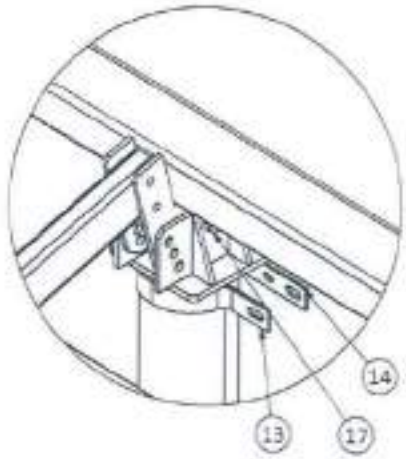
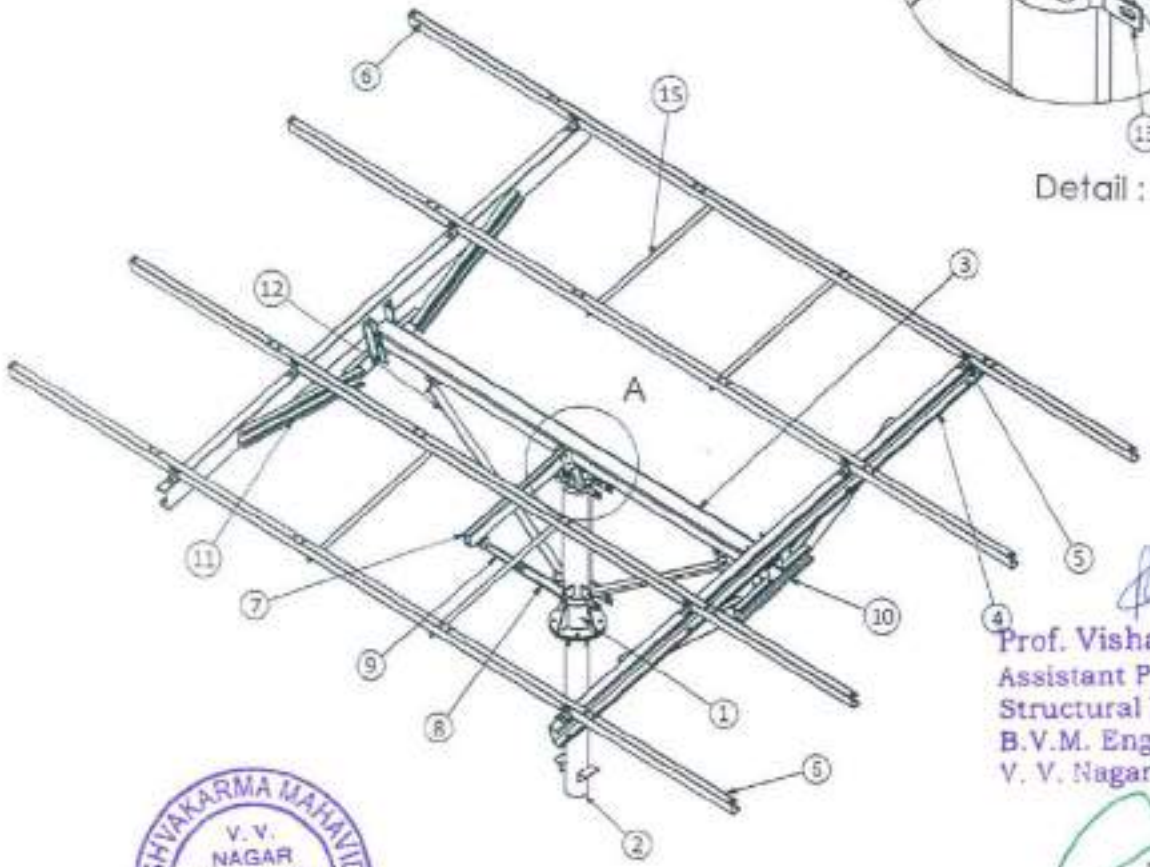
10 MMS Structure



Detail : A



Sr. nos.	Descriptions	Qty.
1	Main column	1
2	Bottom column	1
3	Center beam assly.	1
4	Rafter	2
5	Purlin clit	8
6	Purlin	4
7	North south brancing	1
8	Front tilt support bottom	1
9	Front tilt support top	1
10	Rafter bracing holder	2
11	Rafter bracing	4
12	Bracing center beam	2
13	Controller clamp- rear	2
14	Controller clamp- front	2
15	Sag angle	4
16	Rubber pad	1
17	Center pin	1

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V. V. NAGAR
PIN-388120
DIST. ANAND.

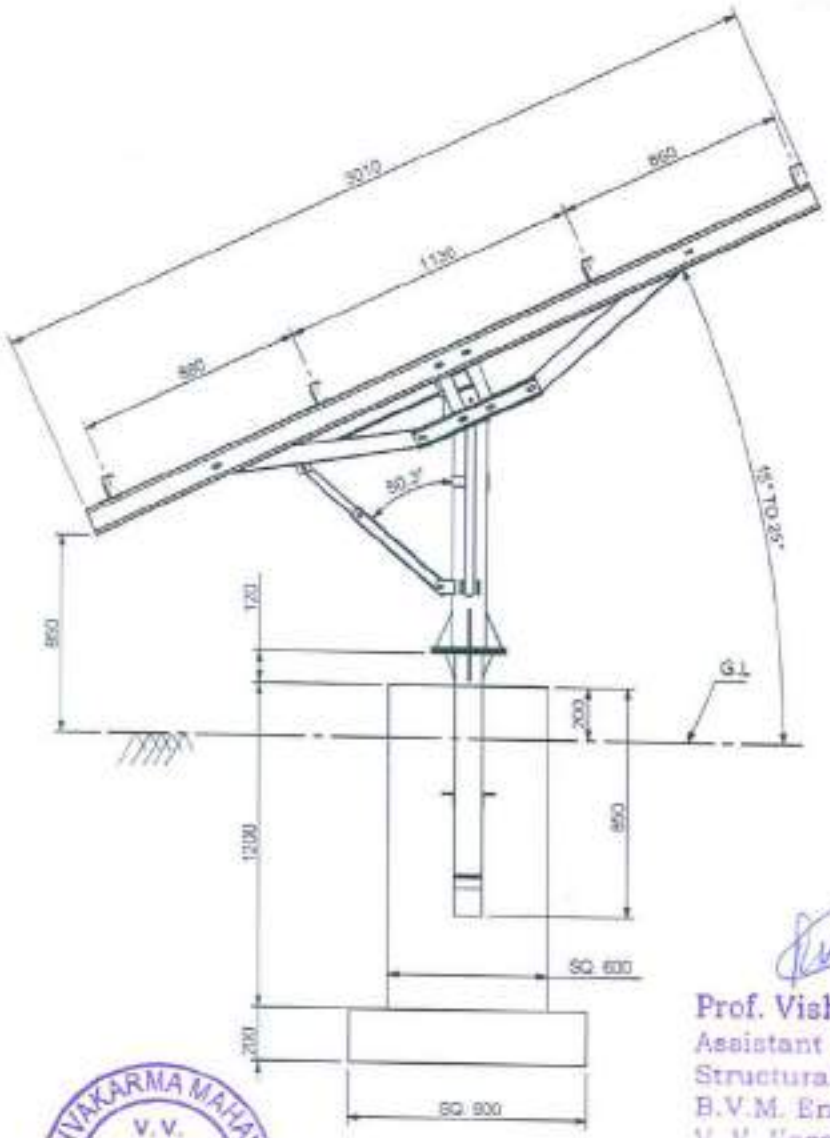
Notes : 1) MS HD Galvanizing according to IS 4759 for all parts, wherever applicable.
2) All dimensions are in mm.

