



Westinghouse

# SwitchBoard

Alpha Plus  $\alpha^+$



CE

## Switchgear & ControlGear System



5

Switchboard

### General Features:

- form 3 / form 4 series is a metal clad compartmentalized switchboard with each feeder units enclosed inside a separate metallic compartment.
- These boards are available in various depths and heights to suit the individual project requirements.
- Protection Class Up to IP – 54
- Cubicles are made out of 2.0mm thick Electro-galvanized sheet steel as standard for outer covers and doors. 1mm thick sheet steel for internal partitions.
- Busbar Chamber of 300mm height is provided at the Top or Bottom as per project specifications.
- Removable Rear covers are provided.
- Doors have Semi-concealed hinges and locks.
- M 12 Lifting Eye Bolts are provided on top of each cubicle.
- All cubicles are powder coated to RAL 7032 – Textured.
- All doors are provided with gaskets for IP54 degree of protection.

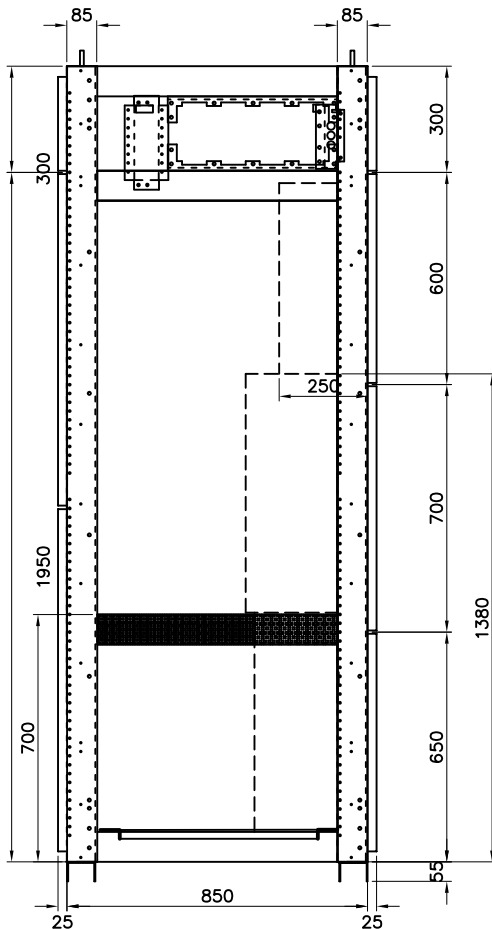
### Incoming Section:

- Separate compartments are provided for instruments, ACB and the incoming cabling.
- The Instrument compartment has separate doors for KWh meter and instruments.
- The ACB compartment has a hinged door.

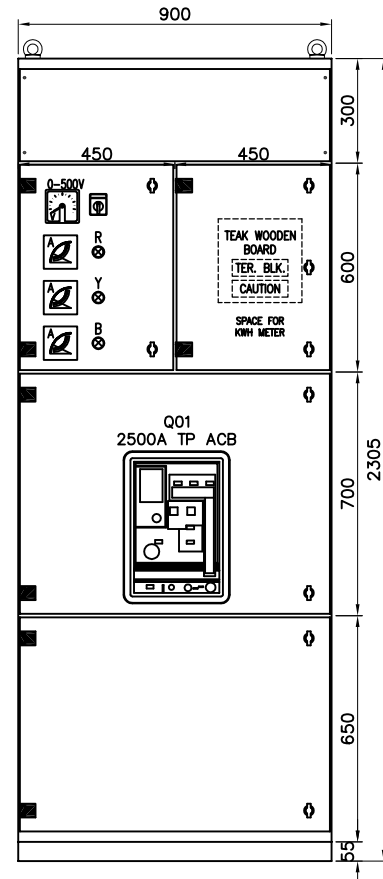
#### Outgoing Section:

- Outgoing enclosures are provided with compartments of minimum 200mm height in multiples of 25mm.
- Each compartment has removable side module covers, Rear mounting plate, Base plate and a hinged door.
- Vertical Bus Bar chamber column of 300mm width will provided for feeder columns.
- Cable alleys can be provided either for front or rear access cabling for all outgoing feeder compartments.

