

Sr. nos.	Descriptions	Qty.
1	Main column	1
2	Rotating Plate	1
3	Rotating Clamp	2
4	Center beam assly.	1
5	Rafter	2
6	Purlin clift	8
7	Purlin-front	4
8	North south brancing	1
9	Front tilt support bottom	1
10	Front tilt support top	1
11	Rear tilt support bottom	1
12	Rear tilt support top	1
13	Sq. pipe for rear support	1
14	Angle for rear suppoer	2
15	Flat for raeer support	2
16	Rafter bracing holder	2
17	Rafter bracing	4
18	Bracing center beam	2
19	Controller clamp- rear	2
20	Controller clamp- front	2
21a	Front sag angle	2
21b	Rear sag angle	2
22	Center pin	1

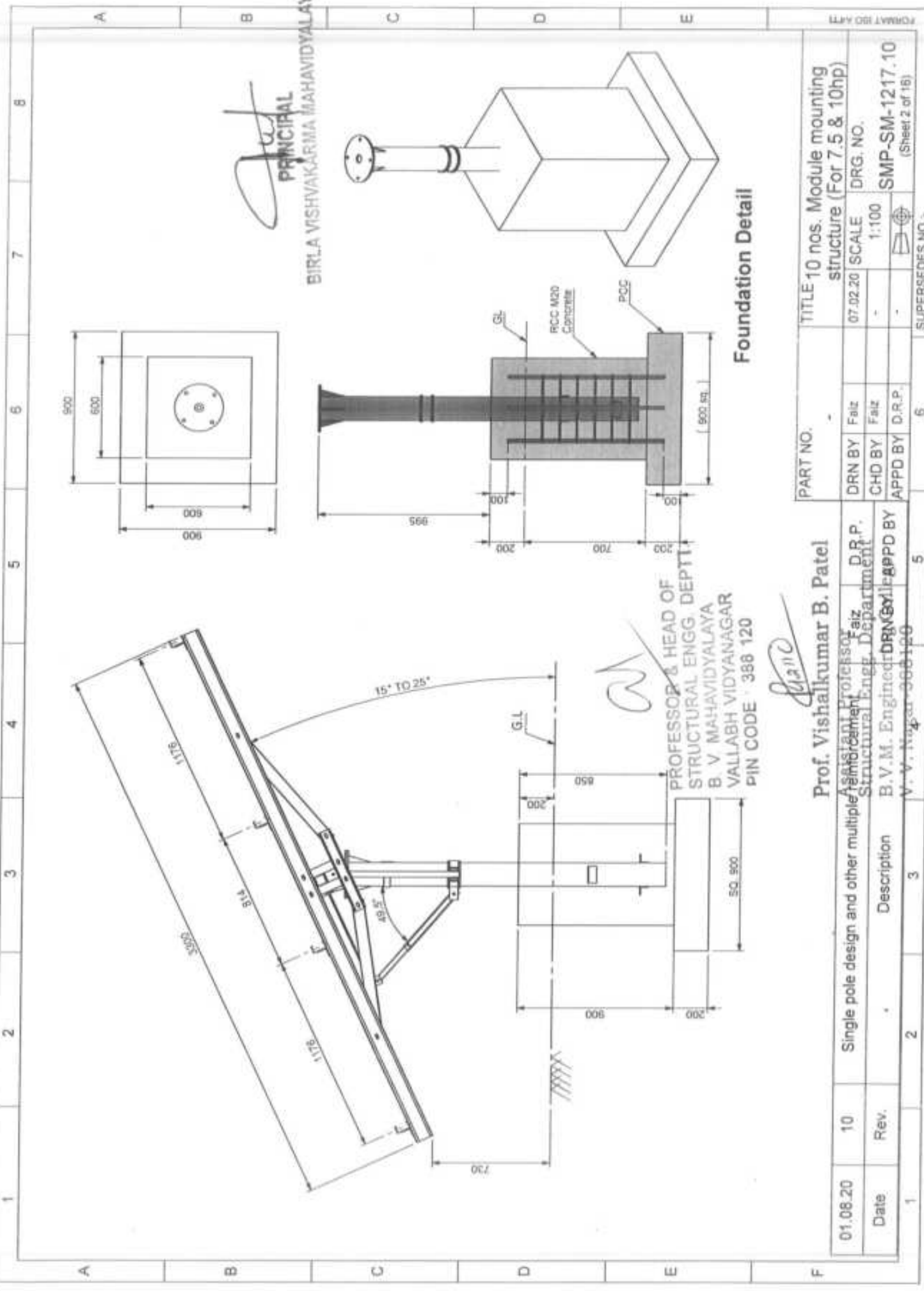
Notes : 1) M5 HD Galvanizing according to IS 4759 for all parts, wherever applicable.
 2) All dimensions are in mm.

Prof. Vishalkumar B. Patel
 Assistant Professor
 Structural Engg. Department
 B. V. MAHAVIDYALAYA
 VALLABH VIDYANAGAR
 PIN CODE - 388 120

PRINCIPAL
 BIRLA VISHVAKARMA MAHAVIDYALAYA

TITLE 10 nos. Module mounting structure (For 7.5 & 10hp)

01.06.20	10	Single pole design and other multiple reinforcements	DRN BY V. V. Narasimha Murthy	APPD BY D.R.P.	6
Date	Rev.	Description	DRN BY V. V. Narasimha Murthy	APPD BY D.R.P.	6
			SCALE 1:50	DRG. NO. SMP-SM-1217.10	(Sheet 1 of 16)
			07.02.20	SCALE 1:50	DRG. NO. SMP-SM-1217.10
			SUPERSEDES NO. -		



PRINCIPAL
BIRLA VISHVAKARMA MAHAVIDYALAYA

Foundation Detail

PROFESSOR & HEAD OF
STRUCTURAL ENGG. DEPTT
B. V. MAHAVIDYALAYA
VALLABH VIDYANAGAR
PIN CODE : 388 120

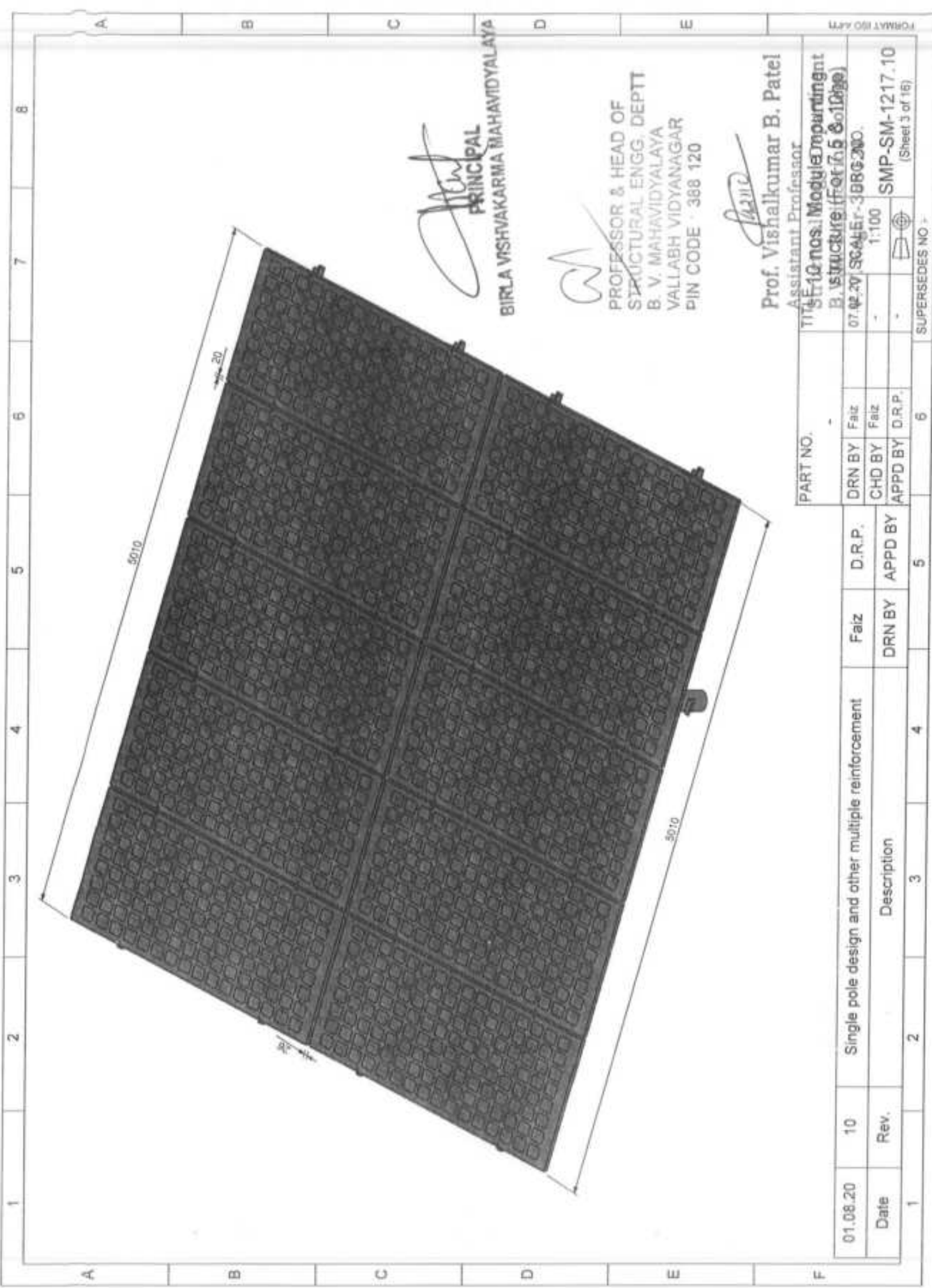
PART NO.		TITLE 10 nos. Module mounting structure (For 7.5 & 10hp)	
DRN BY	Faiz	SCALE	07.02.20
CHD BY	Faiz	SCALE	1:100
APPD BY	D.R.P.	DRG. NO.	SMP-SM-1217.10
		(Sheet 2 of 18)	