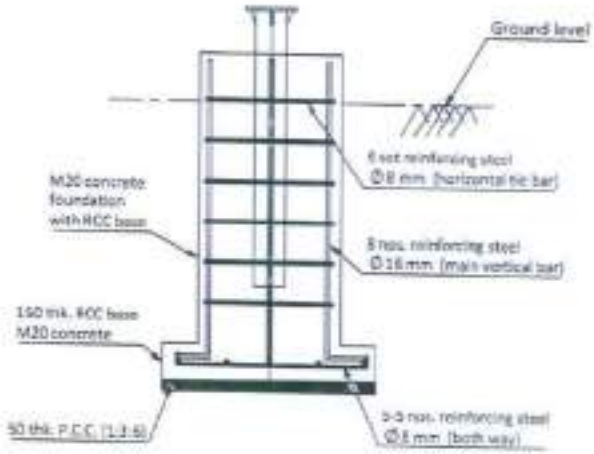
PART NO.	-		TITLE	10 nos. Module mounting structure	
DRN BY	Faiz		07.02.20	SCALE 1:100	DRG. NO. SMP-SM-1217 (Sheet 1 of 16)
CHD BY	Faiz		-		
APPD BY	D.R.P.		-		

SUPERSEDES NO :

FORMAT ISO A4

Type text he





Foundation Detail

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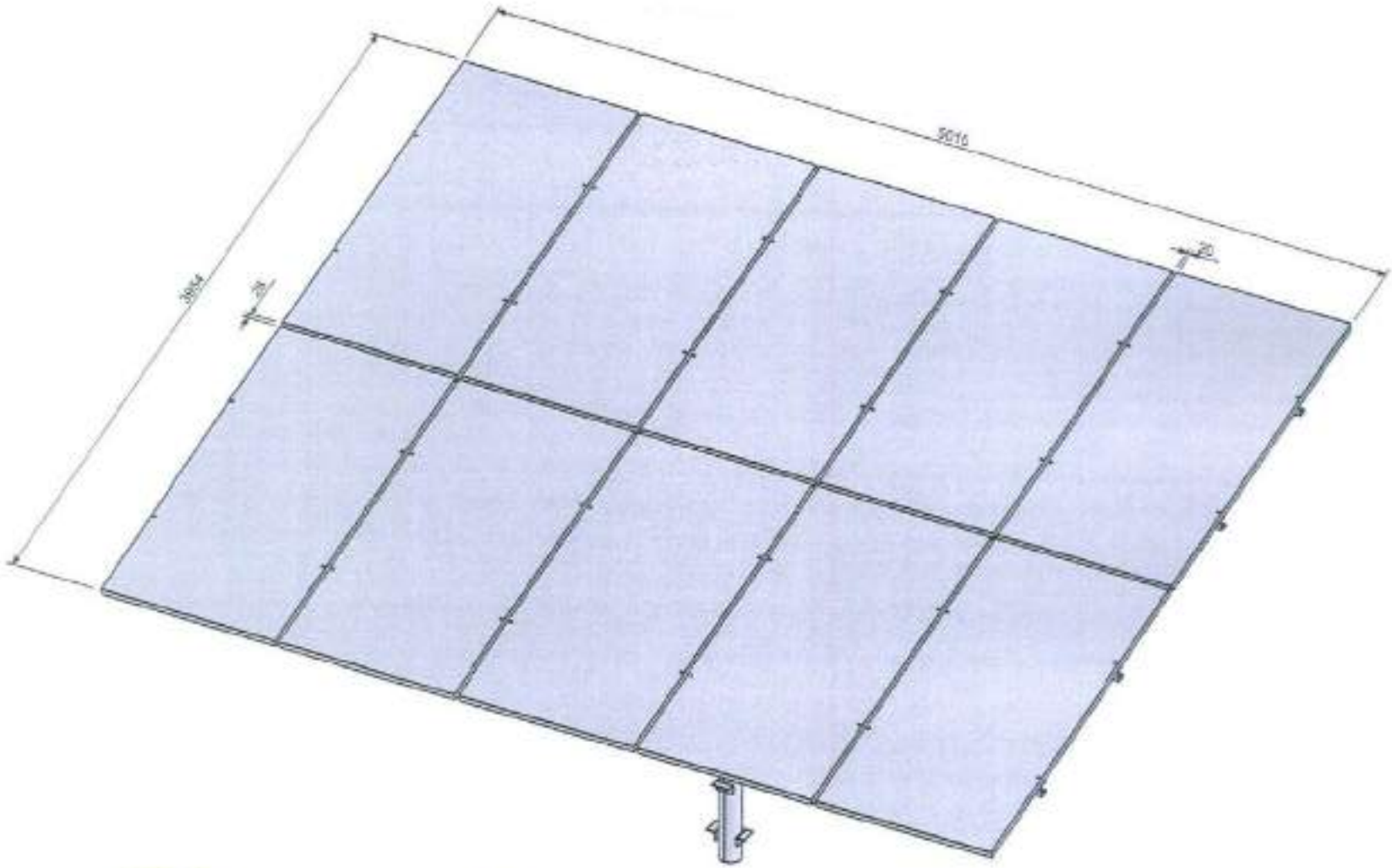
PART NO. -	TITLE 10 nos. Module mounting structure				
DRN BY	Faiz	07.02.20	SCALE 1:100	DRG. NO. SMP-SM-1217 (Sheet 2 of 16)	
CHD BY	Faiz				
APPD BY	D.R.P.				
SUPERSEDES NO :					

FORMAT ISO A4(R)



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PART NO. -	TITLE 10 nos. Module mounting structure				
DRN BY	Faiz		07.02.20	SCALE 1:100	DRG. NO. SMP-SM-1217 (Sheet 3 of 16)
CHD BY	Faiz		-		
APPD BY	D.R.P.		-		
SUPERSEDES NO :					

FORMAT ISO A4T1

Item list of 10nos. MMS

Sr. nos.	Descriptions	Qty.	Total weight (kgs.)	Material Grade	Reference standards
1	Main column	1	26.86	E250	IS:1161 & IS 2062
2	Bottom column	1	17.36		IS:1161, IS 2062 & IS:808
3	Center beam assly.	1	40.9		IS:4923, IS:2062 & IS:808
4	Rafter	2	37.5	E350	IS:2062 & IS:811
5	Purlin clit	8	2.16		IS:2062
6	Purlin	4	51.3		IS:2062 & IS:811
7	North south brancing	1	3.52	E250	IS:4923
8	Front tilt support bottom	1	1.83		
9	Front tilt support top	1	1.31		
10	Rafter bracing holder	2	4.61	E350	IS:2062 & IS:811
11	Rafter bracing	4	15.55		
12	Bracing center beam	2	5.69	E250	IS:1161
13	Controller clamp- rear	2	1.00		IS:2062
14	Controller clamp- front	2	0.88		
15	Sag angle	4	5.76	---	---
16	Rubber pad	1	---	---	---
17	Center pin	1	---	---	---
	Approx. total weight.		216.2		
	Galvanizing -7 %		15.14		IS 4759
1	M16x60 bolt with 1-nut & 2-palin washer	4	7.5	8.8 GI	IS : 1364
2	M12x115 bolt with 1-nut & 2-palin washer	1			
3	M10x100 bolt with 1-nut & 2-palin washer	13			
4	M12x35 bolt with 1-nut & 2-palin washer	16			
5	M10x130 bolt with 1-nut & 2-palin washer	4			
6	M10x30 bolt with 1-nut & 2-palin washer	24			
7	Center Pin (EN9)	1			
8	Cotter pin for ∅ 8mmx50 long	1			
9	M6X25 Anti theft nut bolt, SS-304 (HeadOD ∅ 15 mm)	40			
	Approx. total weight of the structure		238.84	---	---

