum design voltage at which the Isolator can operate(KV)	245 KV
05.	Frequency (Hz)	50 Hz
06.	Rated voltage (kV)	220 KV
07.	Maximum current that can be safely interrupted by the Isolator	
	Inductive (A & %PF)	0.7 Amps at 0.15 PF
	Capacitive (A & %PF)	0.7 Amps at 0.15 PF
08.	Continuous current rating	MAIN / EARTH
	Nominal (Amps)	800 Amps. / ---
	Under site conditions (Amps)	800 Amps. / ---
09.	Rated short time current	
	i. For 3 Seconds (KA rms.)	---
	ii. For 1 Second (KA rms.)	-- 40 KA (RMS) --
	iii. Rated peak short time current (KVP)	-- 100 KA (Peak) --
10.	Current density at the minimum cross section of	MAIN / EARTH
	a. Moving blade (Amps/Sq.mm)	2.5 Amp/ Sq.mm Cu. pipe
	b. Terminal pad	1.0 Amp/ Sq.mm Al. flat
	c. Contacts	1.6 Amp/ Sq.mm Cu. flat
	d. Terminal Connector	1.0 Amp/ Sq.mm Aluminium.
11.	Maximum Temp. rise of current carrying parts when carrying rated current continuously (Deg.C)	With in the limits specified in IS
12.	Derating factor for specified site conditions	Unity
13.	Insulation Levels	
	i. Impulse withstand voltage (KV peak)	
	a. Phase to Earth	1050 KV P
	b. Isolating distance	1200 KV P
	ii. Switching surge withstand voltage(KV Peak)	Not Applicable.
	a. Phase to Earth	
	b. Isolating Distance	
	iii. Power Frequency withstand voltage (KV rms.)	
	a. Phase to Earth	460 KV (RMS.)
	b. Isolating distance	530 KV (RMS.)

Contd.. 2..

4.	Minimum clearance in air :		
	i. Between poles (mm)	4000 mm(Phase to phase center of 4500 mm)	
	ii. Between live parts & earth (mm)	2300 mm.(equal to Insulators Height)	
	iii. Between live parts when switch is open a. On the same pole (mm)	3000 mm (Center to Center of outer stacks – 3200)	
	b. Between adjacent poles (mm)	4000 mm	
15.	Rated mechanical terminal load i.Load long the terminal connector side (Kg.) ii.Load across the terminal connector side (Kg.)	800 (N) 270 (N)	
16.	Torque required to operate the switch in Kg.M.	MAIN 35 Kg/m	EARTH 40 Kg/m
17.	Contract Zone i. Horizontal deflection (mm) ii. Vertical deflection (mm) iii. Total amplitude of longitudinal movement w.r.t conductor supporting fixed contact (mm)	Not to be assigned for Double Break Isolator & applicable in case of pentograph Isolators only.	
18.	Design and Construction	MAIN	EARTH
	i. No. of Insulators per pole	3 Stacks/per Phase	----
	ii. No. of breaks per pole	Two	Single
	iii. Type of closing/ opening Mechanism (Horizontal/vertical Break straight etc.)	Horizontal Turn & Twist	Vertical Banging
	iv. Contacts a. Material & Grade	HDE Copper Flat	HDE Copper Flat
	b. Cross – Sectional area (mm).	512 Sq. mm	512 Sq. mm
	v. Moving blades a. Material & Grade	HDE Copper Tube	HDE Copper Tube
	b. Cross sectional area (mm.)	329 Sq.mm	329 Sq.mm.
	vi. Contact Support : a. Material & size of channel / block b. Material & size of plate. (Bottom)	MS HDG MS HDG	MS HDG MS HDG
	vii. Rain hood – Material grade & size	GI sheet	

Contd..3..