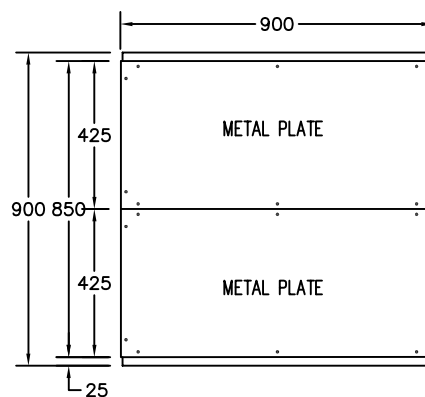
# Switchgear & ControlGear System MDB



SIDE VIEW



FRONT VIEW

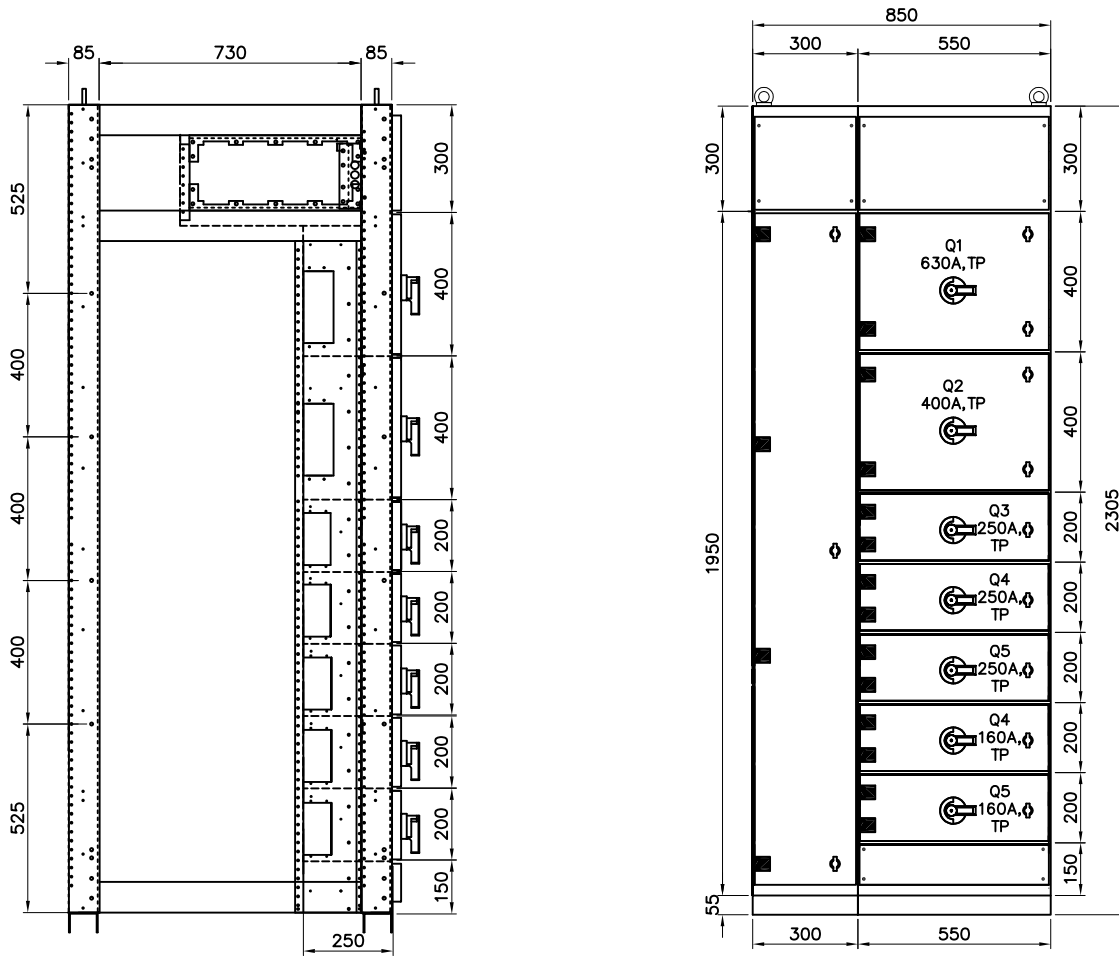


SECTIONAL PLAN

## MDB INCOMING SECTION

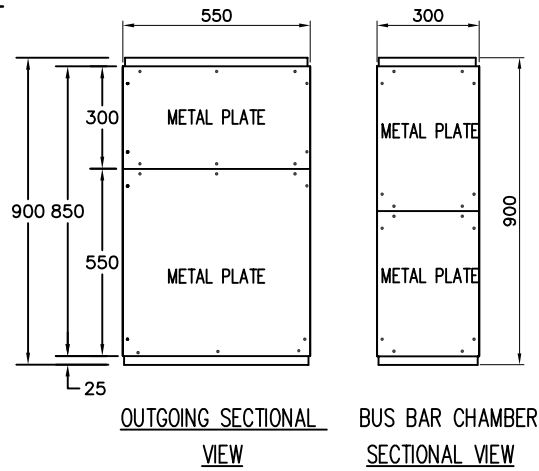
# Switchgear & ControlGear System MDB

5 Switchboard



SIDE VIEW

FRONT VIEW



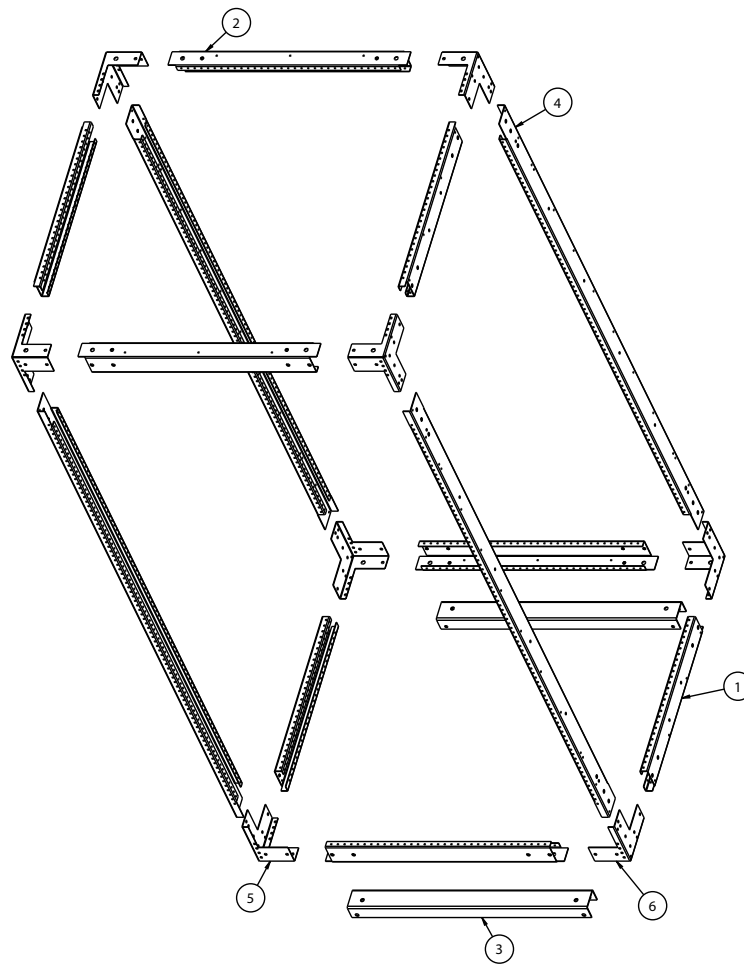
OUTGOING SECTIONAL VIEW

BUS BAR CHAMBER SECTIONAL VIEW

## MDB OUTGOING FEEDER SECTION

# MDB Incoming Columns Frame Assembly

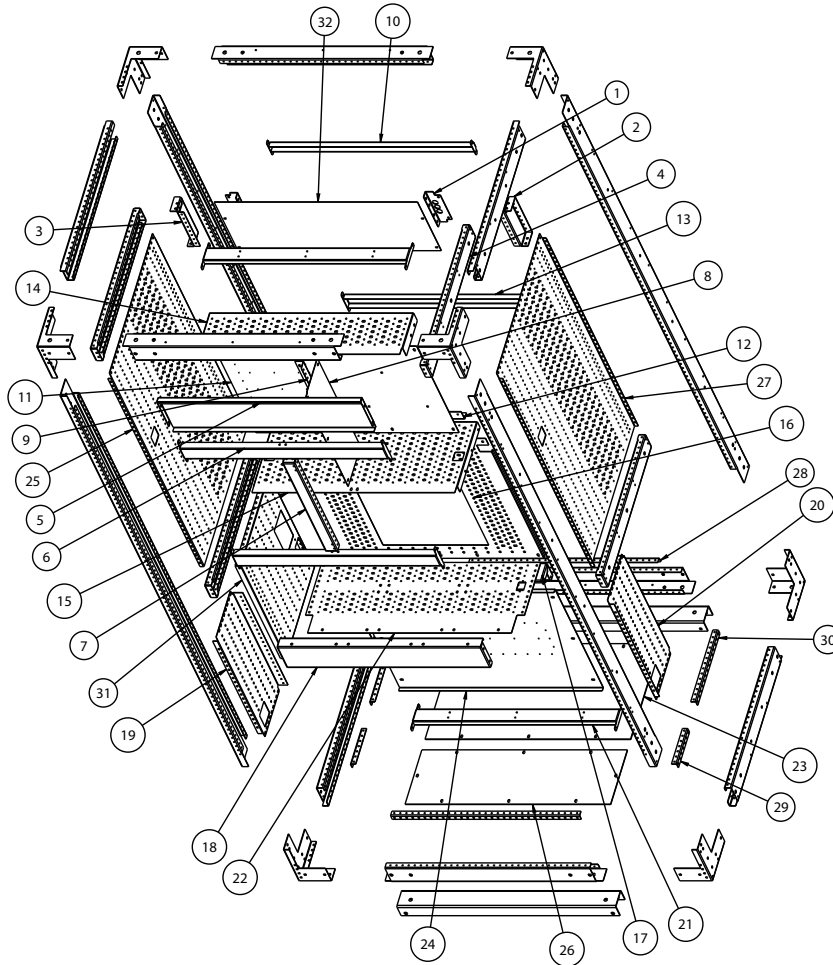
## EXPLODED ISOMETRIC VIEW



LOCATION	PART IDENTIFICATION	QUANTITY
1	9890017-1_T_B_VERT_SPT_D721	4
2	9900048-1_T-B_VERT_SUPP_W840	4
3	9900049-1_METAL_BS_INC_W898D80	2
4	9900050-1_VERT_POST_H2250W85	4
5	9900051_CORNER_BKT_RIGHT	4
6	9900052_CORNER_BKT_LEFT	4