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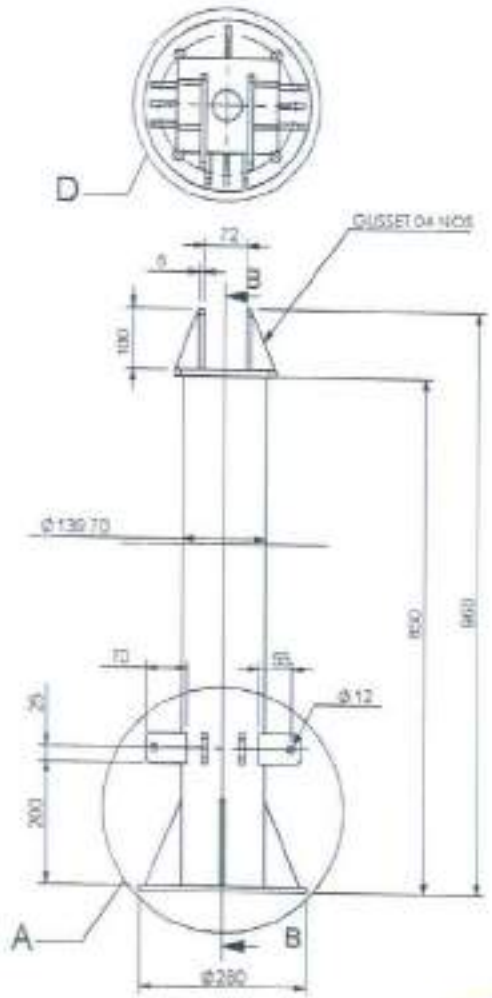
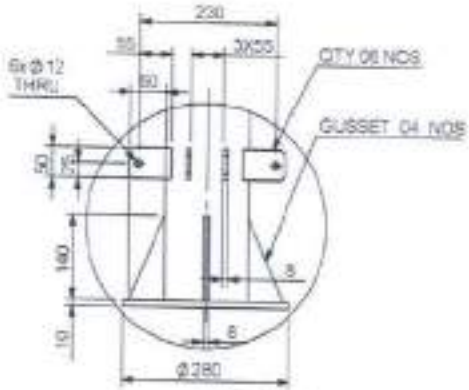
Solar Energy Lab, V. U. Nagar

PART NO	TITLE 10 nos. Module mounting structure			
-				
DRN BY	Faiz	07.02.20	SCALE	DRG. NO
CHD BY	Faiz	-	1:100	SMP-SM-1217 (Sheet 4 of 16)
APPD BY	D.R.P.	-		
		SUPERSEDES NO :-		

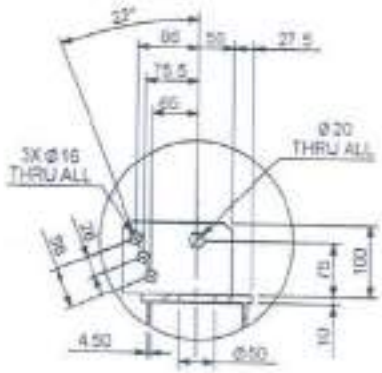
Type text here

1) Main column

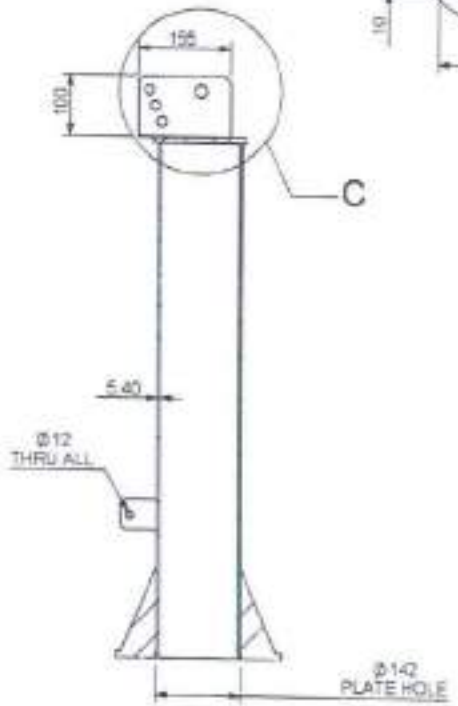




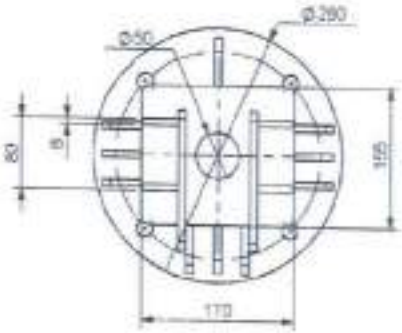
DETAIL A
SCALE 1 : 12



DETAIL C
SCALE 1 : 10



SECTION B-B
SCALE 1 : 12



DETAIL D
SCALE 1 : 8

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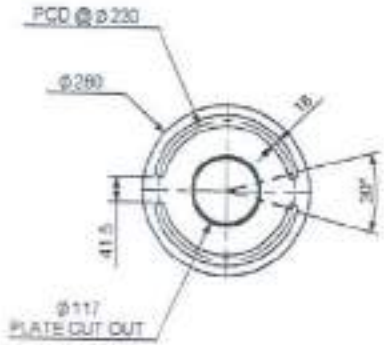
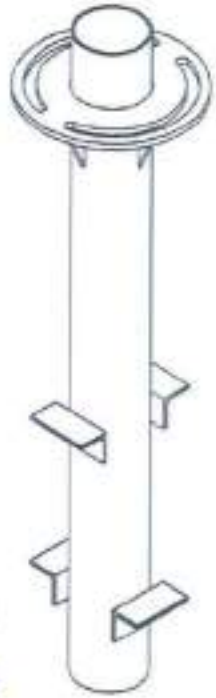
PART NO.		TITLE	10 nos. Module mounting structure		
DRN BY	Faiz	07.02.20	SCALE 1:100	DRG. NO	SMP-SM-1217 (Sheet 5 of 16)
CHD BY	Faiz	-			
APPD BY	D.R.P.	-			
SUPERSEDES NO :					