	viii. Turn & twist mechanism a. Material & size of clamps b. Material size of springs c. Whether springs are encased	 MS HDG SS GRADE 16 SWG YES, encased with grease.
	ix. Nuts & Bolts a. Size, material & grade in live parts	5/8" and above all hot dip galvanized & less than 3/8" are stainless steel.
	b. Size, material & grade in other parts	3/8"and above all hot dip galvanized
	x. Insulator base plate material & size of plate below Insulators (Elevator Plates)	MS HDG 10 MM
	xi. Bearings a. Material & size of housing b. No. of bearings, location & size	 MSHDG 2 Nos. Bearings under rotating Insulator stack shaft of 50mm. Dia.
	xii. Tandem Pipe a) Size length class & No. of pipes	32mm I.D Class "B" 10 Mts. Long 2 Nos. (with Intermediate Joint) for MS and 1 Nos. (with Intermediate Joint) for Earth Switch
	b) Size of shackle, screw.	----- 5/8" DIA -----
	c) No. of Bearings/Bush & its material and size	----- 5/8" DIA -----
	xiii. Type of interlock	Electromagnet type interlock between Isolators & breaker, mechanical Interlock between Main and earth switch.
	xiv. Down pipe size length & class	---- 50mm I.D. CLASS B ----
	xv. Type of universal/ swivel joint. a) Between bearing & down pipe.	 ---- Swivel type Fork joint ----
	b) Between down pipe and operating mechanism.	---- Vernier type flange type ----
	xvi. Operating mechanism	MAIN: Motor Operated EARTH: Manually operated through Worm and Reduction gear
	a. Control cabinet material and Thickness	M.S. Sheet 12 SWG. Enamel Painted
	Degree of protection	IP 55
	Type size and No.of cable glands	Provision for Double compression type brass nickel coated 20mm dia cable glands – 2Nos.
	Whether removal gland plate provided.	YES

Contd .. 4..

	xvii. Base : a) Size of steel sections used	Composite frame fabricated with 2 Nos. of 150 x 75 x 5 mm thick M.S. formed Channel
	b) Overall size	3500 x 300 x 150
	c) Total weight	104 Kg. (Approx)