# MDB incoming Frame Complete with Internal parts

## EXPLODED ISOMETRIC VIEW

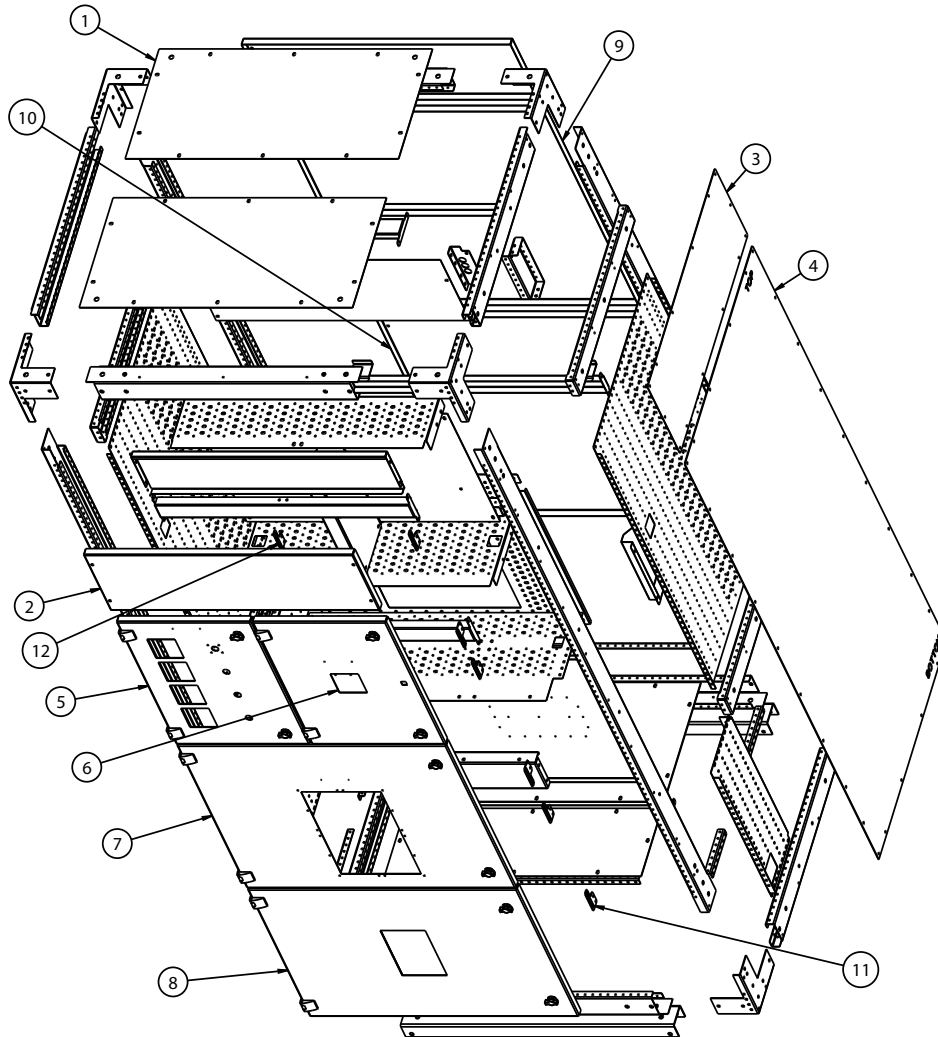
**5**
**Switchboard**


LOCATION	PART IDENTIFICATION	QUANTITY
1	9900057_H R Z _M T L _S P T _H 180	2
2	9890032-1_PIBON-M-B-SPT-3-4A	1
3	9890032-2_PIBON-M-B-SPT-3-4B	1
4	9890034- 1_S D _H R Z T - S P T - 3- 7	4
5	9900010-1_HRZ_BB_D_FR_H184W838	1
6	9900011- 1_M T L _B R K T _W 840	2
7	9900012-1_DVDR_MTL_BKT_H540	1
8	9900013-1_MTRG_KWH_BRR_H598D193	1
9	9900014-1_MTRG_KWH_BRR_SPT_H540	1
10	9900017-1_HRZ_CV_BKT_W840	1
11	9900019-1_W_KWH_M_PLT_H525W838	1
12	9900020-1_WRG_MTG_PLT_M_B_W838	1
13	9900021-1_INCMR_B_DOOR_BKT_W840	1
14	9900022-1_HRZ_BB_BRR_W840D200	1
15	9900024-1_MTR_BTM_CMPT_W840D345	1
16	9900028-1_ACB_INC_BRR_H725W838	1