Prof. Vishalkumar B. Patel

Assistant Professor
Structural Engg. Department
B.V.M. Engng. College
V.V.Nagar-388120

01.08.20	10	Single pole design and other multiple
Date	Rev.	Description

SUPERSEDES NO : 6



[Signature]
PRINCIPAL
 BIRLA VISHVAKARMA MAHAVIDYALAYA

[Signature]
 PROFESSOR & HEAD OF
 STRUCTURAL ENGG. DEPTT
 B. V. MAHAVIDYALAYA
 VALLABH VIDYANAGAR
 PIN CODE - 388 120

[Signature]
Prof. Vishalkumar B. Patel
 Assistant Professor

TITLE	STR-10 nos. Module mounting B. structure (for 10.5 & 10Dge)				
DATE	07.08.20	SCALE	1:100	SMP-SM-1217.10 (Sheet 3 of 16)	
DRN BY	Faiz	D.R.P.	-		
CHD BY	Faiz	-			
APPD BY	D.R.P.	-			
PART NO.	-	DRN BY	Faiz	D.R.P.	-
TITLE			SMP-SM-1217.10 (Sheet 3 of 16)		

01.08.20	10	Single pole design and other multiple reinforcement	Faiz	D.R.P.	-
Date	Rev.	Description	DRN BY	APPD BY	D.R.P.
1	2	3	4	5	6

SUPERSEDES NO : -

Sr. nos.	Descriptions	Qty.	Total weight (kgs.)	Material Grade	Reference standards
1	Main column	1	35.27		
2	Rotating Plate	1	7.9	E250	IS:1161 & IS 2062
3	Rotating Clamp	1	3.2		IS 2062
4	Center beam assly.	1	40.9		IS:4923, IS:2062 & IS:808
5	Rafter	2	41.44	E350	IS:2062 & IS:811
6	Purlin clt	8	2.16	E250	IS:2062
7	Purlin-front	4	51.3	E350	IS:2062 & IS:811
8	North south bracing	1	3.52		
9	Front tilt support bottom	1	1.83		
10	Front tilt support top	1	1.31	E250	IS:4923
11	Rear tilt support bottom	1	3.34		
12	Rear tilt support top	1	1.08		
13	Sq. pipe for rear support	1	2.76	E250	IS:4923, IS:2062 & IS:808
14	Angle for rear support	2	0.48	---	---
15	Flat for raer support	2	0.36	---	---
16	Rafter bracing holder	2	4.61	E350	IS:2062 & IS:811
17	Rafter bracing	4	15.55		
18	Bracing center beam	2	5.69		
19	Controller clamp- rear	2	1.00	E250	IS:1161
20	Controller clamp- front	2	0.88		IS:2062
21a	Front sag angle	2	3.84	---	---
21b	Rear sag angle	2	3.84	---	---
22	Center pin	1	---	---	---
Approx. total weight.			232.26		
Galvanizing - 7 %			16.25		IS 4759
1	M16x50 bolt with 1-nut & 2-plain washer	4			
2	M12x115 bolt with 1-nut & 2-plain washer	1			
3	M12x100 bolt with 1-nut & 2-plain washer	13			
4	M12x35 bolt with 1-nut & 2-plain washer	16			
5	M12x130 bolt with 1-nut & 2-plain washer	4	7.08	8.8 GI	IS : 1364
6	M12x30 bolt with 1-nut & 2-plain washer	24			
7	Center Pin (EN9)	1			
8	Cotter pin for ϕ 8mmx50 long	1			
9	M6X25 Anti theft nut bolt, SS-304 (HeadOD ϕ 15 mm)	40	0.46	SS - 304	
Approx. total weight of the structure			256.05		

[Signature]
PRINCIPAL
BIRLA VISHVAKARMA MAHAVIDYALAYA

[Signature]

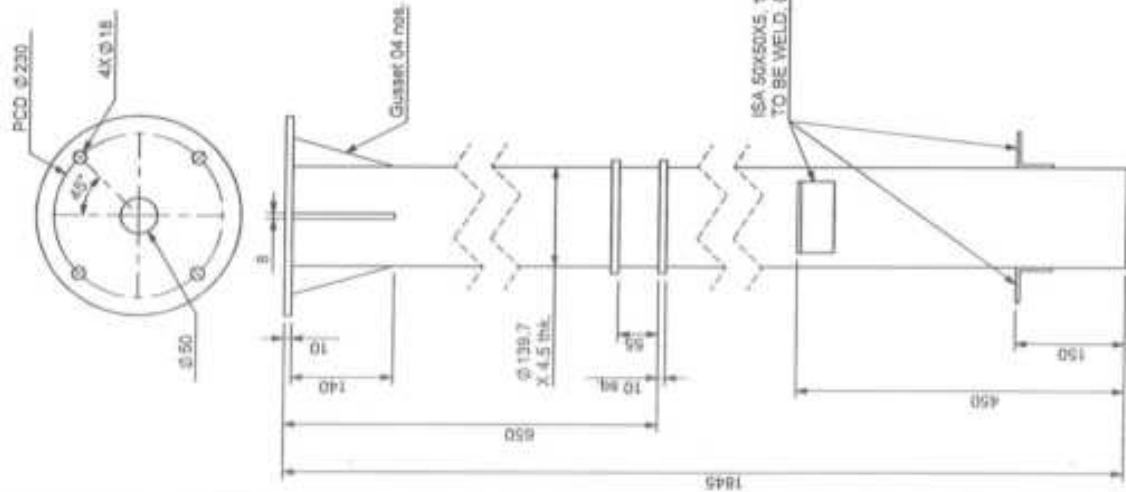
PROFESSOR & HEAD OF
STRUCTURAL ENGG DEPTT
B. V. MAHAVIDYALAYA
VALLABH VIDYANAGAR
PIN CODE - 368 120

[Signature]
Prof. Vistakumar B. Patel

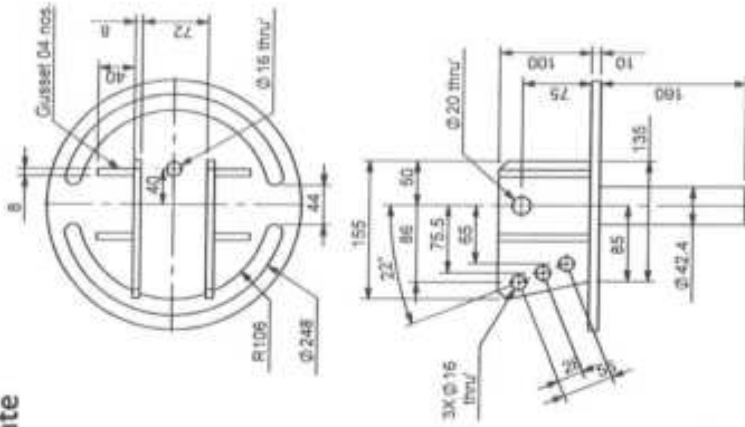
PART NO.		TITLE 10 nos. Module mounting structure for 7.5 & 10hp department	
DRN BY	Faiz	SCALE	07.02.20
CHD BY	Faiz	DATE	07.02.20
APPD BY	D.R.P.	PROJECT NO.	DRG No 988120
			Nayat 988120
			SMP-SM-1217.10
			(Sheet 4 of 16)

01.08.20	10	Single pole design and other multiple reinforcement	Faiz	D.R.P.
Date	Rev.	Description	DRN BY	APPD BY

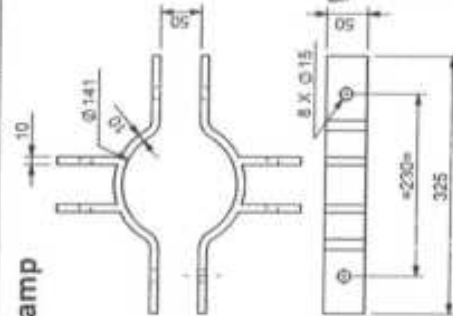
1) Main column



2) Rotating plate



3) Rotating clamp (2 nos.)



PROFESSOR & HEAD OF
STRUCTURAL ENGG. DEPTT
B. V. MAHAVIDYALAYE
VALLABH VIDYANAGAR
PIN CODE - 368 120

(Signature)
PRINCIPAL
BIRLA VISHVAKARMA MAHAVIDYALAYA

Prof. Vishalkumar B. Patel

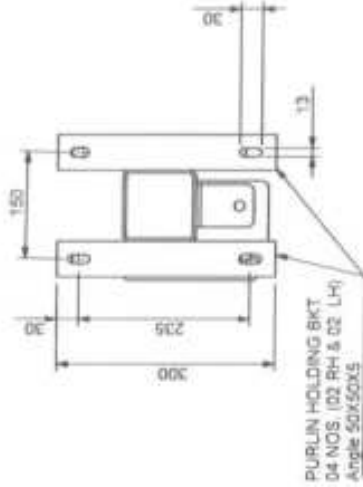
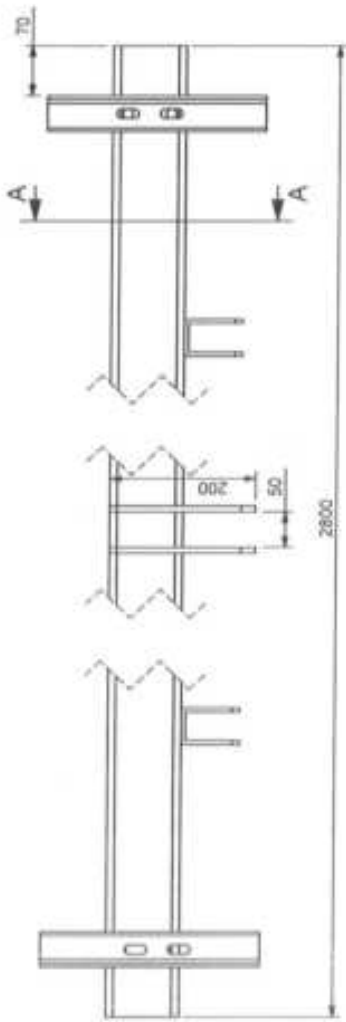
TITLE	10 nos. Module mounting or structure (For 7.5 & 10hp)
SCALE	07.02.20 DRG. No Engineering College, 1:100
DATE	07.02.20
BY	DRN BY Faiz
CHECKED BY	CHD BY Faiz
APPROVED BY	APPD BY D.R.P.