APPROVED FOR TURNKEY PROJECTS

CHIEF ENGINEER / CONSTRUCTION-1
APTRANSCO/VIDYUTH SOUDHA/HYD

M/S. SOUTHERN SWITCHGEAR INDUSTRIES,

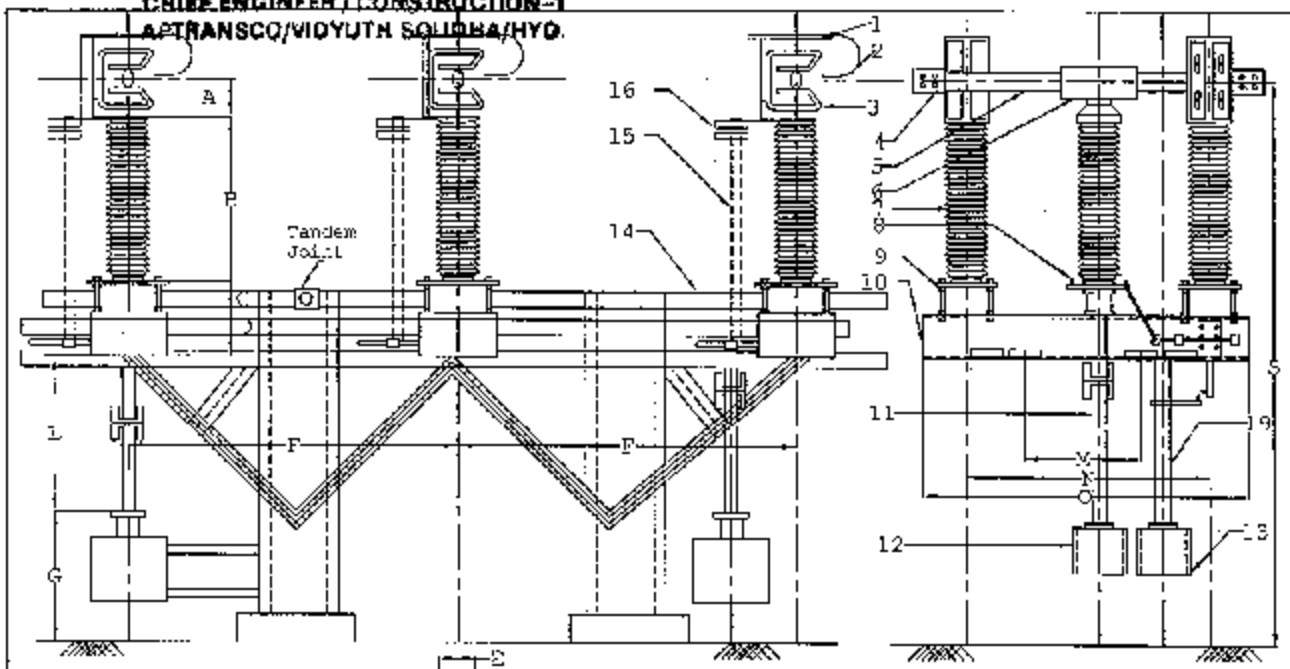
AUTHORISED SIGNATORY

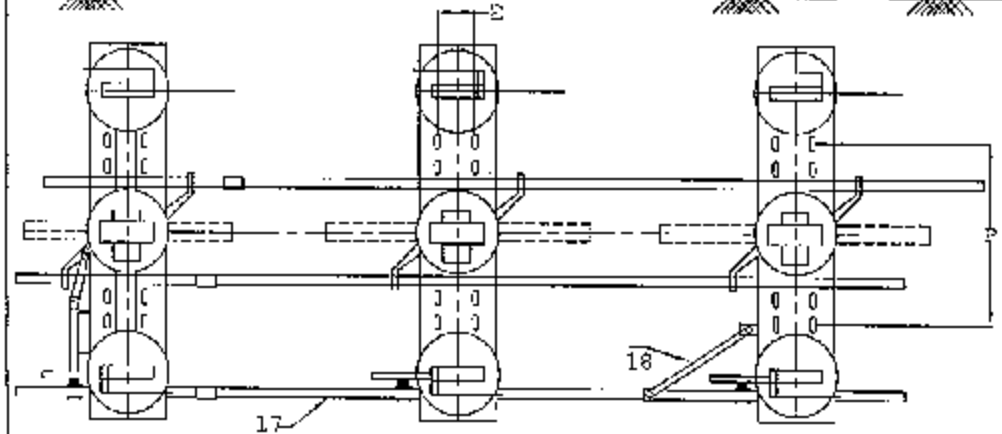
	Standardised Drawing for 220 kV Isolator (M/s Southern Switchgear Industries)
	STD/GTP-DWG/Approval No. 238-1 04 sheets Revision No. 0
	Prepared & Approved during November – 2011
Customer ref : APTRANSCO	
Title: GTP for 220 KV Isolators.	

APPROVED FOR TURNKEY PROJECTS

CHIEF ENGINEER / CONSTRUCTION-1
APTRANSCO/VIDYUTH SOUDHA/HYD.

Standardised Drawing for 220 kV Isolator
(M/s Southern Switchgear Industries)
STD/GIL-DWG/Approval No. 238-2.01 sheet Revision No. 0
Prepared & Approved during November – 2011
Customer ref : APTRANSCO
Title: GA of 220 KV D.B Isolators with earth switch





REFERENCE

1. Rain Hood G.I.
2. Arcing Horn 10 mm DIA G.I. rod
3. Main Switch fixed Contact HDBC Flat (Refer Part Drawing)
4. Jumper pad (Refer Part Drawing)
5. Moving contact HDBC pipe (Refer Part Drawing)
6. Rotating Blade Mechanism.
7. Insulator (not in scope of supply)
8. Main switch lever Arm with clamp.
9. Elevator plate 10mm Thick MSHDG
10. Switch base formed channel 150x75mmx5mm MSHDG
11. Main switch down pipe 50Dia class3
12. Main switch XXM box
13. Earth switch BOM box
14. Main switch Tandem pipe 32Dia.class3 10M long(in 2 lengths)
15. Earth switch moving contact S.D.E.C Pipe (Refer Part Drawing)
16. Earth switch fixed contacts HDBC flat (Refer Part Drawing)
17. E/S tandem pipe 32mm dia class B 10 mts long(in 2 lengths)
18. Auxillary Tandem pipe
19. Earth Switch Down pipe 50mm dia.

NOTES
1. All dimensions are in mm.
2. All ferrous parts hot dip galvanised.
3. All contacts ends silver plated.
4. Elevator plate shall be provided with 200mm P.C.D. holes to accomodate solid core insulators.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
120	2300	70	150	225	4500	1240					1620	1320	3200	3500	2440			5500

Southern Switchgear Industries
Plot No.13, Phase-II, I.D.A
Jeedimetla, Hyderabad

GENERAL ARRANGEMENT OF 220 KV D.B. ISOLATOR WITH EARTH SWITCH

SCALE	N.T.S.	DRAWN BY	S.M. MURTHY
TOLERENCE	+/- 5 MM.	CHECKED BY	[illegible]
DATE		APPROVED BY	
DRG.NO.	SSI - 220 - GA - 159		