LOCATION	PART IDENTIFICATION	QUANTITY
17	9900031-1_ACB_METAL_BASE_W844	1
18	9900032-1_ACB_INC_BKT_H125W840	1
19	9900034-1_REF_MTG_BR_L_H604W235	1
20	9900035-1_REF_MTG_BR_R_H604D235	1
21	9900036-1_M_B_FOR_BP_IN_SC_W840	2
22	9900037-1_AVB_IN_M_P_W898D400	1
23	9900038-1_AL_BS_PLT_W843D461	1
24	9900039-1_W_MTG_PLT_H600W835	1
25	9900040-1_S_BR_IN_S_L_H1172D676	1
26	9900041- 1_B S _P L T _W 846D 262	1
27	9900044-1_S_BR_IN_S_R_H1172D676	1
28	9900054-1_MTL_SP_BTM_BS_PL_W775	2
29	9900054-2_MTL_SP_BTM_BS_PL_D171	2
30	9900054-3_MTL_SP_BTM_BS_PL_D346	2
31	9900055-1_N_AN_ERTH_BR_H565D443	1
32	9900056-1_HRZ_BB_RR_C_H295W838	1

# MDB Incoming Complete with Module Parts

## EXPLODED ISOMETRIC VIEW



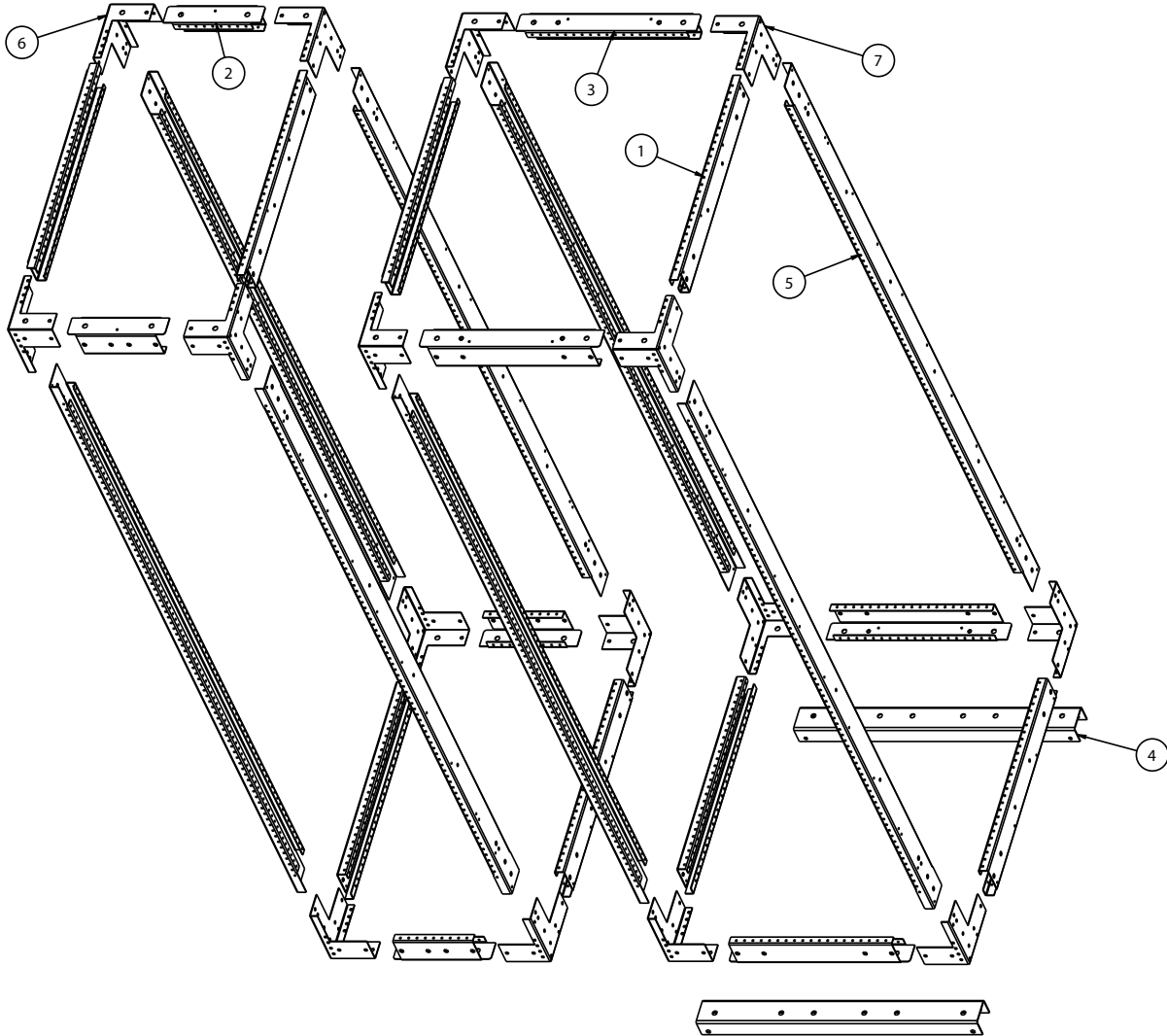
5  
Switchboard

LOCATION	PART IDENTIFICATION	QUANTITY
1	9900015-1_TOP_CVR_INC_SE_W898_D424	2
2	9900005-1_T O P _F R T _C V R _H 270_W 885	1
3	9890031- 1_SIDE_CVR_6- 7	1
4	9890031- 2_S I D E _C V R _6- 8	1
5	9900003-1_METERING_FRT_CVR_H595_W440	1
6	9900004- 1_KWH_FRT_CVR_H 595_W 440	1
7	9900002- 1_TOP_FRT_CVR_H 695_W 885	1
8	9900001- 1_REF_FRT_CVR_H 620_W 885	1
9	9900029-0_WLD_BC_CVR_INC_SEC_H944_W885	1
10	9900030-0_WLD_BC_CVR_INC_SEC_H969_W885	1
11	9900043- 1_DOOR LOCKES _2_H 90	6
12	9900042- 1_DOOR LOCKES _1_H 90	2