FORMAT ISO A4

2) Bottom column



SECTION A-A
SCALE 1 : 12



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Assistant Professor
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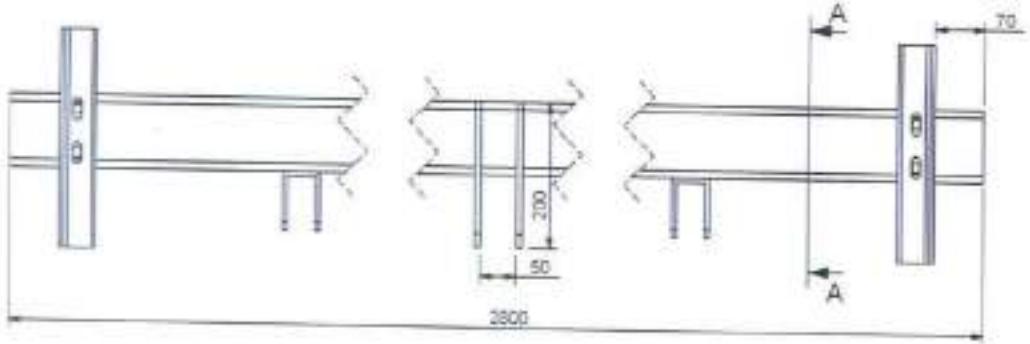
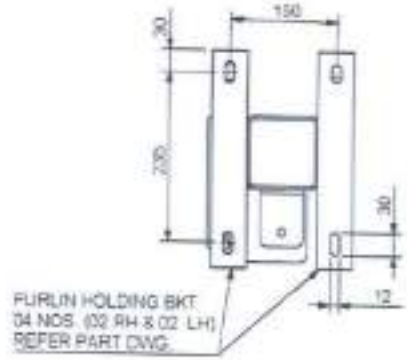
PART NO. -			TITLE 10 nos. Module mounting structure		
DRN BY	Faiz		07.02.20	SCALE 1:100	DRG. NO. SMP-SM-1217 (Sheet 6 of 16)
CHD BY	Faiz		-		
APPD BY	D.R.P.		-		
SUPERSEDES NO :					

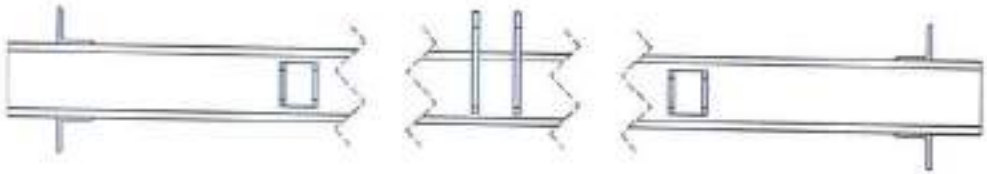
FORMAT ISO A4

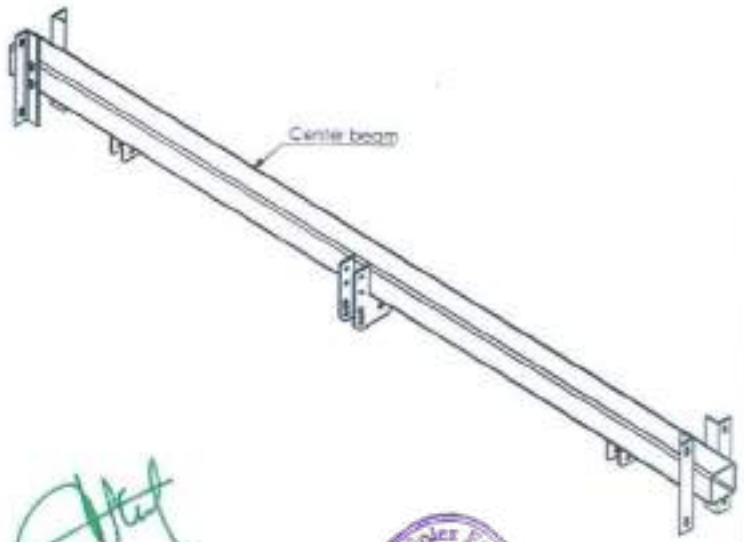
Type text he

3) Center beam assly.









SECTION A-A
SCALE 1 : 10

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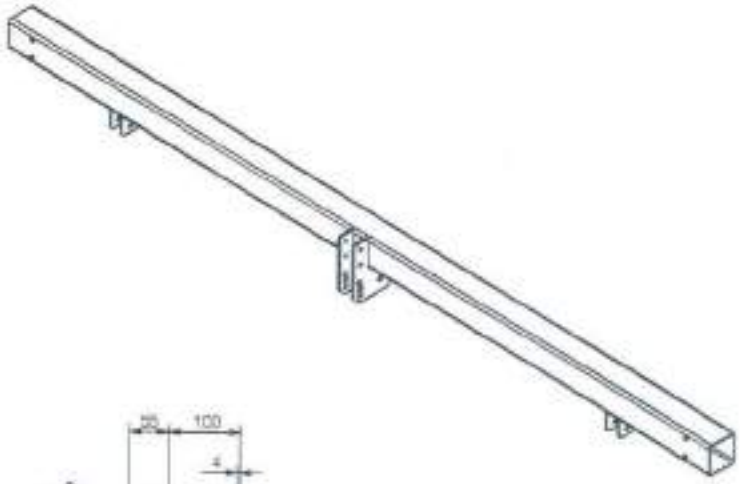
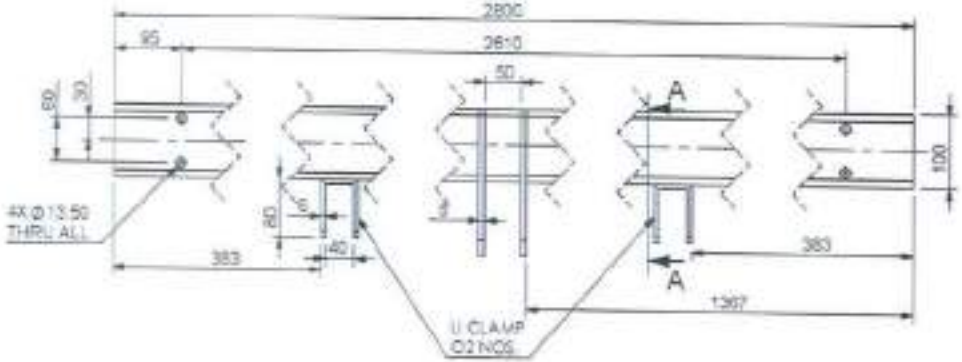
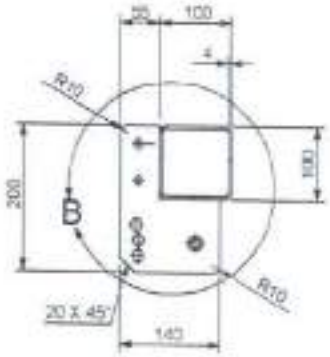
PART NO. -			TITLE : 10 nos. Module mounting structure		
DRN BY	Faiz		07.02.20	SCALE 1:100	DRG. NO. SMP-SM-1217 (Sheet 7 of 10)
CHD BY	Faiz		-		
APPD BY	D.R.P.		-		
			SUPERSEDES NO :-		