SOUTHERN SWITCHGEAR INDUSTRIES HYD-38

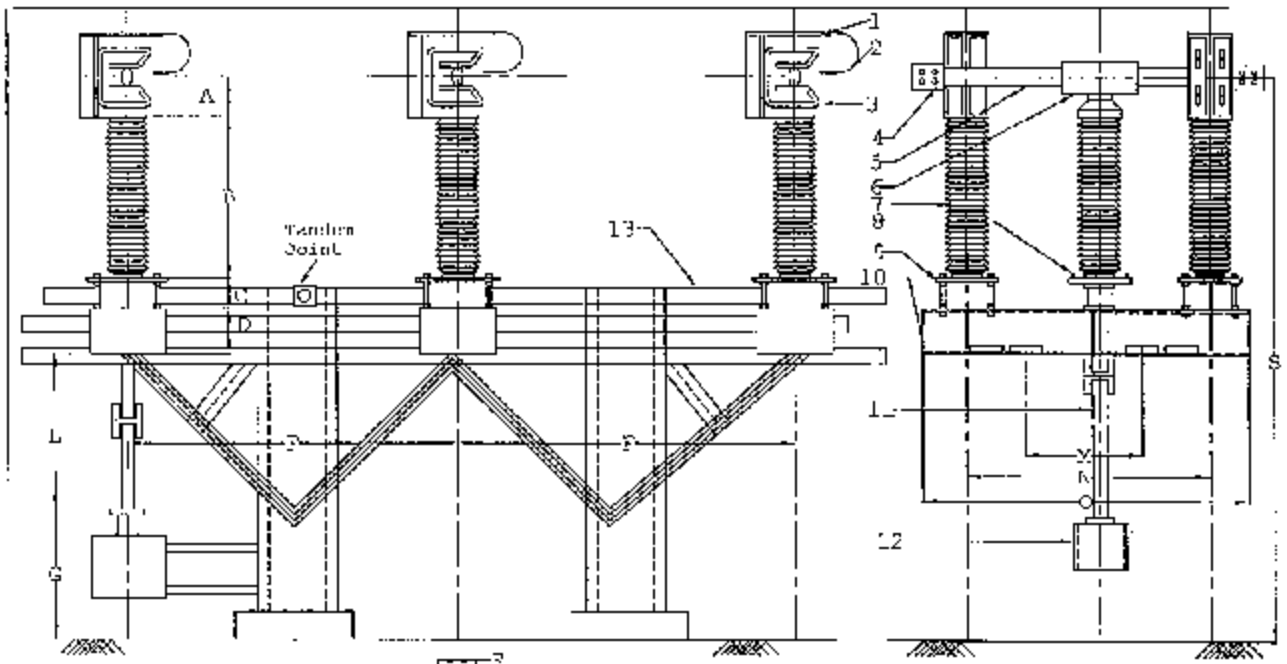
Standardised Drawing for 220 kV Isolator
(M/s Southern Switchgear Industries)

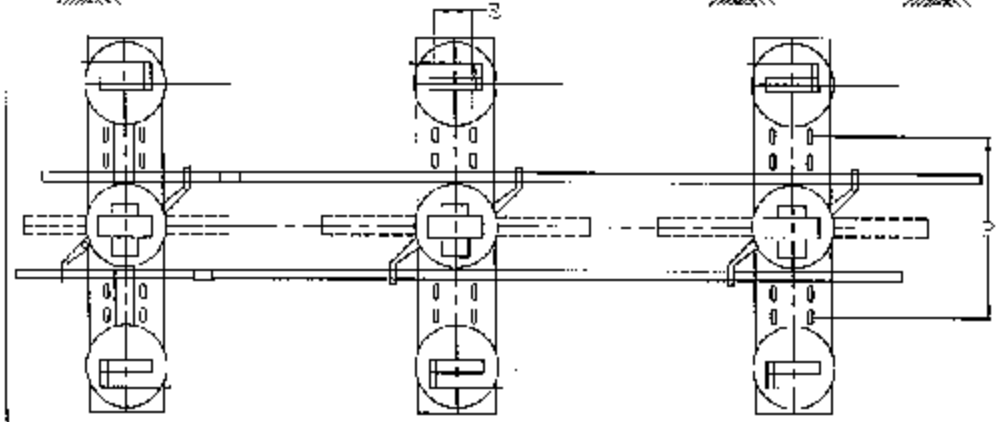
STD/GTP-DWG/Approval No. 238-3.01 sheet Revision No. 0

Prepared & Approved during November – 2011

Customer rel : APTRANSCO

Title: GA of 220 KV D.B Isolators without earth switch





REFERENCE

1. Rain Hood G.I.
2. Arcing Horn 10 mm DIA G.I. rod
3. Main Switch Fixed Contact ASAC Flat (Refer Part Drawing)
4. Jumper pad (Refer Part Drawing)
5. Moving contact HDEC Pipe (Refer Part Drawing)
6. Breaking Blade Mechanism.
7. Insulator (not in scope of supply)
8. Main switch lever arm with clamp.
9. Elevator plate 12 mm Thick MSHDG
10. Switch base formed channel 150X75mmX5mm Thick MSHDG
11. Main switch down pipe 80Dia class8
12. Main switch MOM box
13. Main switch tandem pipe 32Dia.class8 10M long(in 2 lengths)

NOTES
1. All dimensions are in mm.
2. All ferrous parts hot dip galvanised.
3. All contacts are silver plated.
4. Elevator plate shall be provided with 200mm P.C.D. holes to accommodate solid core insulators.