Date	Rev.	Description
01.08.20	10	Single pole design and other multiple reinforcement

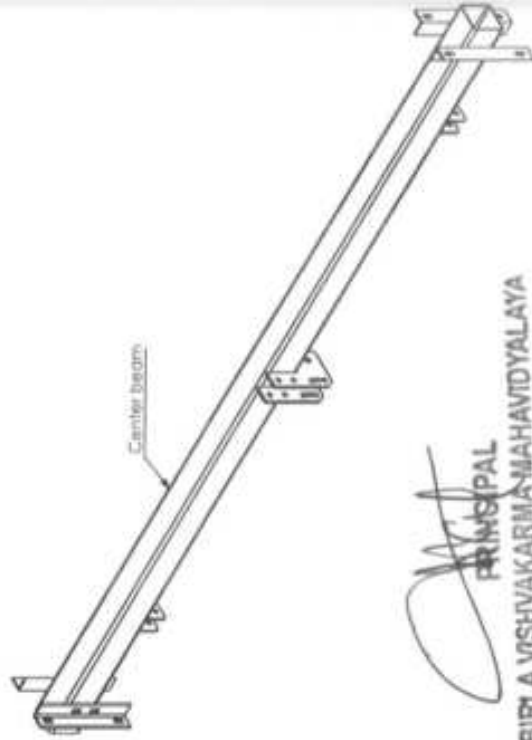
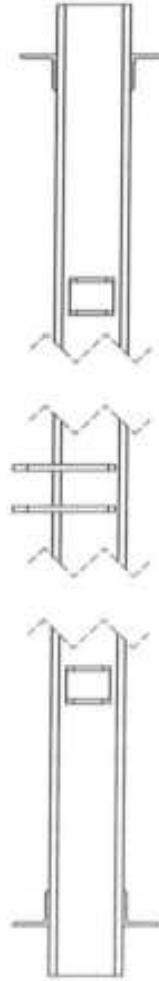
SMPSM-1297-10
(Sheet 5 of 15)

SUPERSEDES NO -

4) Center beam assly.



PURLIN HOLDING BKT
04 NOS. (02 RH & 02 LH)
Angle 50X50XS



SHS-100X100X4

PURLIN HOLDING BKT
04 NOS. (02 RH & 02 LH)

Prof. Vishalkumar B. Patel

PROFESSOR & HEAD OF
STRUCTURAL ENGG. DEPTT
B. V. MAHAVIDYALAYA
VALLABH VIDYANAGAR
PIN CODE - 388 120

BIRLA VISHVAKARMA MAHAVIDYALAYA

BIRLA VISHVAKARMA MAHAVIDYALAYA

SECTION A-A
SCALE 1 : 10

Prof. Vishalkumar B. Patel

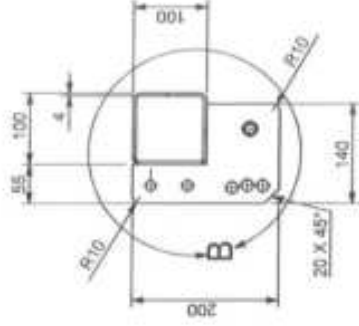
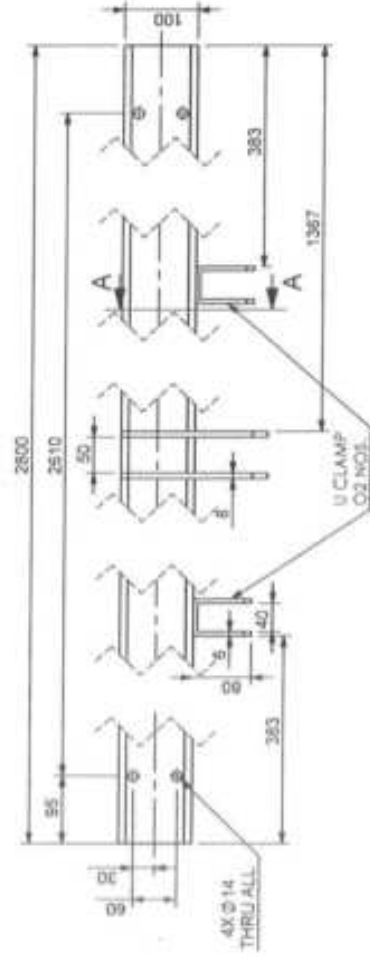
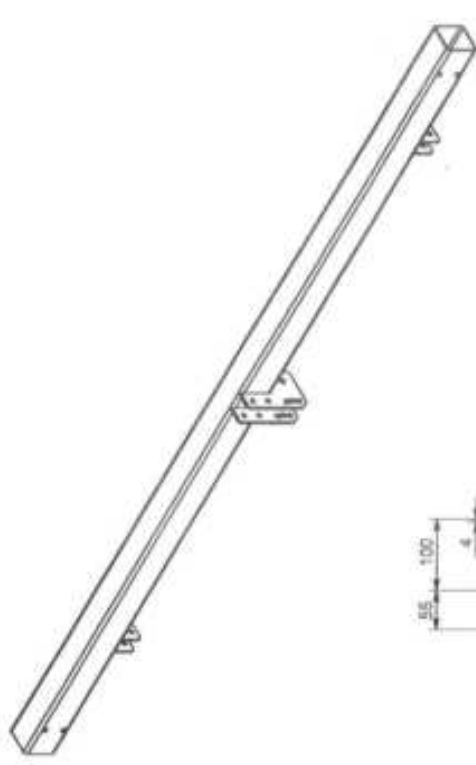
Principal
Structural Engg. Department
B.V.M. Engineering College, APPD BY
V. V. Nagar 4388120

PART NO.	TITLE 10 nos. Module mounting structure (For 7.5 & 10hp)		
DRN BY	Faiz	SCALE	07.02.20
CHD BY	Faiz	DRG. NO.	1:100
APPD BY	D.R.P.		SMP-SM-1217.10 (Sheet 6 of 16)

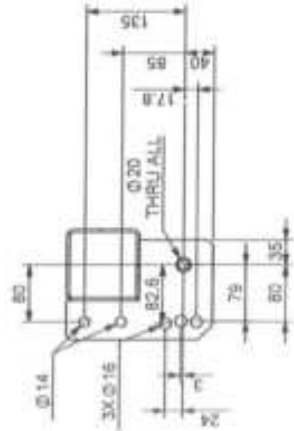
01.08.20	10	Single pole design and other multiple	Faiz	D.R.P.
Date	Rev.	Description	DRN BY	APPD BY
1	2	3	5	6

SUPERSEDES NO -

4) Center beam



SECTION A-A
SCALE 1 : 10



DETAIL B
SCALE 1 : 10

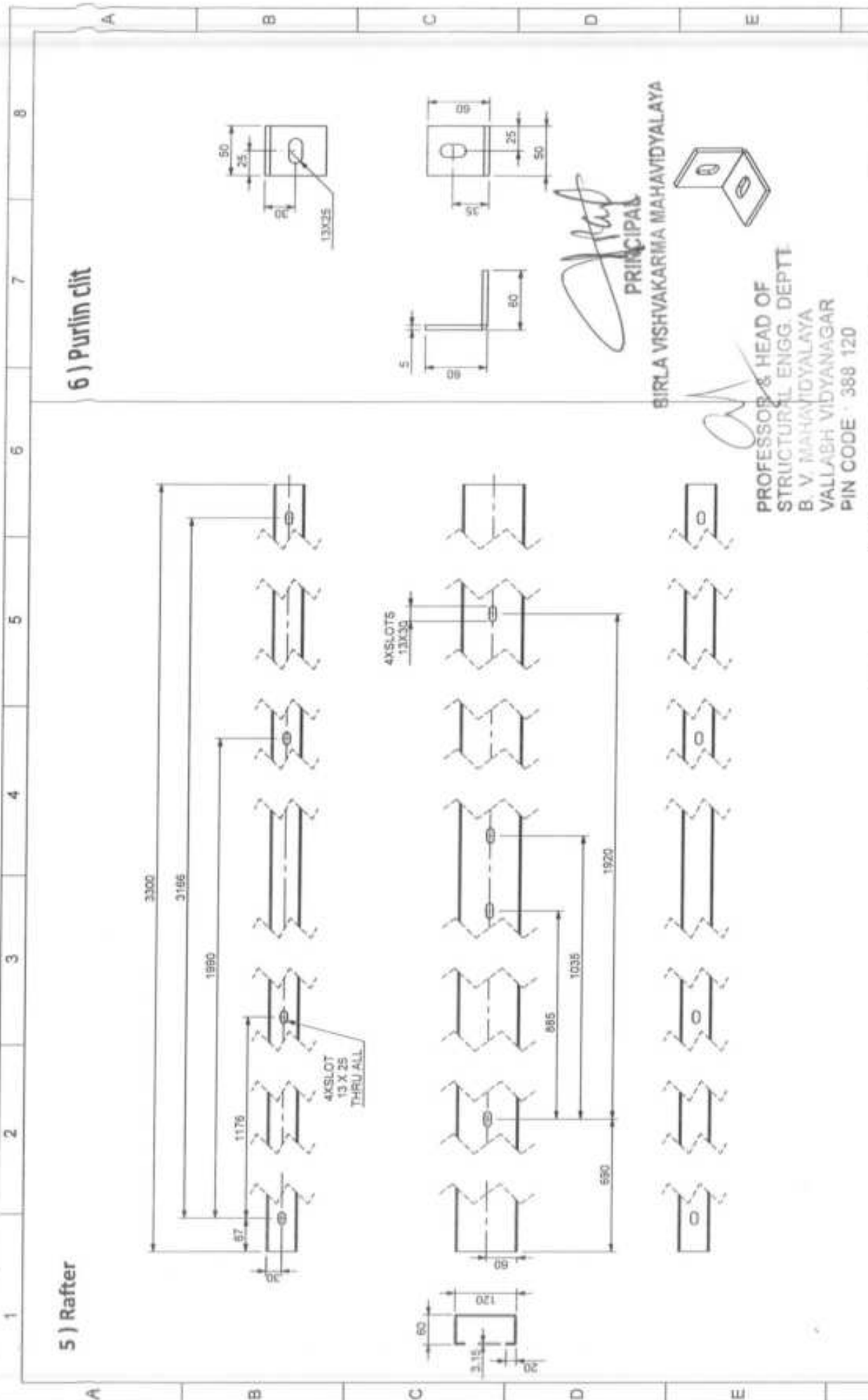
PROFESSOR & HEAD OF
STRUCTURAL ENGG. DEPTT
B. V. MAHAVIDYALAYA
VALLABH VIDYANAGAR
PIN CODE : 352 120