FORMAT ISO A4 T1

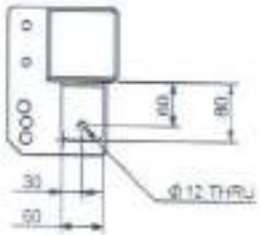
3) Center beam

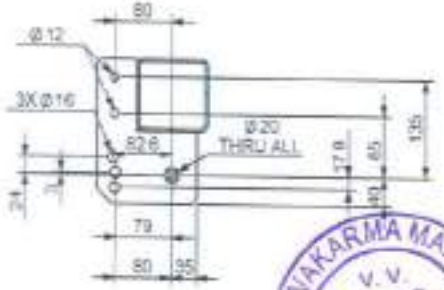






SECTION A-A
SCALE 1 : 10





DETAIL B
SCALE 1 : 10

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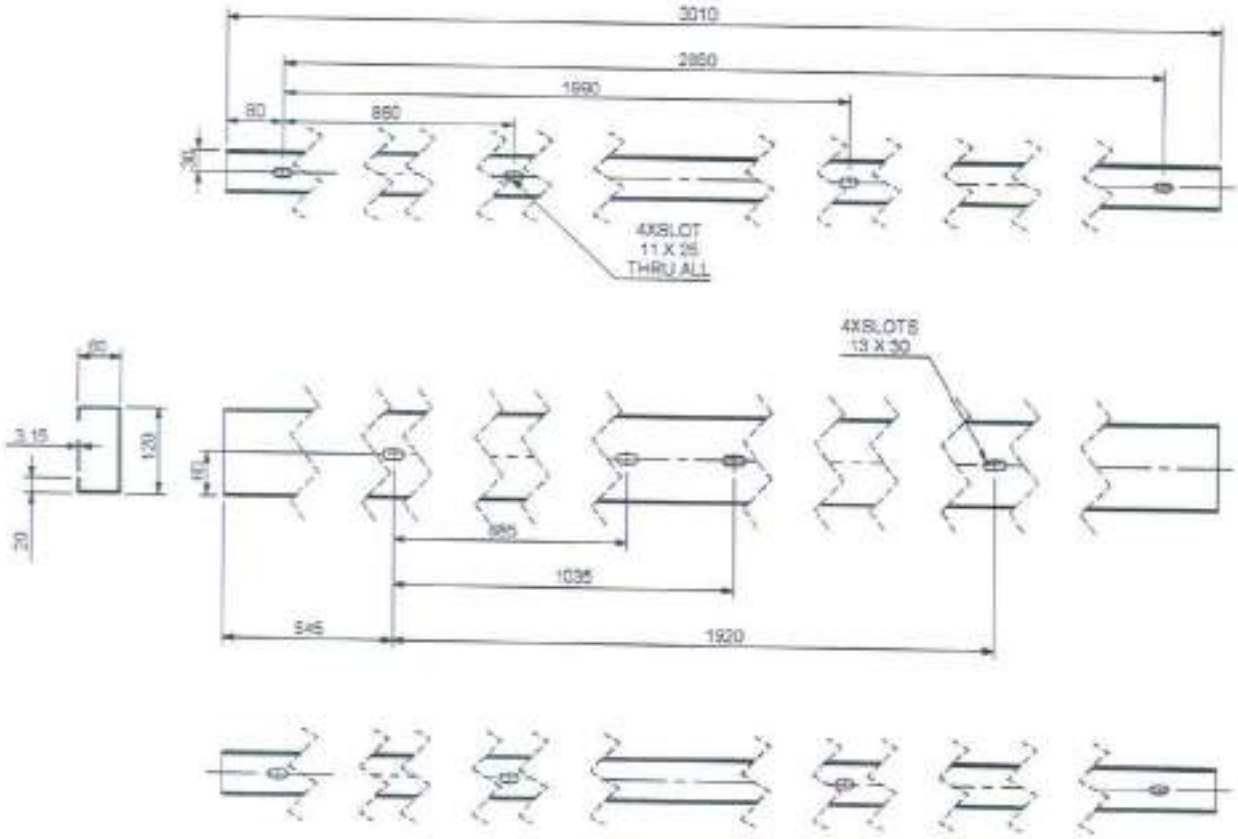
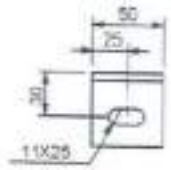
PART NO. -		TITLE 10 nos. Module mounting structure			
DRN BY	Faiz		07.02.20	SCALE 1:100	DRG. NO. SMP-SM-1217 (Sheet 8 of 16)
CHD BY	Faiz		-		
APPD BY	D.R.P.		-		
SUPERSEDES NO :-					

FORMAT ISO A4/T1

4) Rafter



5) Purlin clit



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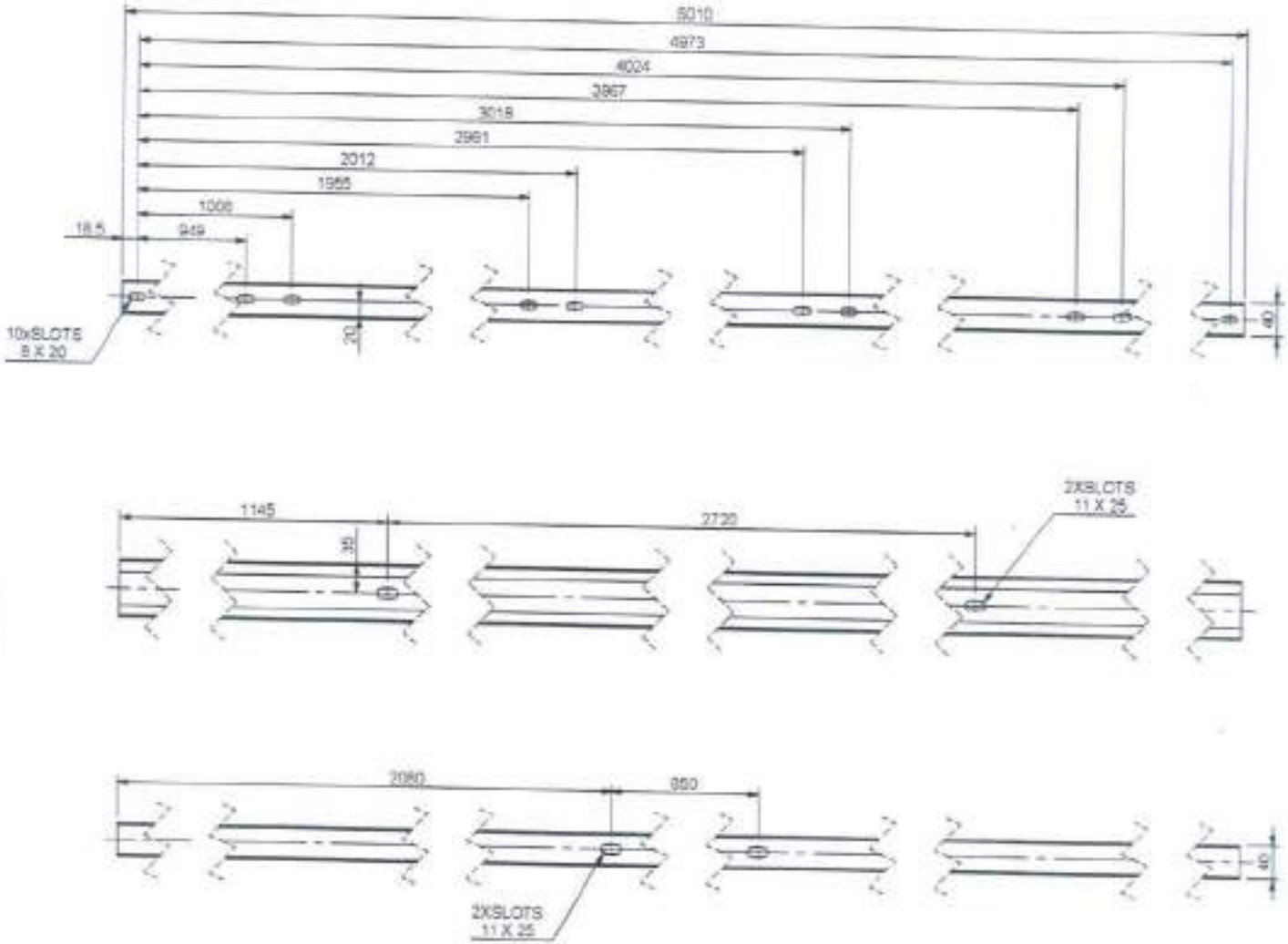
PART NO. -	TITLE 10 nos. Module mounting structure				
DRN BY	Faiz		07.02.20	SCALE 1:100	DRG. NO. SMP-SM-1217 (Sheet 9 of 15)
CHD BY	Faiz		-		
APPD BY	D.R.P.		-		
			SUPERSEDES NO :		