APPROVED FOR TURNKEY PROJECTS

CHIEF ENGINEER / CONSTRUCTION-1
APTRANSCO/VIDYUTH SOUDHA/HYD.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
120	2300	70	150	225	4500	1240					1620	1220	3200	3500	2440			5500

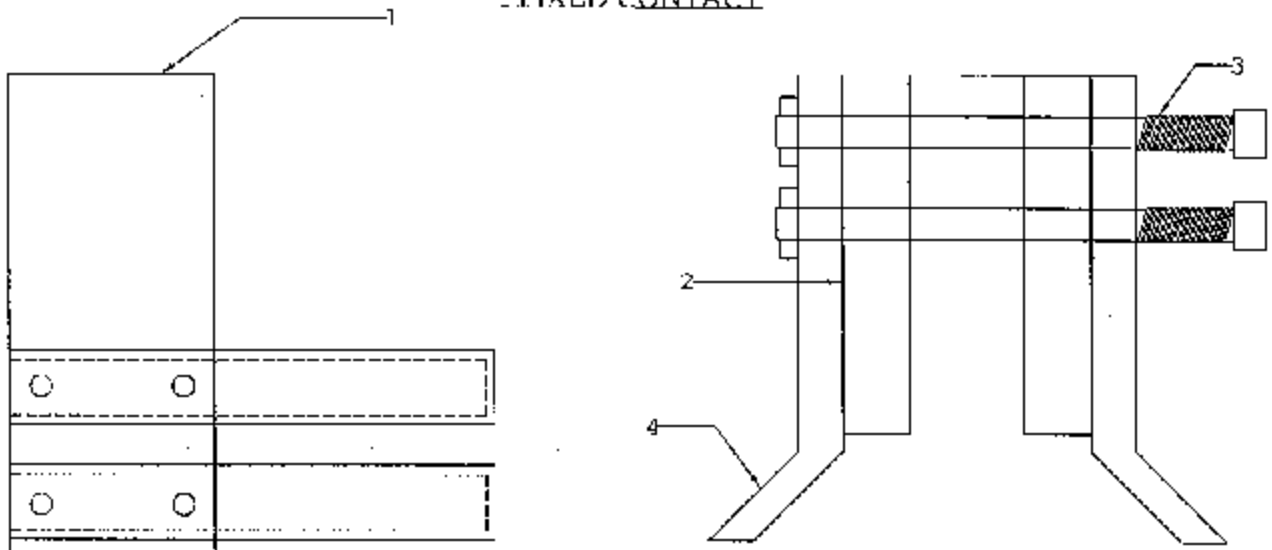
Southern Switchgear Industries
Plot No.13, Phase-II, I.D.A.
Jeedimetla, Hyderabad

GENERAL ARRANGEMENT OF 220 KV D.B. ISOLATOR WITHOUT EARTH SWITCH

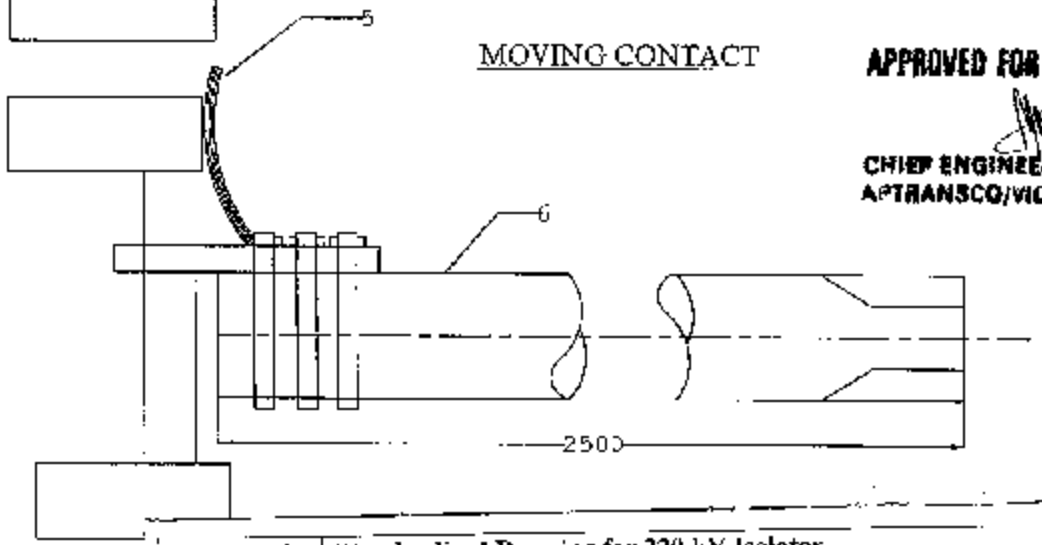
SCALE	N.T.S.	DRAWN BY	SIGNATURE
TOLERENCE	+/- 5 MM.	CHECKED BY	
DATE	23-5-09	APPROVED BY	
DRG.NO.	SSI - 220 - GA - WOES -169		