# MDB Outgoing Columns Frame Assembly

## EXPLODED ISOMETRIC VIEW

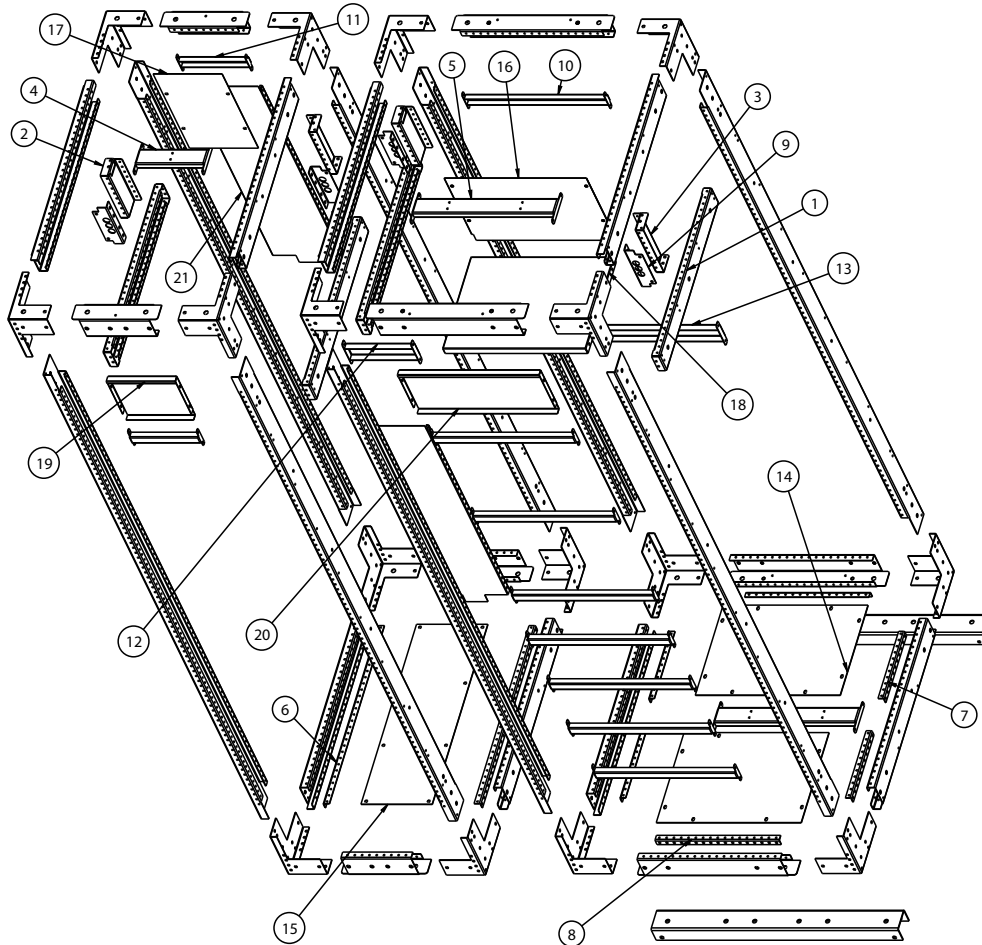


LOCATION	PART IDENTIFICATION	QUANTITY
1	9890034-1_SD-HRZT-SPT-3-7	4
2	9890032-3_PIBON-M-B-SPT-3-4C	2
3	9890032-4_PIBON-M-B-SPT-3-4D	2
4	9890005-1_OG-T-AD-B-PLT-BKT	1
5	9890022-1_OG-T-AD-B-PLT-BKT	2
6	9890036-1_OG-BTM-PT-BKT_D425	2
7	9890024-1_OG-TOP-PT-BKT_W175	4
8	9890024-2_OG-TOP-PT-BKT_W375	2
9	9900057_HRZ_MTL_SPT_HI800	4
10	9890040-2_OG_CPM_SPT_BKT_W490	9