FORMAT ISO A4

6) Purlin



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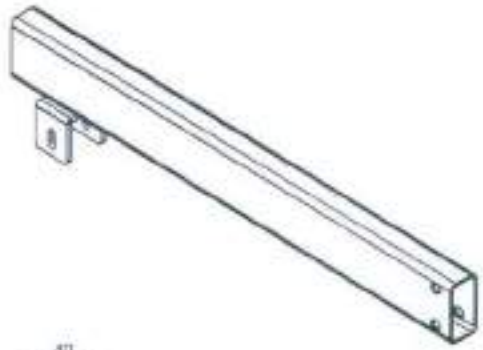
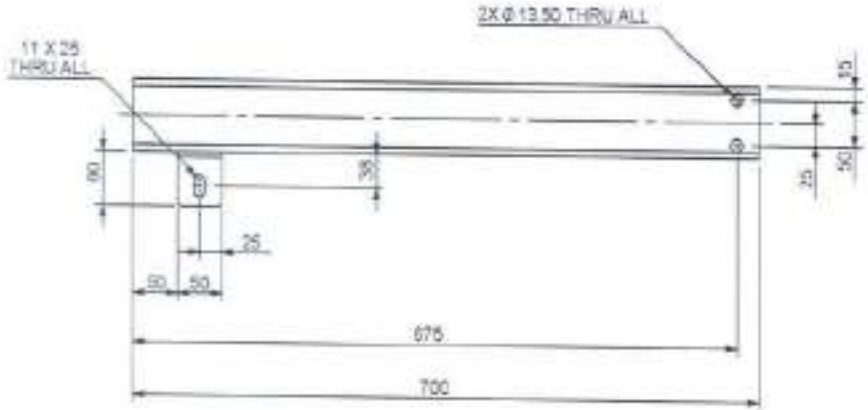
PART NO. -				REV.	10 nos. Module mounting structure
DRN BY	Faiz			SCALE	DRG. NO.
CHD BY	Faiz		-	1:1	SMP-SM-1217
APPD BY	D.R.P.		-		(Sheet 10 of 16)
SUPERSEDES NO :					

FORMAT ISO A4T1

Type text here

7) North south brancing





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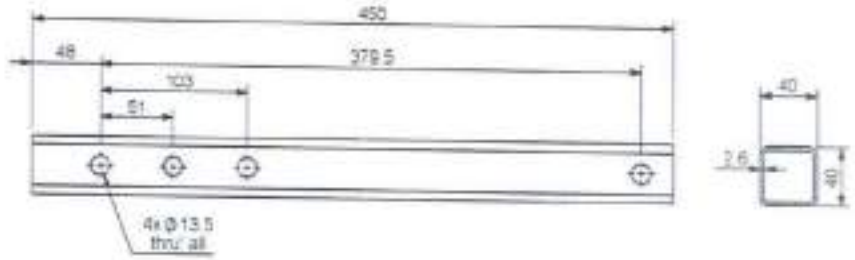
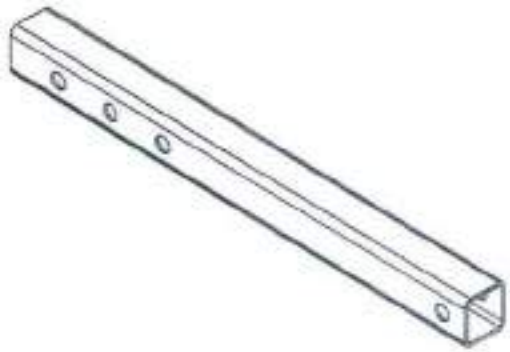
PART NO.		TITLE	10 nos. Module mounting structure		
DRN BY	Faiz	07.02.20	SCALE	DRG. NO.	
CHD BY	Faiz	-	1:100	SMP-SM-1217	
APPD BY	D.R.P.	-		(Sheet 11 of 16)	
		SUPERSEDES NO :			

FORMAT ISO A4(T)

8) Front tilt Support bottom

9) Front tilt Support top





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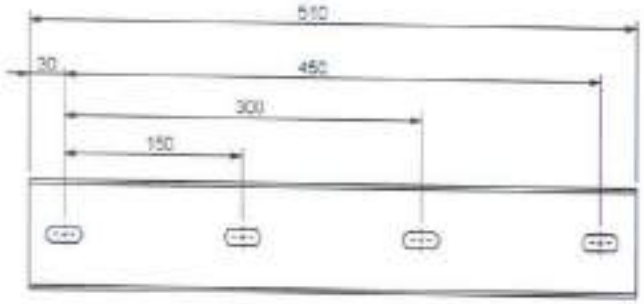
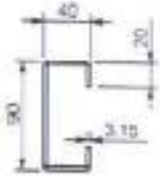
PART NO.	-		TITLE	10 nos. Module mounting structure	
DRN BY	Faiz	07.02.20	SCALE	1:5	DRG. NO. SMP-SM-1217 (Sheet 12 of 18)
CHD BY	Faiz	-			
APPD BY	D.R.P.	-			
SUPERSEDES NO :-					

FORMAT ISO A4

10) Rafter bracing holder





11) Rafter bracing

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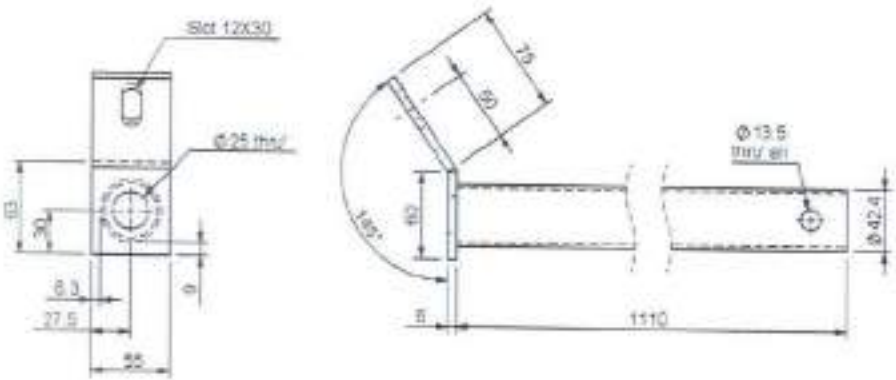
V. V. Nagar-388120