[Signature]
PRINCIPAL

BIRLA VISHVAKARMA MAHAVIDYALAYA

Prof. Vishalkumar B. Patel
10 nos. Module mounting
structure (For 7.5 & 10hp)
V.V.M. Engineering College,
V.V. Nagar - 352120
SMP-SM-1217.10
(Sheet 7 of 15)

Date	Rev.	Description	DRN BY	APPD BY	D.R.P.	APPD BY	D.R.P.
01.08.20	10	Single pole design and other multiple reinforcement	Faiz	Faiz	Faiz	Faiz	Faiz




5) Rafter

6) Purlin clitt

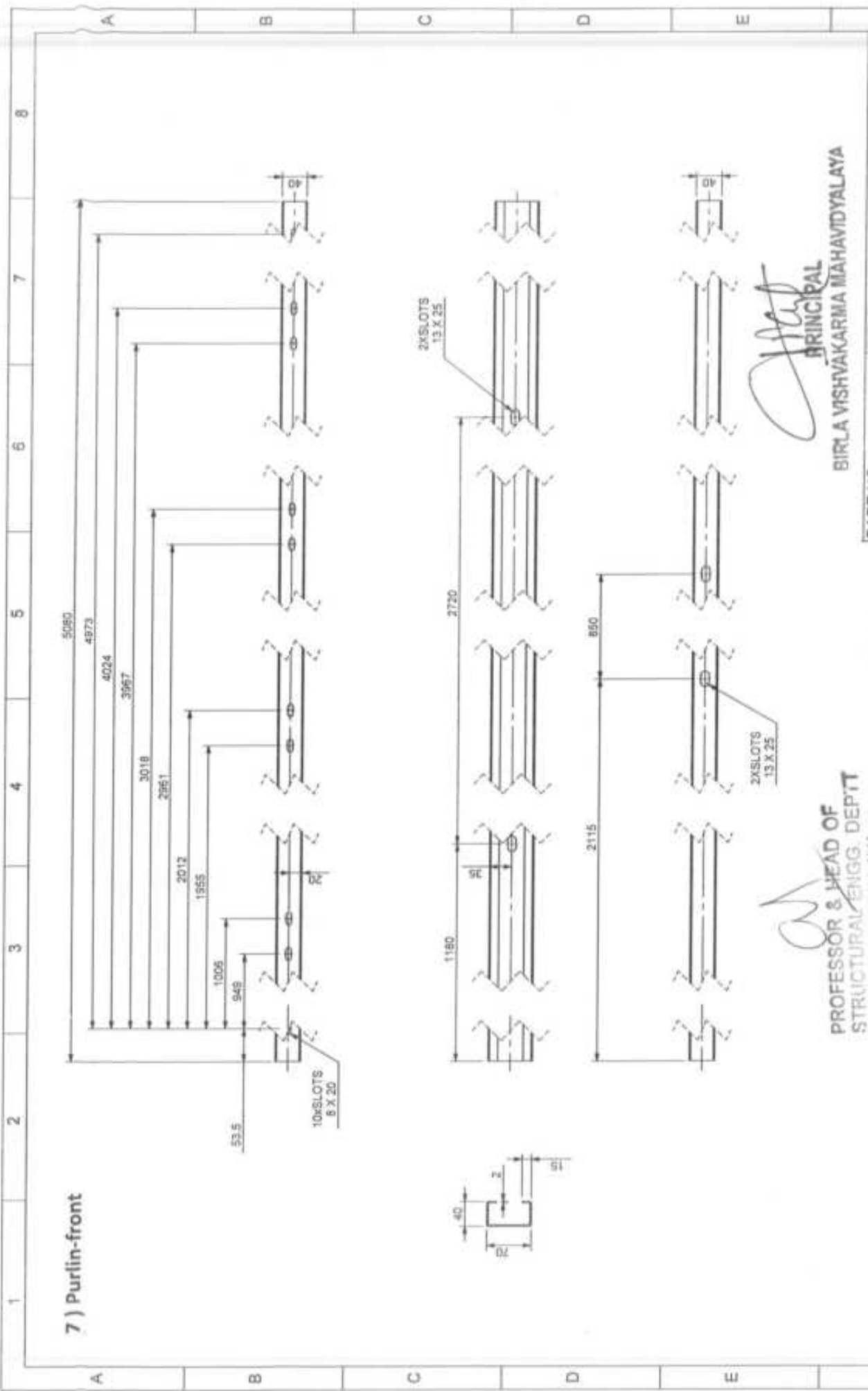

PRINCIPAL
 BIRLA VISHVAKARMA MAHAVIDYALAYA

PROFESSOR & HEAD OF
STRUCTURAL ENGG. DEPTT
 B. V. MAHAVIDYALAYA
 VALLABH VIDYANAGAR
 PIN CODE : 388 120

PART NO.		TITLE 10 nos. Module mounting structure (For 7.5 & 10hp)	
01.08.20	10	DRN BY	DRG. NO.
Date	Rev.	CHD BY	SCALE
		APPD BY	1:100
			SMP-SM-1217.10
			(Sheet 6 of 16)
			SUPERSEDES NO :


 Prof. Vishalkumar B. Patil
 Assistant Professor
 Structural Engg. Deptt
 B.V.M. Engineering College,
 V. V. Nagar-388120

Date	Rev.	Description
	2	3



7) Purlin-front

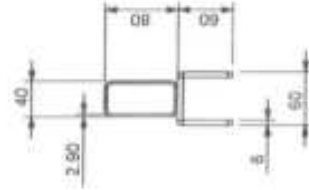
**PROFESSOR & HEAD OF
STRUCTURAL ENGG. DEPT
B. V. MAHAVIDYALAYA
VALLABH VIDYANAGAR**

**PRINCIPAL
BIRLA VISHVAKARMA MAHAVIDYALAYA**

01.08.20	10	Single pole design and other multiple reinforcement	Dr. P. Sankar Kumar B. Patel Assistant Professor Stru. ENGG. Dept. V.V.Nagar	Dr. P. Sankar Kumar B. Patel Assistant Professor Stru. ENGG. Dept. V.V.Nagar	07.02.20	SCALE 1:1	TITLE 10 nos. Module mounting structure (For 7.5 & 10hp)
Date	Rev.	Description	CHD BY	D.R.P.			DRG. NO.
1	2	3	4	6			SMP-SM-1217.10 (Sheet 9 of 16)
							SUPERSEDES NO

1 2 3 4 5 6 7 8 A B C D E F

8) North south bracing



CV
PROFESSOR & HEAD OF
STRUCTURAL ENGG. DEPT
B. V. MAHAVIDYALAYA
VALLABH VIDYANAGAR

[Signature]
PRINCIPAL
BIRLA VISHVAKARMA MAHAVIDYALAYA

[Signature]
Prof. Vishwakumar B. Patel
Assistant Professor
Structural Engg Dept
B.V.M. Engineering College,
4 V. V. Nagar-388150

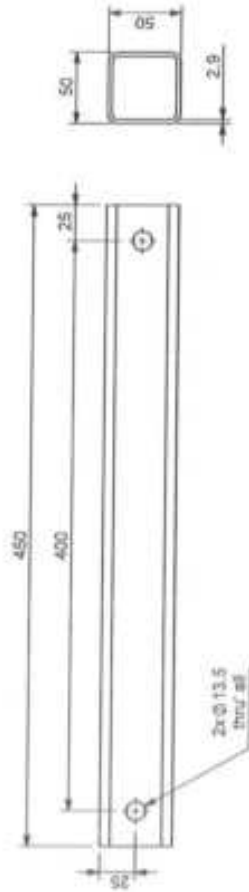
PART NO.	-	TITLE	10 nos. Module mounting structure (For 7.5 & 10hp)
DRN BY	Faz	SCALE	07.02.20 1:100
CHD BY	Faz	DRG. NO.	SMP-SM-1217.10
APPD BY	D.R.P.	(Sheet 10 of 16)	

Date	Rev.	Description
01.08.20	10	Single pole design and other multiple reinforcement
	2	
	3	