# MDB Outgoing Frame Complete with Internal Parts

## EXPLODED ISOMETRIC VIEW

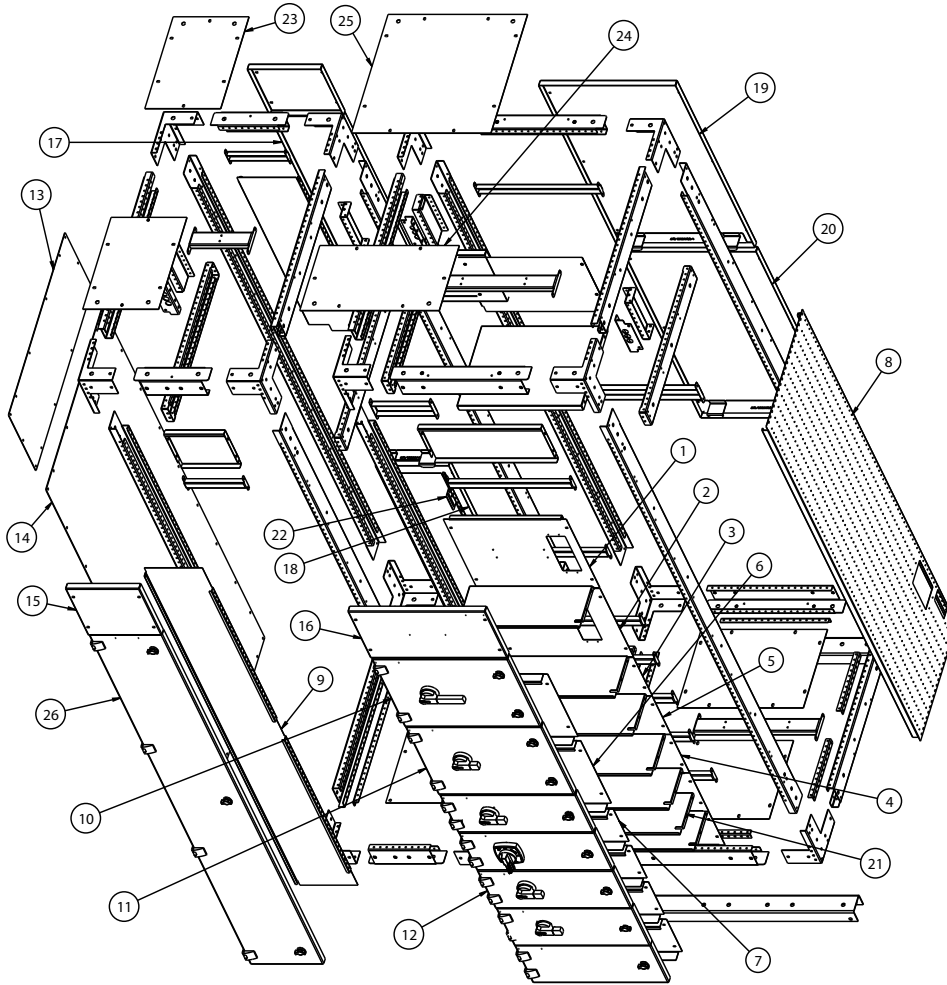


5  
Switchboard

LOCATION	PART IDENTIFICATION	QUANTITY			
1	9890034-1_SD-HRZT-SPT-3-7	4	11	9890040-1_OG_CPM_SPT_BKT_W240	2
2	9890032-3_PIBON-M-B-SPT-3-4C	2	12	9890006-1_BB_CMB_BCK_BKT_W240	1
3	9890032-4_PIBON-M-B-SPT-3-4D	2	13	9890006-2_BB_CMB_BCK_BKT_W490	1
4	9890005-1_OG_T_AD_B_PLT_BKT	1	14	9890026-1_OG_BTM_PLT_3-3	2
5	9890022-1_OG_T_AD_B_PLT_BKT	2	15	9890004-1_BTM-PLT-FOR_BB-CB-3-2	1
6	9890036-1_OG-BTM-PT-BKT_D425	2	16	9890001-1_BACKBARRIER-4-3	1
7	9890024-1_OG-TOP-PT-BKT_W175	4	17	9890002-1_BACKBARRIER_4-4	1
8	9890024-2_OG-TOP-PT-BKT_W375	2	18	9890023-1_O_G_CMPRMT_TP_CVR	1
9	9900057_HRZ_MTL_SPT_H1800	4	19	9890046-1_HRZ_BB_DPT_FRT_W238	1
10	9890040-2_OG_CPM_SPT_BKT_W490	9	20	9890046-2_HRZ_BB_DPT_FRT_W485	1
			21	9890021-1_B B_C H B_B R	2

# MDB Outgoing Frame Complete with Feeder Module Parts

## EXPLODED ISOMETRIC VIEW


**5**
**Switchboard**

LOCATION	PART IDENTIFICATION	QUANTITY
1	9890081-1_O_B_P_GE-FG630A_H400	1
2	9890082-2_O_B_P_FTCK400A_H400	1
3	9890081-2_O_B_P_GE-FE250A_H220	1
4	9890081-3_O_B_P_GE-FD160A_H220	1
5	9890082-3_O_B_P_FTCJ250A_H220	1
6	9890084-1_DPH_FRT _CVR_630A-400A	2
7	9890084-2_DPH_FRT _CVR_250A-160A	4
8	9890090-1_INTR-SD-BARR_D545	1
9	9890007-2 BB CMB_BARR-B	1
10	9890096-0_DOOR_GEGF630_H395_ASY	1
11	9890097-0_DOOR_FTCK400_H395_ASY	1
12	9890100-0_DOOR_GE-FTM_160A_ASY	2
13	9890031-1_SIDE-CVR-6-7	1

LOCATION	PART IDENTIFICATION	QUANTITY
14	9890031-2_SIDE-CVR-6-8	1
15	9890012-1 BB-CMB- T -F-N-R-CR-6-4	2
16	9890035-1_TP-FR-N-RE-CVR-6-1	1
17	9890051-0_BB-CMB-BK-CVR-6-5_WLD	1
18	9890052-0_BB-CMB-BK-CVR-6-6_WLD	1
19	9890053-0_OG-BCK-CVR-6-2_ WLD	1
20	9890054-0_OG-BCK-CVR-6-3_ WLD	1
21	9890045-2_OG OPT PL T D195-B	7
22	9890059_BKT_DR_LCK	12
23	9890011-1 BB-CMB-TOP-CVR-7-3	2
24	9890029-1 OG TOP-CVR-7-1	1
25	9890029-2_OG TOP-CVR-7-2	1
26	9890101-0_BB_CMB_FRT _DR_ASY	1

# Switchgear & ControlGear System

Westinghouse provides an extensive low voltage electrical equipment package to cover most applications. Due to the adaptability of Westinghouse is modular systems, many of the equipment or systems can easily be supplied and integrated in the same enclosure. Westinghouse offers the complete range form packaged sub-stations main boards with nominal ratings from 800A to 6400A. Incoming feeder sections and bus-coupler arrangements are available for rated current up to 6400A. Full flexibility of choice is offered in the selection of electrical equipment with regard to brand, make and type of breakers for fixed, withdrawal, etc. Rating Table- Type- TESTED Range of Assemblies(TTA)\*

## Rating Table- Type-Tested Range of Assemblies (TTA)\*



All Westinghouse L.V. Switchgear has been fully type- tested according to specifications and requirements of latest IEC 61439-1 & 2.it conforms to major markets specification in the world.



# Switchgear & ControlGear System

The following tests have been successfully carried out at independent test laboratories by ASTA & KEMA.

Further specific tests are also performed and verified by local testing body like PSB (Productivity and Standards Board of Singapore) for some local installations:

- Verification of temperature-rise limits
- Verification of dielectric properties
- Verification of short-circuit withstand strength
- Verification of the effectiveness of protective circuit
- Verification of the clearances and creepage distances
- Verification of mechanical operation
- Verification of degree of protection
- Verification of electromagnetic compatibility
- Verification of the resistance of insulating material to abnormal heat and fire

The busbar system and its operating temperature is designed and tested for below 80 degree temp rise i.e. 80K for both vertical and horizontal placements of breakers in both direct and reverse feeding, and ingress protection up to IP43, for FDB, SMDB, IP54 for MDB.

complete Switchgear is certified for electromagnetic compatibility by ASTA & KEMA certification services.