PART NO.	-	TITLE	10 nos. Module mounting structure		
DRN BY	Faiz	DATE	07.02.20	SCALE	1:10
CHD BY	Faiz		-		DRG. NO. SMP-SM-1217
APPD BY	D.R.P.		-		(Sheet 13 of 16)
SUPERSEDES NO :					

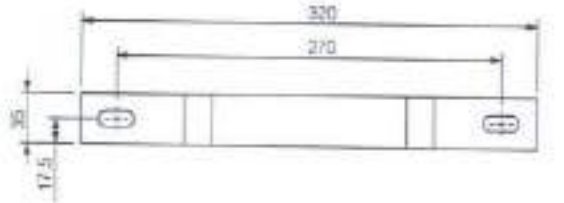
FORMAT ISO A4(1)

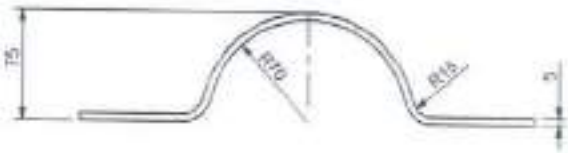
Type text here

12) Bracing center beam



13) Controller clamp - rear





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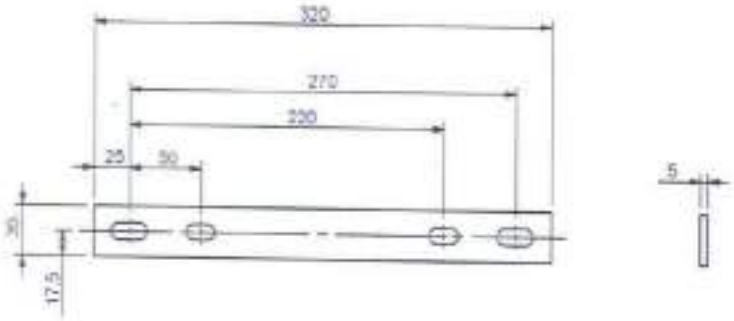
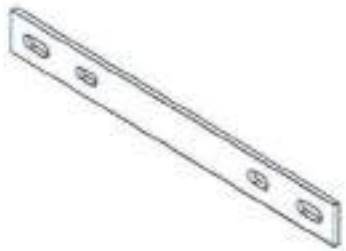
V.V.N.

PART NO. -				For 10 nos. Module mounting structure	
DRN BY	Faiz		07.02.20	SCALE 1:10	DRG. NO. SMP-SM-1217 (Sheet 14 of 16)
CHD BY	Faiz				
APPD BY	D.R.P.		-		
SUPERSEDES NO :					

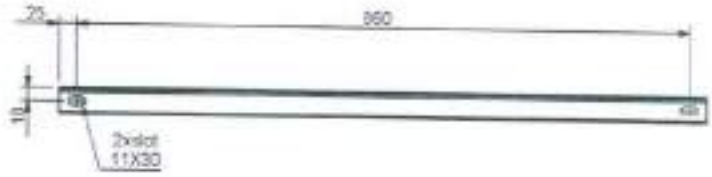
FORMAT ISO A4(T)

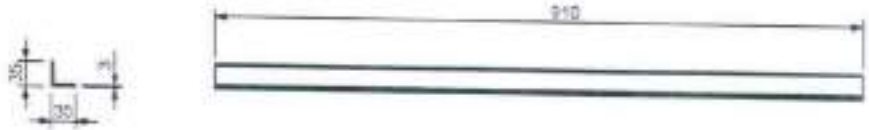
14) Controller clamp - Front





15) Sag angle





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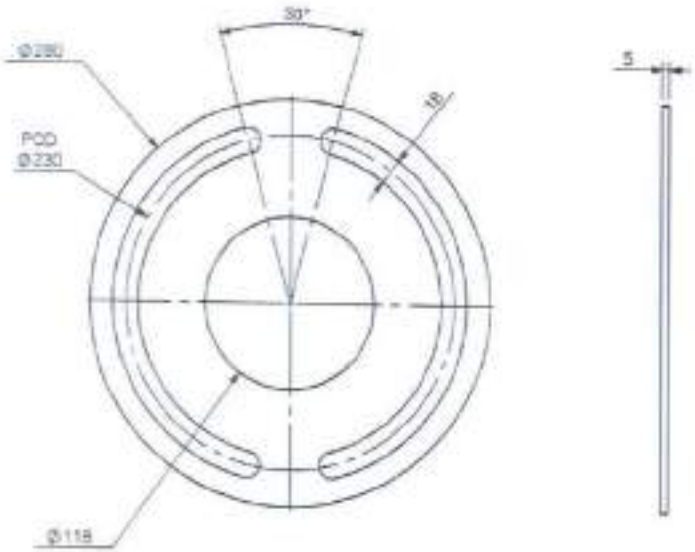
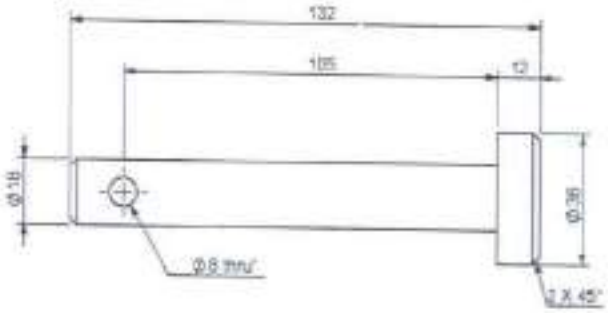
PART NO. -			TITLE: 10 nos. Module mounting structure		
DRN BY	Faiz		07.02.20	SCALE 1:2	DRG. NO. SMP-SM-1217 (Sheet 15 of 16)
CHD BY	Faiz		-		
APPD BY	D.R.P.		-		
			SUPERSEDES NO :		

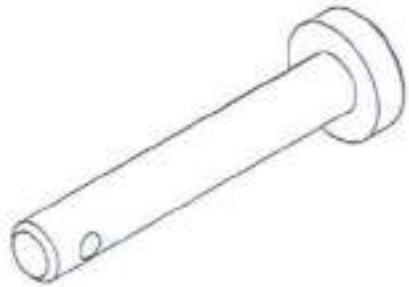
FORMAT ISO A4T

16) Rubber pad



17) Center pin





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PART NO. -	TITLE 10 nos. Module mounting structure			
DRN BY	Faiz	DATE 07.02.20	SCALE 1:5	DRG. NO. SMP-SM-1217 (Sheet 16 of 16)
CHD BY	Faiz			
APPD BY	D.R.P.			
SUPERSEDES NO :-				

FORMAT ISO 4TH

10'MMS

PROJECT :-					
DOCMENT TITLE :-	SOLAR MODULE MOUNTING STRUCTURE INPUT DESIGN CALCULATIONS FOR STAAD (TILT ANGLE-25 DEGREE)				
CLIENT :-					
DOC NO :-	DESIGNED BY:-	CHECKED BY:-	APPROVED BY:-	DATE	REVISION
******	HIMANSHU SINGH			26.02.2020	0