SOUTHERN SWITCHGEAR INDUSTRIES HYD-30.

FIXED CONTACT



MOVING CONTACT



APPROVED FOR TURNKEY PROJECTS

CHIEF ENGINEER / CONSTRUCTION-I
APTRANSCO/VIDYUTH SOUDHA/HYD.

REFERENCE
1. JUMPER PAD 75x12mm AL.FLAT WITH BI METALIC STRIP(CU+AL)
2. JAWS 25x4 2NOS.HDEC FLAT
3. SPRINGS STAINLESS STEEL
4. JAWS SUPPORTING CLAMP
5. FLEXIBLE 25x3 COPPER - 2 NOS.
6. MOVING CONTACT 38MM O.D.x 32 MM I.D. HDEC PIPE.

NOTES

1. ALL DIMENSIONS ARE IN MM ONLY
2. ALL CONTACT ENDS ARE SILVER PLATED.
3. ALL FERROUS PARTS HOT DIP GALVANIZED.

Southern Switchgear Industries
Plot No.13, Phase-II, I.D.A.
Jeedimetla, Hyderabad

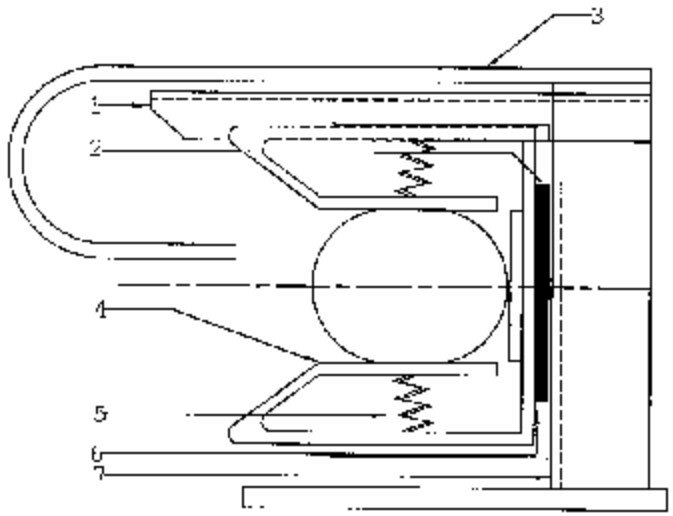
220 KV 800 AMPS EARTH SWITCH FIXED AND MOVING CONTACTS

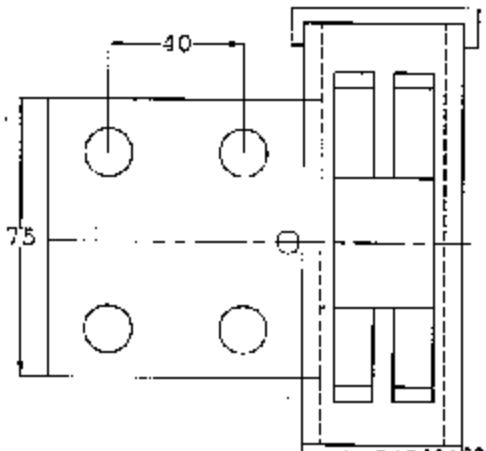
SCALE	N.T.S.	DRAWN BY	S.V.MURTHY
TOLERENCE	+/- 5 MM.	CHECKED BY	M.V.K
DATE		APPROVED BY	HYD-38
DRG.NO.	SSI - 220 - 82		

SOUTHERN SWITCHGEAR INDUSTRIES

Standardised Drawing for 220 kV Isolator
(M/s Southern Switchgear Industries)
STD/GTP-DWG/Approval No. 238-4 01 sheet Revision No. 0
Prepared & Approved during November – 2011
Customer ref : APTRANSCO
Title: 220 KV 800A earth switch fixed and moving contacts