## Rating Table-Tested Range of Assemblies (TTA)\*

Rated current	Short time withstand (Icw)	Configuration
800 Amp	50/1 secs	Single support
1250 Amp	50/1 secs	Single support
1600 Amp	50 / 3 secs and 80/1 secs	Single support
2000 Amp	65/1 secs	Single support
2500 Amp	65/3 secs	Single support
3200 Amp	80/1 secs	Single support
4000 Amp	80/1 secs	Single support
5000 Amp	100/1 secs	Single support
6400 Amp	100/1 secs	Single support

\*Updated at the time of publication. Please contact us for an updated list.

### Busbar

Tinned copper with 100% full-sized neutral (no matt-black copper is used within board)

### Finishing

Powder coated texture finishing to RAL 7032 (light beige). A wide choice of colours is also available upon request.

### Forms of Separation

Form 2, 3 & 4 constructions up to Form 4 - Type 7-

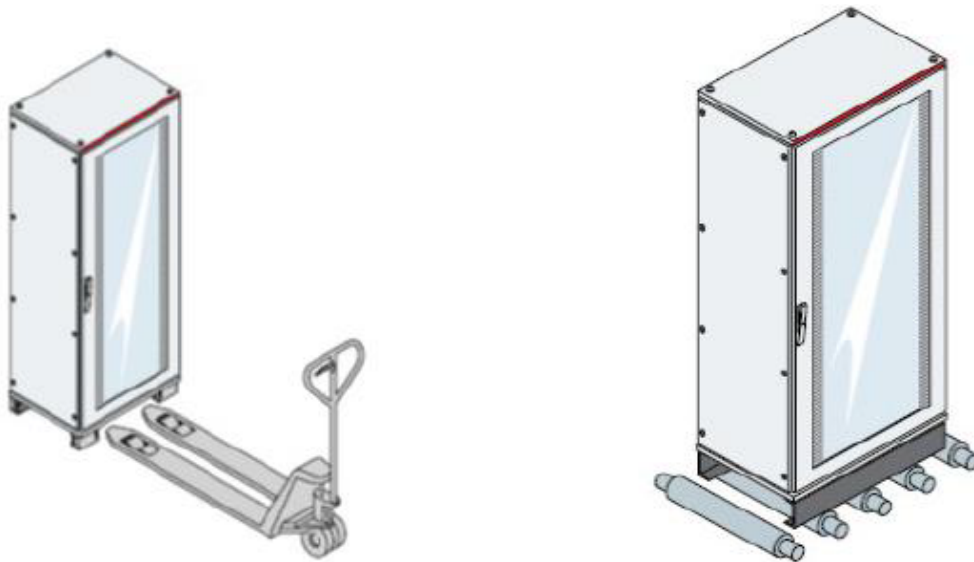
### Entry

Top and bottom cable and busduct entry with removable cable entry gland plates or insulated boards.

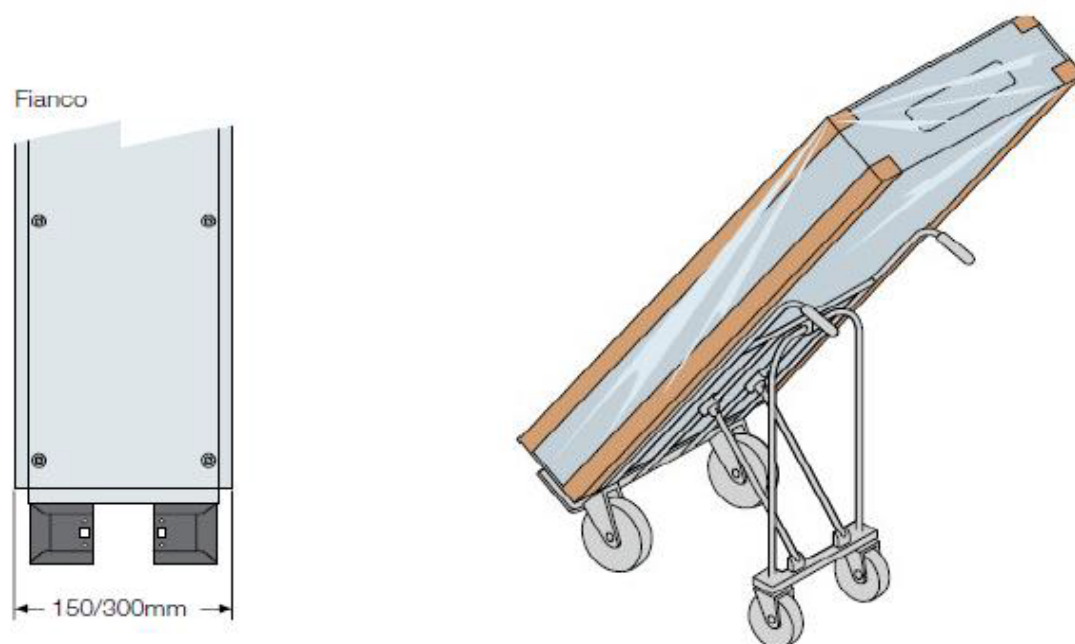
## HANDLING AND INSTALLATION

### Handling

- Handling the structures by rollers. It is applicable only with plinths.