Dead Load Calculations:-					
Length of Module	Lm=	1955	mm	1.955	m
Width of Module	Bm=	990	mm	0.99	m
Thickness of Module	Tm=	40	mm	0.04	m
Weight of each Module	Wm=	22.5	Kg		
No. of Modules	=	10	Nos		
Total Weight of Modules	=	225	Kg		
No. of Purlins	=	4	Nos		
Load on each Purlin	=	56.250	Kg		
Length of each Purlin	=	5.01	m		
UDL Load per metre on Purlin	=	11.23	Kg/m	0.110	kN/m
Wind Load Calculations as per IS:875 Part-3 2015 :-					
Wind Speed (Kmph)	Vb=	155	Kmph		
Basic Wind Speed	Vb=	43.06	m/sec		
Risk Coefficient	K1=	0.91		As per Table - 1 Clause 6.3.1(25 Years)	
Terrain Roughness & Height Factor	K2=	1		As per Table - 2, Terrain Category 2, class A,Height 10 m	
Topography Factor	K3=	1		As per Clause 6.3.3	
Importance Factor	K4=	1		As per Clause 6.3.4	
Design Wind Speed	Vz=	39.18	m/s	As per Clause 6.3	
Wind Pressure	Pz=	0.92	kN/m2	As per Clause 7.2	
Wind Directionally Factor	Kd=	0.9		As per Clause 7.2.1	
Area Averaging Factor	Ka=	0.96		As per Table - 4 Clause 7.2.2	
Combination Factor	Kc=	1		As per Clause 7.3.3.13	
Design Wind Pressure	Pd=	0.80	kN/m2	As per Clause 7.2	
Tilt Angle	=	25	Degree	As per Table - 8	
	Case 1				
Tilt Angle	25				
Pressure Coefficient Cf max	1				As per Table - 8
Pressure Coefficient Cf min	-1.6				As per Table - 8
Wind Pressure Downward	0.80				kN/m2
Wind Suction Upward	-1.27				kN/m2
Wind Suction Upward					
Area of Module	=	1.94	m2		
Tilt Angle	=	Case 1			
Wind Pressure Upward	=	-1.27	kN/m2		
Wind Load on each PV Module	=	-2.46	KN		
Total Wind Load on 10 Module	=	-24.64	KN		
Load on each Purlin	=	-6.16	KN		
UDL Load per metre on Purlin	=	-1.230	KN/m		
Wind Pressure Downward					
Wind Pressure Downward	=	0.80	kN/m2		
Wind Load on each PV Module	=	1.54	KN		
Total Wind Load on 10 Module	=	15.40	KN		
Load on each Purlin	=	3.85	KN		
UDL Load per metre on Purlin	=	0.769	KN/m		
Wind Load on Solar Frame Structure					
Pressure Co-efficient - Members	=	1.2		As per Table - 26 For C-Section	
Wind Pressure on Member	=	0.955	kN/m2		
Assuming Column Member Size	=	PIPE 139L			
Column Member Dia	=	139	mm		
Column Member Dia	=	139	mm		
Wind Load on Column	Ucc=	0.133	kN/m		
Wind Load on Column	Ucc=	0.133	kN/m		
Assuming Rafter Member Size	=	[illegible]			
Rafter Member Depth	=	120	mm		
Rafter Member Width	=	60	mm		
Wind Load on Rafter	Ur=	0.115	kN/m		
	Ur=	0.057	kN/m		
Assuming Bracket Member Size	=	HFL 42(OD)			
Bracing Member Depth	=	42	mm		
Bracing Member Width	=	42	mm		
Wind Load on Bracing	Ub=	0.040	kN/m		

Energy Ltd. V.U. Nagar

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10 MMS

PROJECT :-					
DOCMENT TITLE :-	SOLAR MODULE MOUNTING STRUCTURE INPUT DESIGN CALCULATIONS FOR STAAD (TILT ANGLE-25 DEGREE)				
CLIENT :-					
DOC NO :-	DESIGNED BY:-	CHECKED BY:-	APPROVED BY:-	DATE	REVISION
******	HIMANSHU SINGH			26.02.2018	0

Dead Load Calculations:-					
Length of Module	Lm=	1955	mm	1.955	m
Width of Module	Bm=	990	mm	0.99	m
Thickness of Module	Tm=	40	mm	0.04	m
Weight of each Module	Wm=	22.5	Kg		
No. of Modules	=	10	Nos		
Total Weight of Modules	=	225	Kg		
No. of Purlins	=	4	Nos		
Load on each Purlin	=	56.250	Kg		
Length of each Purlin	=	5.03	m		
UDL Load per metre on Purlin	=	11.23	Kg/m	0.110	kN/m
Wind Load Calculations as per IS:875 Part-3 2015 :-					
Wind Speed (Kmph)	Vb=	155	Kmph		
Basic Wind Speed	Vb=	45.06	m/sec		
Risk Coefficient	K1=	0.91		As per Table - 1 Clause 6.3.1(25 Years)	
Terrain Roughness & Height Factor	K2=	1		As per Table - 2, Terrain Category 2, class A,Height 10 m	
Topography Factor	K3=	1		As per Clause 6.3.3	
Importance Factor	K4=	1		As per Clause 6.3.4	
Design Wind Speed	Vz=	35.18	m/s	As per Clause 6.3	
Wind Pressure	Pz=	0.92	kN/m2	As per Clause 7.2	
Wind Directionally Factor	Kd=	0.9		As per Clause 7.2.1	
Area Averaging Factor	Ka=	0.96		As per Table - 4 Clause 7.2.2	
Combination Factor	Kc=	1		As per Clause 7.3.3.13	
Design Wind Pressure	Pd=	0.80	kN/m2	As per Clause 7.2	
Tilt Angle	=	25	Degree	As per Table - 8	
	Case 1				
Tilt Angle	25				
Pressure Coefficient Cf max	1				As per Table - 8
Pressure Coefficient Cf min	-1.6				As per Table - 8
Wind Pressure Downward	0.80				kN/m2
Wind Suction Upward	-1.27				kN/m2
Wind Suction Upward					
Area of Module	=	1.94	m2		
Tilt Angle	=	Case 1			
Wind Pressure Upward	=	-1.27	kN/m2		
Wind Load on each PV Module	=	-2.46	KN		
Total Wind Load on 10 Module	=	-24.64	KN		
Load on each Purlin	=	-6.16	KN		
UDL Load per metre on Purlin	=	-1.220	KN/m		
Wind Pressure Downward					
Wind Pressure Downward	=	0.80	kN/m2		
Wind Load on each PV Module	=	1.54	KN		
Total Wind Load on 10 Module	=	15.40	KN		
Load on each Purlin	=	3.85	KN		
UDL Load per metre on Purlin	=	0.769	KN/m		
Wind Load on Solar Frame Structure					
Pressure Co-efficient - Members	=	1.2		As per Table - 26 For C-Section	
Wind Pressure on Members	=	0.935	kN/m2		
Assuming Column Member Size	=	PIPE 139L			
Column Member Dia	=	139	mm		
Column Member Dia	=	139	mm		
Wind Load on Column	Qxz=	0.133	kN/m		
Wind Load on Column	Qxz=	0.133	kN/m		
Assuming Rafter Member Size	=	120X60X3.15			
Rafter Member Depth	=	120	mm		
Rafter Member Width	=	60	mm		
Wind Load on Rafter	Qzz=	0.111	kN/m		
	Qzz=	0.057	kN/m		
Assuming Bracket Member Size	=	PIPE 42400			
Bracing Member Depth	=	42	mm		
Bracing Member Width	=	42	mm		
Wind Load on Bracing	Qzb=	0.041	kN/m		

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