FIXED CONTACT

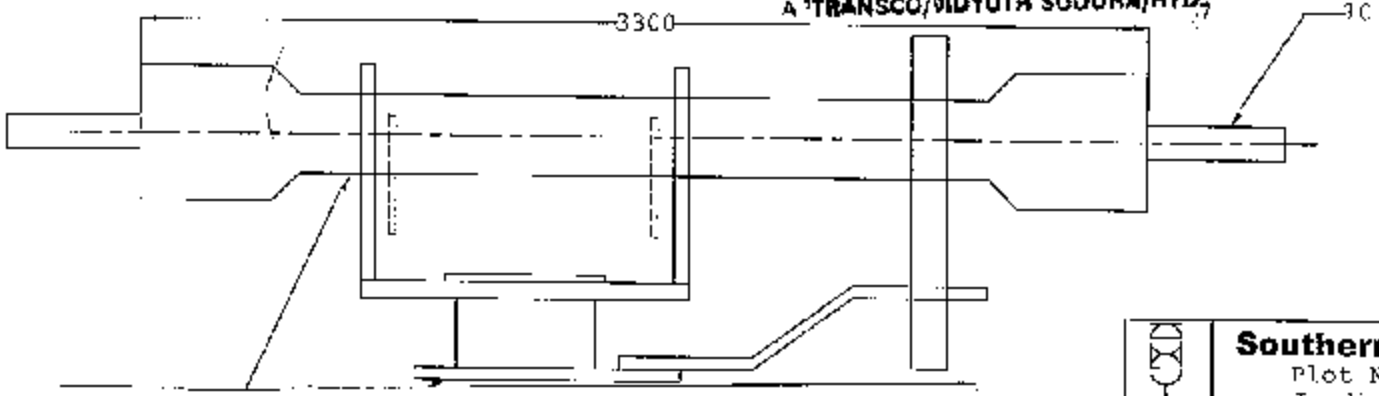




APPROVED FOR TURNKEY PROJECTS

CHIEF ENGINEER / CONSTRUCTION-I
APTRANSCO/VIDYUTH SOUDHA/HYD.

MOVING CONTACT



REFERENCE

1. G.I.RAIN HOOD
2. JUMPER PAD 75X12 mm AL.FLAT
3. FC ARCING HORN GI ROD
4. JAWS-32X4mm HDEC FLAT 2 NOS.
5. SPRING-STAINLESS STEEL
6. BI METALLIC STRIP CU-AL
7. F.C. CUP SUPPORT MSHDG
8. MOVING CONTACT - 38mmO.D X 32 mm I.D HDEC PIPE
9. TORN & TWIST MECHANISM
10. M.C.ARCING HORN G.I. ROD

NOTES

1. ALL DIMENSIONS ARE IN MM
2. ALL FERROUS PARTS ARE HOT DIP GALVANISED
3. ALL CONTACTS ENDS SILVER PLATED.
4. MOVING CONTACT BOTH ENDS SLIGHTLY PRESSED

Southern Switchgear Industries
Plot No.13, Phase-II, I.D.A
Jeedimetla, Hyderabad

FIXED AND MOVING CONTACT FOR 220 KV 800 AMPS D.B. ISOLATOR

SCALE	N.T.S.	DRAWN BY	SHRI MURTHY
TOLERENCE	+/- 5 MM.	CHECKED BY	R.V.S.K
DATE		APPROVED BY	
DRG.NO.	SSI - 220 - 81		

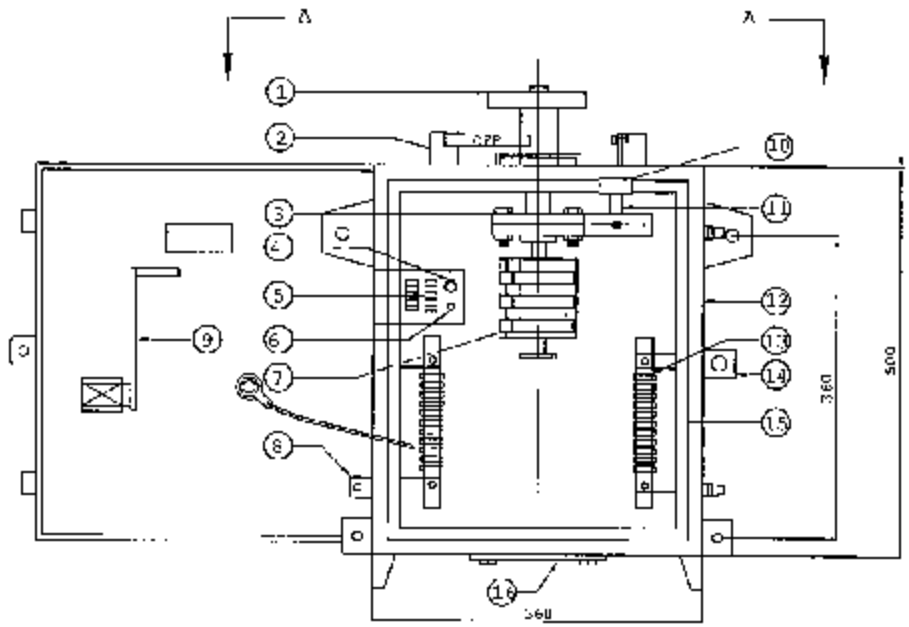
Standardised Drawing for 220 kV Isolator
(M/s Southern Switchgear Industries)