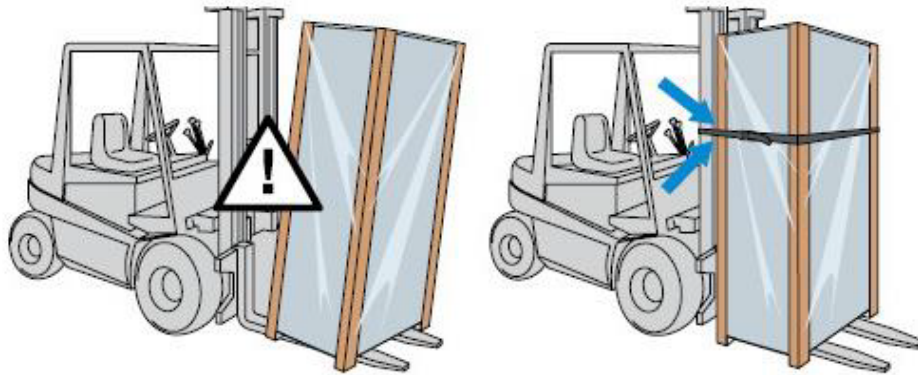


- For the panels which has depth up to 250 mm, following type handling is recommended:

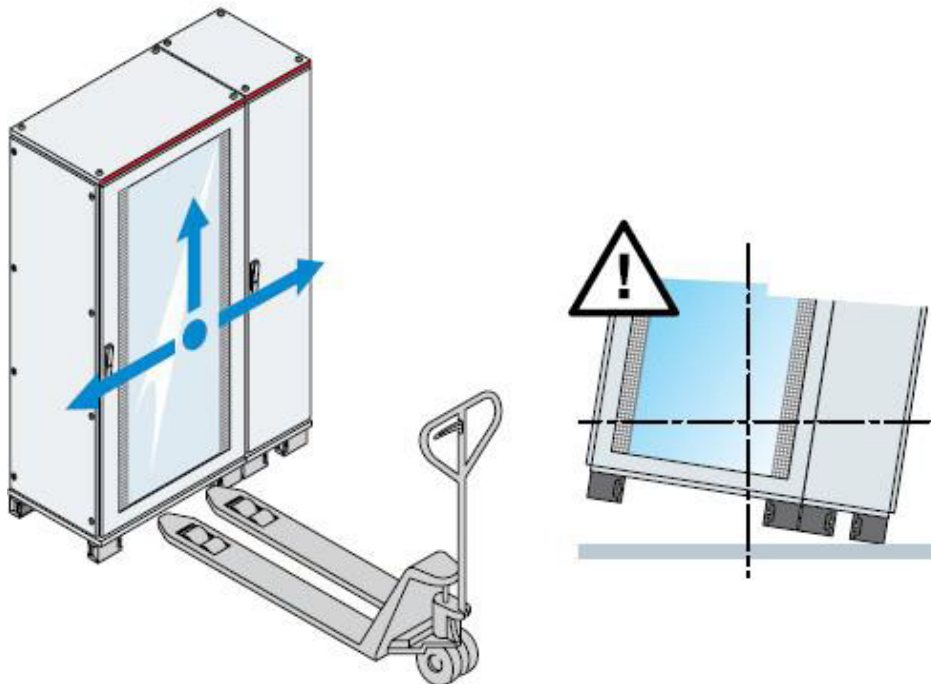




- During transport with a forklift it is advisable to tie the panel with rope.

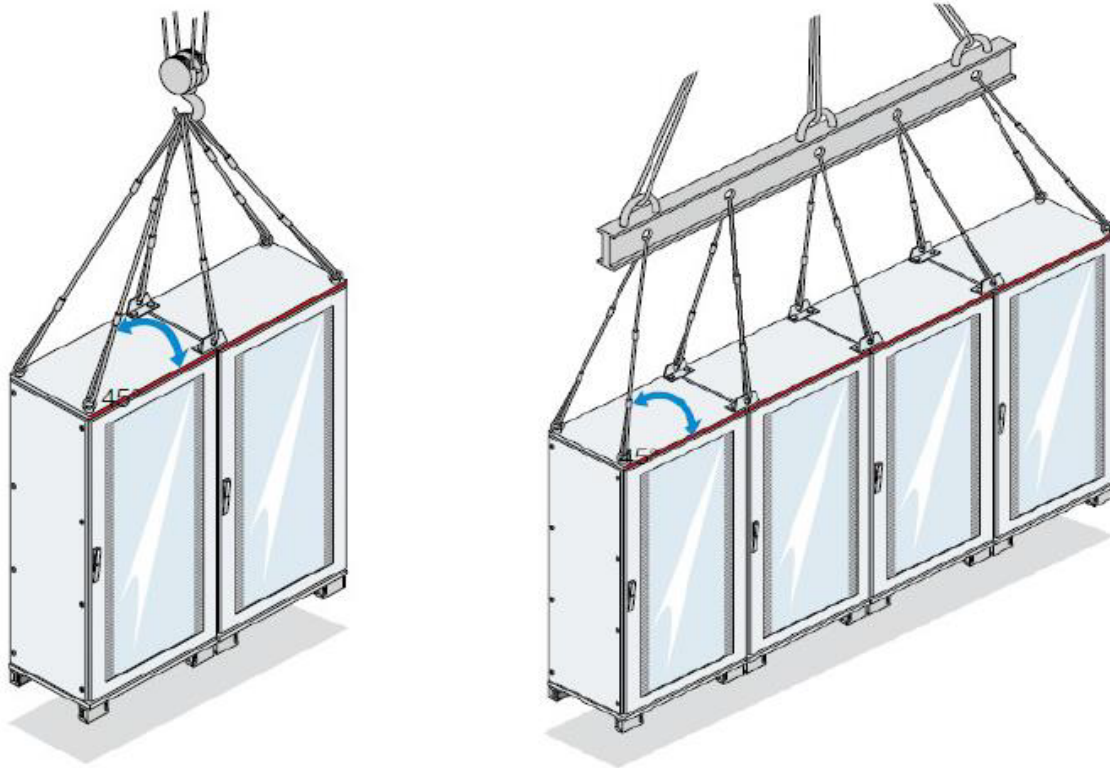


- For the structures with busbar compartment, check the center of gravity before handling.



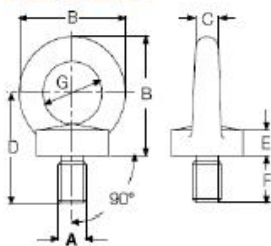
### Handling with Crane

- Handle using a crane, check the following conditions before lifting the panel.
- Excellent positioning of the ropes or chains;
- The angle between the lifting ropes and the panel roof must be  $\geq 45^\circ$ ;
- Maximum 3 columns can be transported
- While handling several columns side by side above conditions must be applied



DIN 580 Standard regarding mechanical connection elements (only for lifting eyebolts)

#### Lifting eyebolts



#### Lifting reinforcements