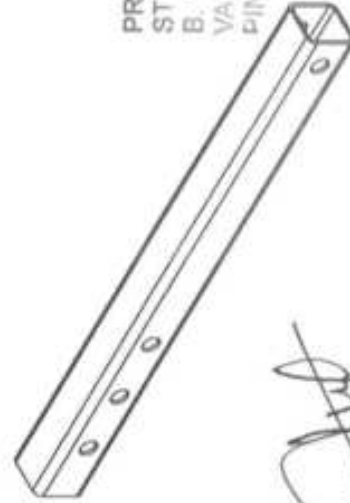
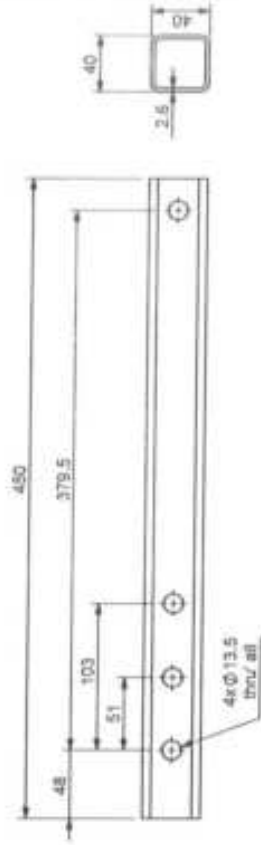
SUPERSEDES NO - 6

UPON 05/11/2020

9) Front tilt Support bottom



10) Front tilt Support top



PROFESSOR & HEAD OF
STRUCTURAL ENGG. DEPTT
B. V. MAHAVIDYALAYA
VALLABH VIDYANAGAR
PIN CODE - 388 120

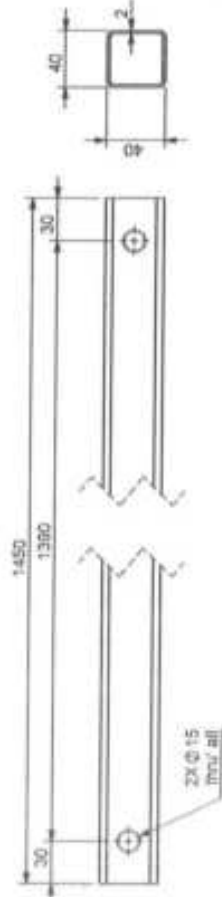
PRINCIPAL
BIRLA VISHVAKARMA MAHAVIDYALAYA

Prof. Vishv Kumar B. Patel

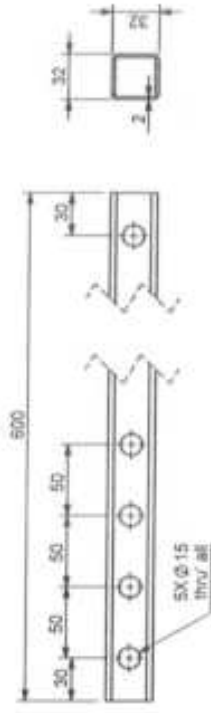
Date	Rev.	Description	DRN BY	APPD BY	D.R.P.	DRN BY	APPD BY	D.R.P.	DRN BY	APPD BY	D.R.P.	PART NO.	TITLE
01.06.20	10	Single pole design and other multiple reinforcement	Faiz			Faiz			Faiz				TITLE 10 nos: Module mounting structure (EP, 7.5 & 10hp) ment
													07.02.20 SCAME. DORG. NO. King College, V. V. Nagar, SMP-SM-1217, 10
													(Sheet 11 of 16)

SUPERSEDES NO. 6

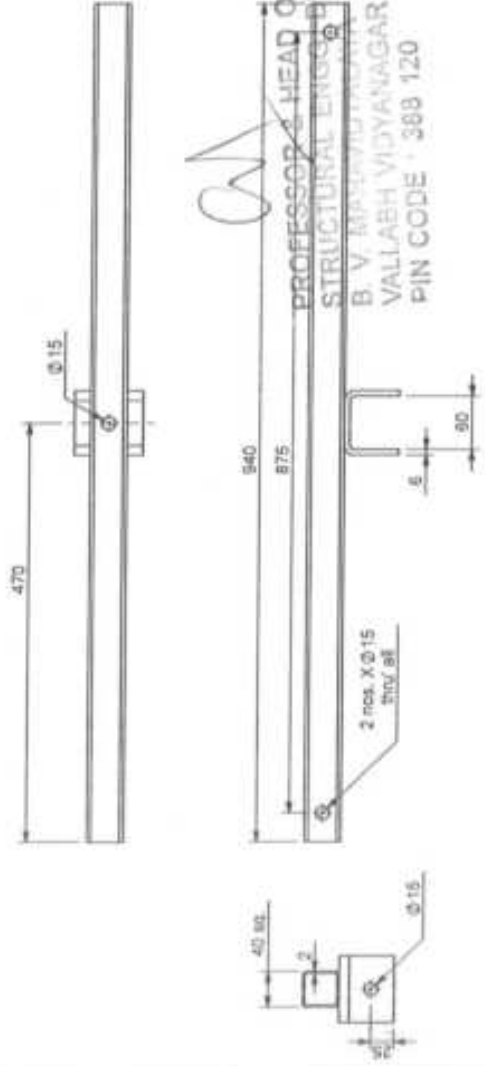
11) Rear tilt Support bottom



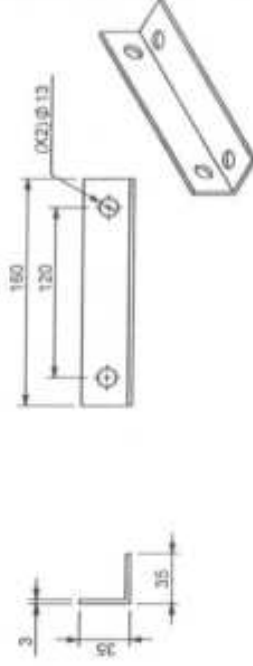
12) Rear tilt Support top



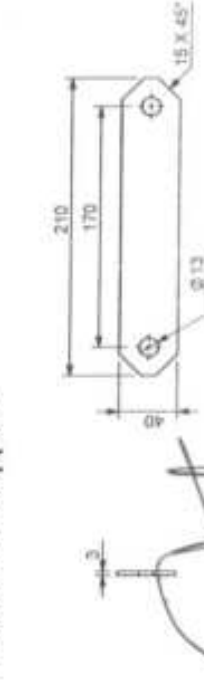
13) Sq. pipe for rear support



14) Angle for rear support



15) Flat for rear support



01.08.20	10	Single pole design and other multiple reinforcement	DRN BY: <i>Dr. P. Jayaram</i>
Date	Rev.	Description	DRN BY: <i>Dr. P. Jayaram</i>
1	2	3	5
			6

Prof. V. N. N. N.
PROFESSOR & HEAD OF
STRUCTURAL ENGINEERING DEPTT.
B. V. MAHAVIDYALAYA
VALLABH VIDYANAGAR
PIN CODE : 388 120

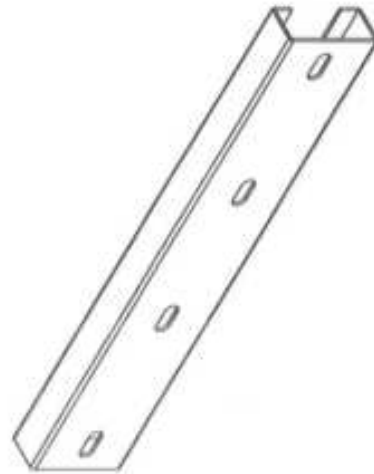
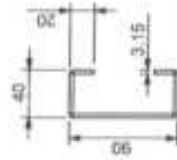
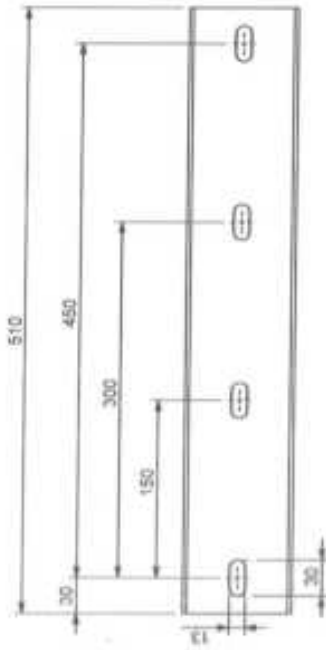
Dr. P. Jayaram
PRINCIPAL

BIPARTY NO. BIPARTY NO. BIPARTY NO.
BIPARTY NO. BIPARTY NO. BIPARTY NO.
BIPARTY NO. BIPARTY NO. BIPARTY NO.