STD/GTP-DWG/Approval No. 238-5 01 sheet Revision No. 0

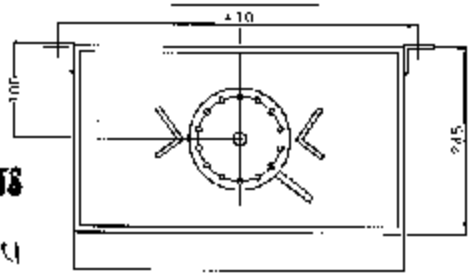
Prepared & Approved during November – 2011

Customer ref : APTRANSCO

Title: Fixed &moving contact for 220KV 800A D.B Isolutor.



ELEVATION



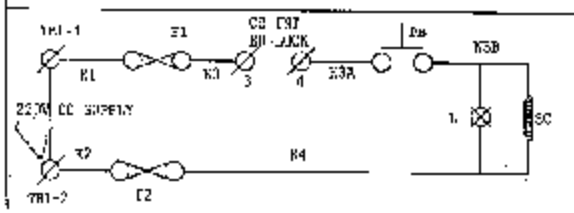
VIEW AT A-A

S.NO	DESCRIPTION
1.	FLANGE
2.	ON\OFF STOPPER
3.	REDUCTION GEAR BOX
4.	PUSH BUTTON
5.	FUSES 5A
6.	INDICATION LAMP
7(a)	AUXILIARY SWITCH 6NO+3NC FOR MAIN SWITCH
7(b)	AUXILIARY SWITCH 3NO+3NC FOR EARTH SWITCH
8.	EARTH TERMINAL
9.	OPERATING HANDLE
10	SOLONOID 220 VOLTS D.C.
11.	PLUNGER
12.	CUBICAL (12G M.S.SHEET)
13.	CAT M3 TERMINALS (STUD)
14.	PROVISION FOR PAD LOCK (WITH CUT LOCK)
15.	RUBBER GASKET FOR DUST\WEATHER PROOF
16.	DETACHABLE CABLE GLAND FIXING PLATE WITH CUT GANDS

APPROVED FOR TURNKEY PROJECTS

CHIEF ENGINEER / CONSTRUCTION-1
APTRANSCO/VIDYUTH SOUDHA/HYD

Standardised Drawing for 220 kV Isolator
(M/s Southern Switchgear Industries)
STD/GTP-DWG/Approval No. 238-6 01 sheet Revision No. 0
Prepared & Approved during November – 2011
Customer ref : APTRANSCO
Title: Bottom operating mechanism box (Reduction Gear).



LEGEND
F1, F2 - FUSES
PB-PUSH BUTTON
L-INDICATOR LAMP
SC-SOLENOID COIL

NOTES:
1. ALL DIMENSIONS ARE IN MM
2. EXTERNAL WIRING WILL BE DONE WITH 2.5 SQ.mm Cu, STRANDED CONDUCTOR AND 2CT SEALS WILL BE PROVIDED
3. DEGREE OF PROJECTION IP-55
4. CUBICAL IS MADED FROM SHEET METAL CUBIC BOARD
5. MERCIER DUST & WEATHER PROOF.

Southern Switchgear Industries
Plot No.13, Phase-II, I.D.
Jeedimetla, Hyderabad

Bottom Operating Mechanism Box (Reduction Gear)			
SCALE	N.T.S.	DRAWN BY	[illegible]
TOLERENCE	+/- 5 MM.	CHECKED BY	K.K
DATE	19-11-2010	APPROVED BY	
DRG NO	GSS - BOM - RG - 10		

SOUTHERN SWITCHGEAR INDUSTRIES HYD-38