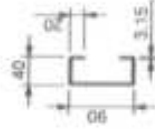
DRN BY: Faiz
CHD BY: Faiz
APPD BY: D.R.P.
SCALE: 1:5
07.02.20

DRG. NO. SMP-SM-1217.10
TITLE: 10 nos. Module mounting structure (For 7.5 & 10hp)
SUPERSEDES NO. -

16) Rafter bracing holder



17) Rafter bracing



Handwritten signature

PROFESSOR & HEAD OF
STRUCTURAL ENGG. DEPT
B. V. MAHAVIDYALAYA
VALLABH VIDYANAGAR
PIN CODE - 388 120

Handwritten signature
PRINCIPAL

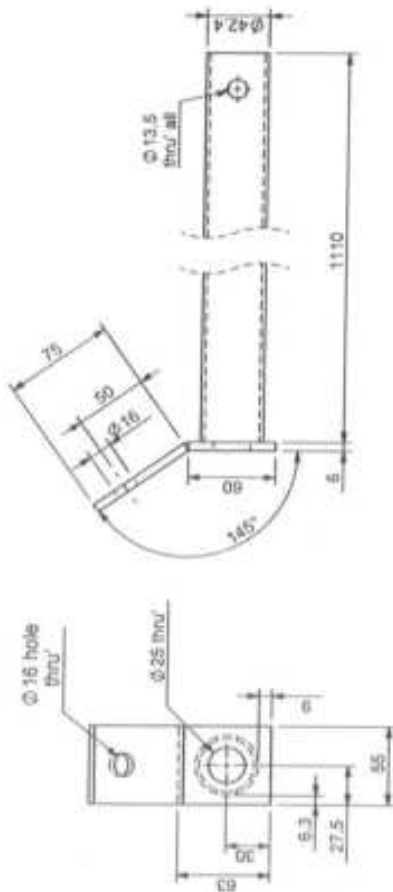
Handwritten signature

BIRLA VISHVAKARMA MAHAVIDYALAYA

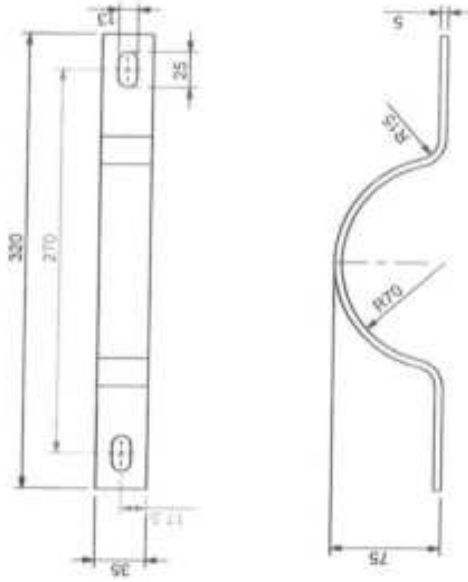
Prof. Vishwakumar B. Patel

PART NO.		TITLE		SCALE		DATE		REV.	
DRN BY	Faiz	DRN BY	Faiz	07.02.20	07.02.20	10	10	10	10
CHD BY	Faiz	CHD BY	Faiz	-	-	Rev.	Rev.	Rev.	Rev.
APPD BY	D.R.P.	APPD BY	D.R.P.	-	-	Description		Description	
6		5		4		3		2	
SUPERSEDES NO.		SMP-SM-1217.10		(Sheet 13 of 16)		10 nos. Module mounting structure (For 7.5 & 10hp)		Single pole design and other multiple reinforcement	

18) Bracing center beam



19) Controller clamp - rear



PROFESSOR & HEAD OF
STRUCTURAL ENGG. DEPTT.
B. V. MAHAVIDYALAYA
VALLABH VIDYANAGAR
PIN CODE : 388 120

Signature

Signature
PRINCIPAL

BIRLA VISHVAKARMA MAHAVIDYALAYA

Prof. Vishalkumar B. Patel

Assistant Professor

Structural Engineering Department

B.V.V. D.R.P.

DRN BY Faiz

CHD BY Faiz

APPD BY D.R.P.

PAR ENO.

DRN BY Faiz

CHD BY Faiz

APPD BY D.R.P.

TITLE 10 nos. Module mounting

structure (For 7.5 & 10hp)

07.02.20 SCALE 1:10 DRG. NO.

SMP-SM-1217.10

(Sheet 14 of 16)

SUPERSEDES NO.

6

5

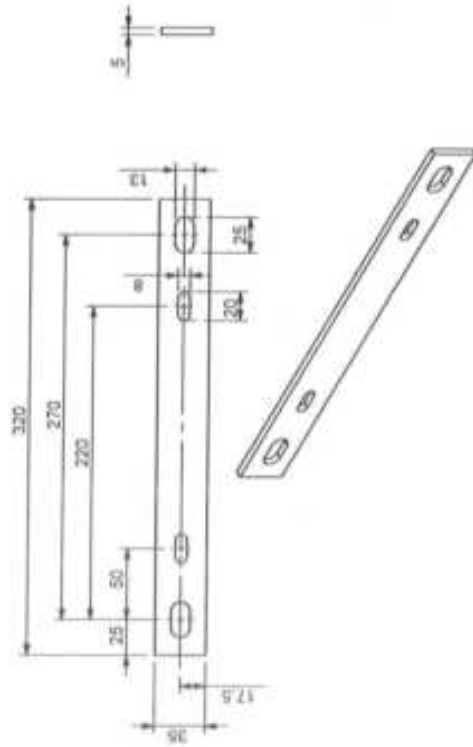
4

3

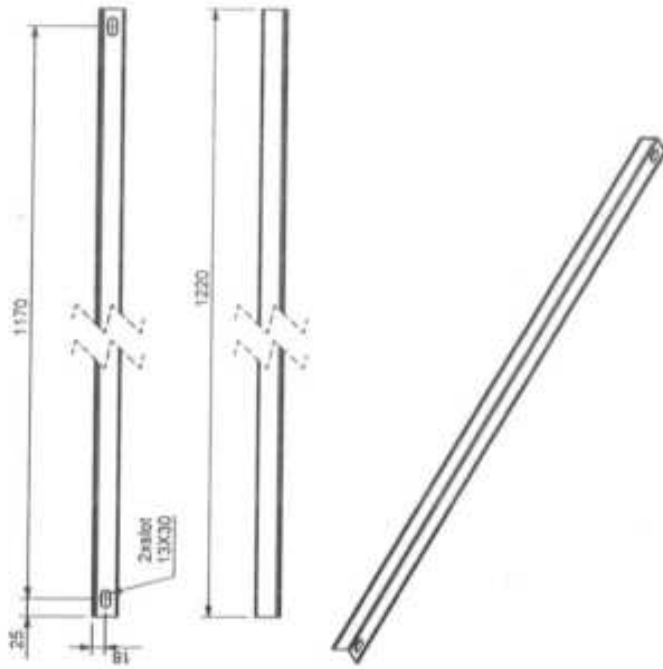
2

1

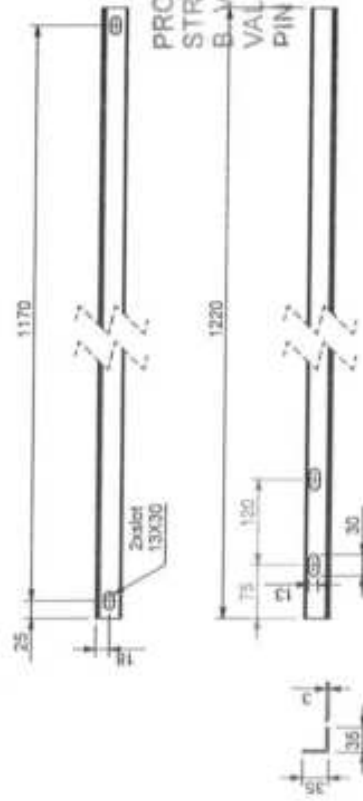
20) Controller clamp - Front



21a) Front sag angle



21b) Rear sag angle



PROFESSOR & HEAD OF
STRUCTURAL ENGG DEPTT
B.V. MAHAVIDYALAYA
VALLABH VIDYANAGAR
PIN CODE - 388 120

PRINCIPAL

SIDA VISHVAKARMA MAHAVIDYALAYA

Prof. Vishalkumar Patel
Assistant Professor

TITLE 10 nos. Module mounting
structure (For 7.5 & 10hp)

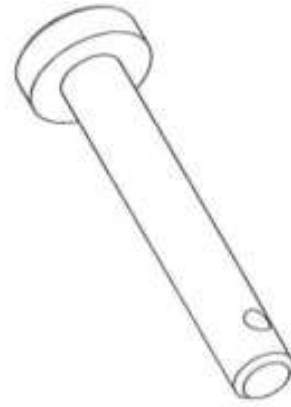
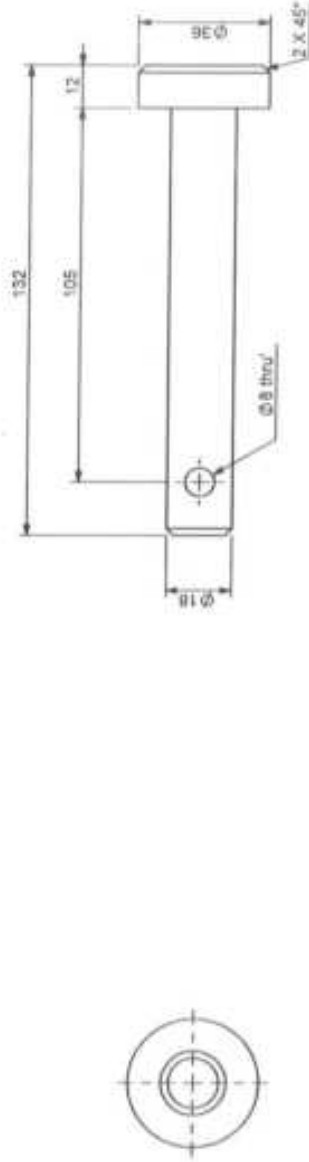
07.02.20 SCALE 1:2
DRG. NO. SMP-SM-1217.10
(Sheet 15 of 16)

Date	Rev.	Description
01.08.20	10	Single pole design and other multiple reinforcement

DRN BY: D.R.P. / Faizuddin
APPD BY: D.R.P. / B.V. Mahavithal

SUPERSEDES NO. :

22) Center pin



[Signature]
PRINCIPAL
 BIRLA VISHVAKARMA MAHAVIDYALAYA

[Signature]
PROFESSOR & HEAD OF
STRUCTURAL ENGG. DEPT
 B. V. MAHAVIDYALAYA
 VALLABH VIDYANAGAR
 PIN CODE - 388 120

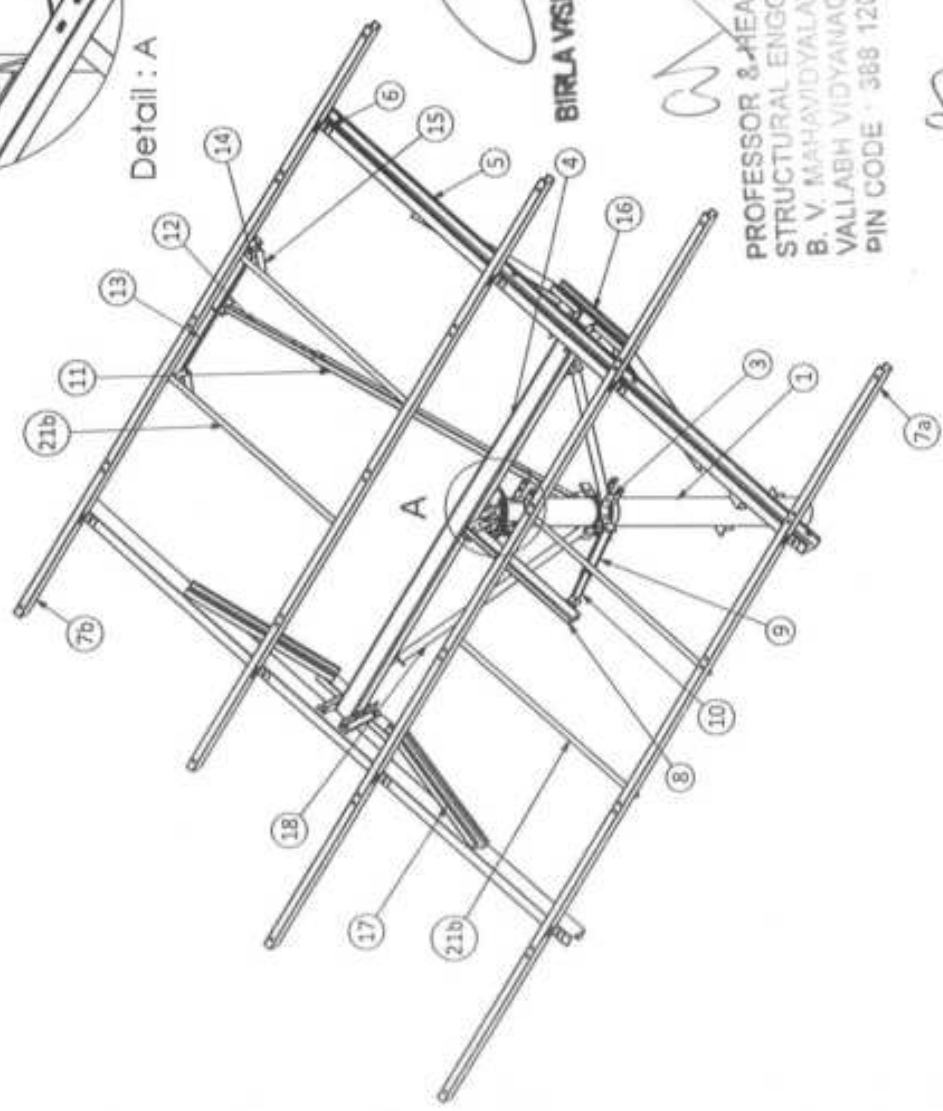
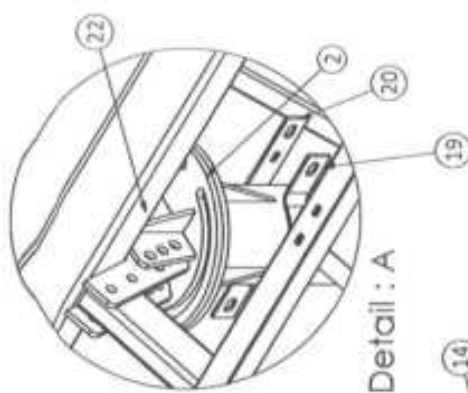
[Signature]
Prof. Vishalkumar B. Patel

PART NO.		TITLE		SCALE		DRG. NO.		COLLEGE	
DRN BY	Faiz	10	Single pole design and other multiple reinforcement	07.02.20	SCALE	DRG. NO.	3	College	10
CHD BY	Faiz	Rev.	Description						
APPD BY	D.R.P.								

1	2	3	4	5	6
SUPERSEDES NO :					

SMP-SM-1217.10
 (Sheet 16 of 16)

Sr. nos.	Descriptions	Qty.
1	Main column	1
2	Rotating Plate	1
3	Rotating Clamp	2
4	Center beam assly.	1
5	Rafter	2
6	Purlin clit	8
7a	Purlin-front	2
7b	Purlin-rear	2
8	North south bracing	1
9	Front tilt support battom	1
10	Front tilt support top	1
11	Rear tilt support bottom	1
12	Rear tilt support top	1
13	Sq. pipe for rear support	1
14	Angle for rear suppoer	2
15	Flat for raer support	2
16	Rafter bracing holder	2
17	Rafter bracing	4
18	Bracing center beam	2
19	Controller clamp- rear	2
20	Controller clamp- front	2
21a	Front sag angle	2
21b	Rear sag angle	2
22	Center pin	1



[Signature]
PRINCIPAL

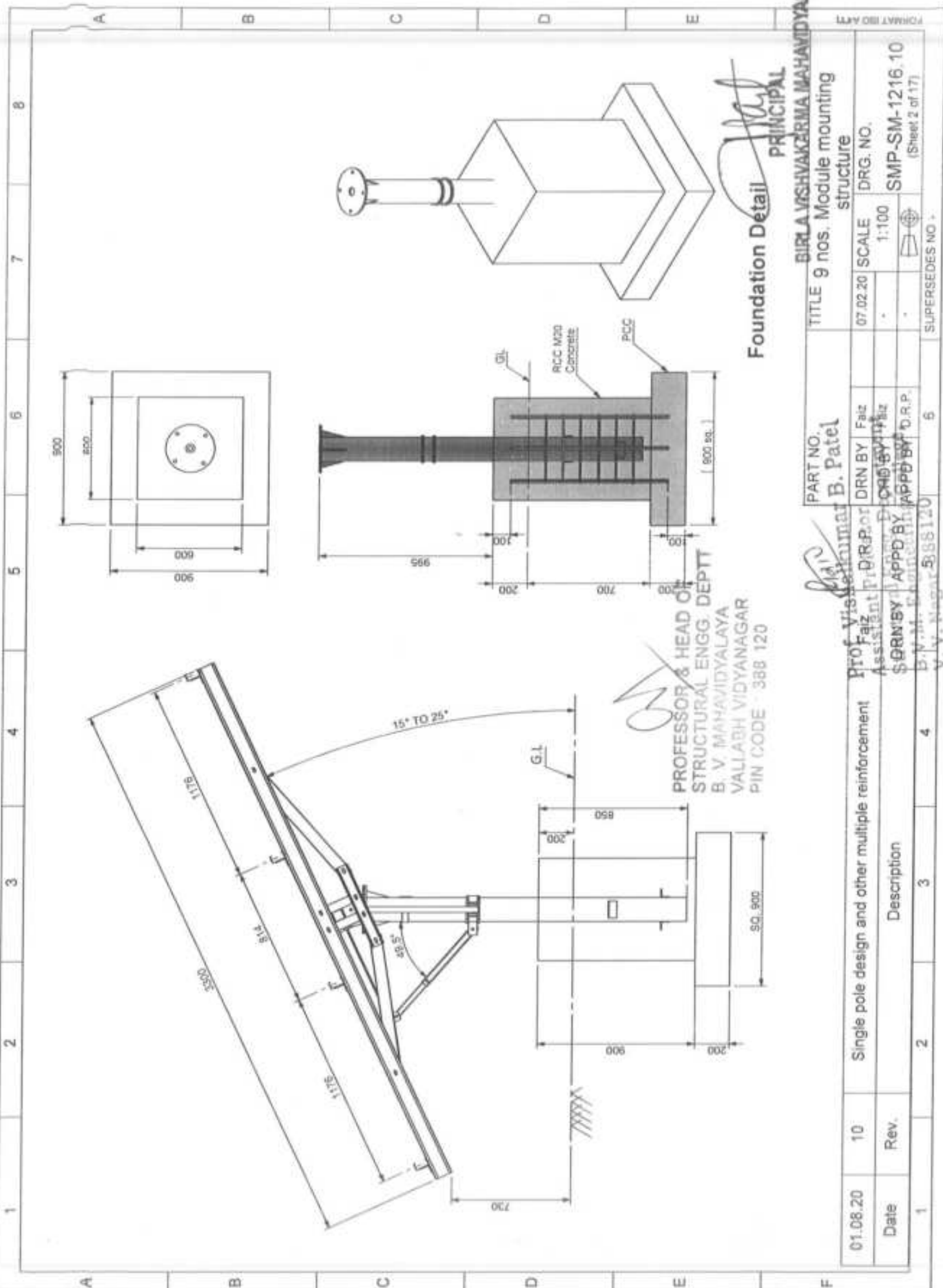
BIRLA VISHVAKARMA MAHAVIDYALAYA

[Signature]
**PROFESSOR & HEAD OF
 STRUCTURAL ENGG. DEPT
 B. V. MAHAVIDYALAYA
 VALLABH VIDYANAGAR
 PIN CODE : 388 120**

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

Date	Rev.	Description	DRG. NO.	SCALE	DRG. NO.
01.08.20	10	Single pole design and other multiple reinforcement		07.02.20	
				1:50	SMP-SM-1216.10
					(Sheet 1 of 17)

PART NO.	TITLE 9 nos. Module mounting structure				
DRN BY	Prof. Faiz	DRN BY	Prof. Faiz	SCALE	DRG. NO.
DESIGN BY	Prof. Faiz	APPD BY	Prof. Faiz		
APPD BY	Prof. Faiz	DRP BY	Prof. Faiz		
B.V.M. EIGHTH FLOOR					
V. V. Nagar-588120					
					SUPERSEDES NO. 6



PROFESSOR & HEAD OFFICER
STRUCTURAL ENGG. DEPT
B. V. MAHAVIDYALAYA
VALLABH VIDYANAGAR
PIN CODE - 388 120

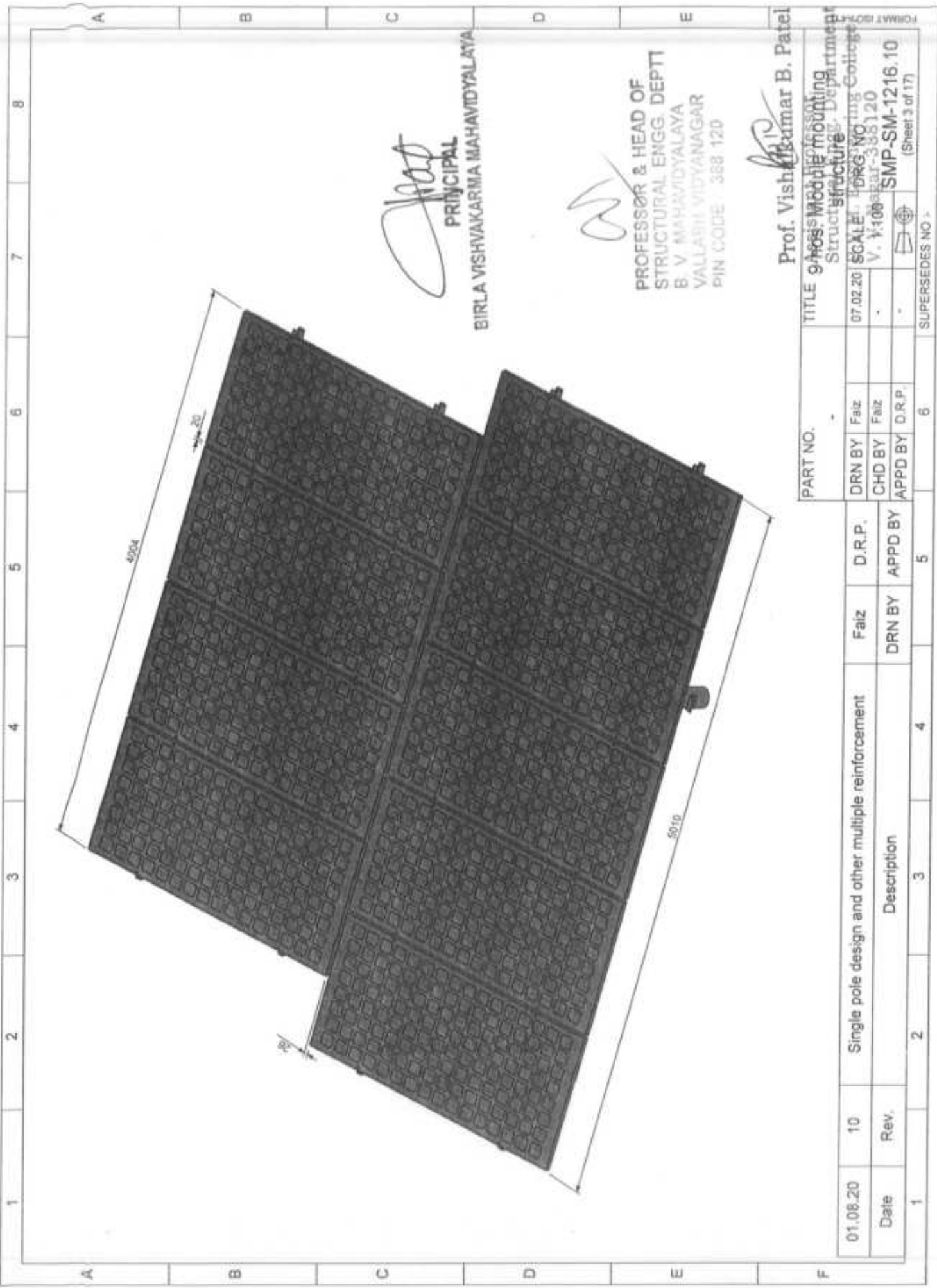
Foundation Detail
PRINCIPAL

BIRLA VISHVAKARMA MAHAVIDYALAYA
TITLE 9 nos. Module mounting structure
DRG. NO. SMP-SM-1216.10
(Sheet 2 of 17)

PART NO.	B. Patel	
DRN BY	DRN BY	FAIZ
DESIGNED BY	APPD BY	D.R.P.
DATE	07.02.20	SCALE 1:100
TITLE	9 nos. Module mounting structure	
DRG. NO.	SMP-SM-1216.10	
SUPERSEDES NO.	5	

01.08.20	10	Single pole design and other multiple reinforcement
Date	Rev.	Description
1	2	3
4	5	6

B. V. Vishwakarma
 Assistant Tr. D.R.P.
 V. V. Nagar 388120



[Signature]
PRINCIPAL
 BIRLA VISHVAKARMA MAHAVIDYALAYA

[Signature]

**PROFESSOR & HEAD OF
 STRUCTURAL ENGG. DEPTT
 B. V. MAHAVIDYALAYA
 VALLABH VIDYANAGAR
 PIN CODE : 388 120**

Prof. Vishv Kumar B. Patel

DATE		DESCRIPTION		D.R.P.		APPD BY		D.R.P.		PART NO.		TITLE	
01.06.20	10	Single pole design and other multiple reinforcement		Faiz	D.R.P.	DRN BY	Faiz	DRN BY	Faiz	-		9 nos. Module mounting structure - Department	
Date	Rev.	Description		DRN BY	APPD BY	APPD BY	D.R.P.	APPD BY	D.R.P.			SCALES: DRG No. 388120 V. V. 100	
												SMP-SM-1216.10 (Sheet 3 of 17)	
										SUPERSEDES NO		6	

1	2	3	4	5	6	7	8
Item list of spms, MMS							
Sr. nos.	Descriptions	Qty.	Total weight (kgs.)	Material Grade	Reference standards		
1	Main column	1	35.27		IS:1161 & IS:2062		
2	Rotating Plate	1	7.9	E250	IS:2062		
3	Rotating Clamp	1	3.2		IS:4923, IS:2062 & IS:808		
4	Center beam assly.	1	40.9		IS:2062 & IS:811		
5	Rafter	2	41.44	E350	IS:2062		
6	Purlin clt	8	2.16	E250	IS:2062		
7a	Purlin-front	2	25.65	E350	IS:2062 & IS:811		
7b	Purlin-rear	2	20.53				
8	North south bracing	1	3.52				
9	Front tilt support bottom	1	1.83				
10	Front tilt support top	1	1.31	E250	IS:4923		
11	Rear tilt support bottom	1	3.34				
12	Rear tilt support top	1	1.08				
13	Sq. pipe for rear support	1	2.76	E250	IS:4923, IS:2062 & IS:808		
14	Angle for rear support	2	0.48	---	---		
15	Flat for raer support	2	0.36	---	---		
16	Rafter bracing holder	2	4.61	E350	IS:2062 & IS:811		
17	Rafter bracing	4	15.55				
18	Bracing center beam	2	5.69		IS:1161		
19	Controller clamp- rear	2	1.00	E250	IS:2062		
20	Controller clamp- front	2	0.88				
21a	Front sag angle	2	3.84	---	---		
21b	Rear sag angle	2	3.84	---	---		
22	Center pin	1	---	---	---		
Approx. total weight.			227.14				
Galvanizing -7 %			15.89		IS:4759		
1	M16x50 bolt with 1-nut & 2-plain washer	4					
2	M12x115 bolt with 1-nut & 2-plain washer	1					
3	M12x100 bolt with 1-nut & 2-plain washer	13					
4	M12x35 bolt with 1-nut & 2-plain washer	16					
5	M12x130 bolt with 1-nut & 2-plain washer	4	7.08	8.8 GI	IS: 1364		
6	M12x30 bolt with 1-nut & 2-plain washer	24					
7	Center Pin (EN9)	1					
8	Cotter pin for ϕ 8mmx50 long	1					
9	M6X25 Antl theft nut bolt, SS-304 (HeadOD ϕ 15 mm)	36	0.42	SS - 304			
Approx. total weight of the structure			250.53				


PRINCIPAL
BIRLA VISHVAKARMA MAHAVIDYALAYA

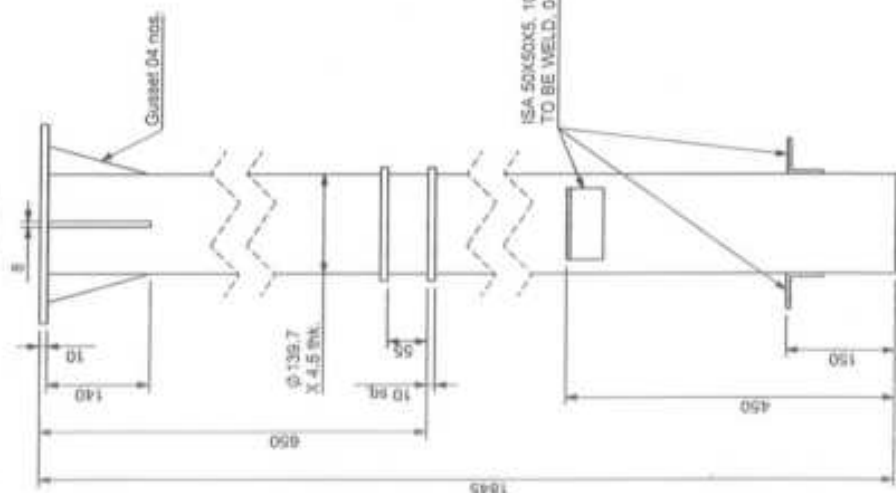

PROFESSOR & HEAD OF
STRUCTURAL ENGG. DEPTT
B. V. MAHAVIDYALAYA
VALLABH VIDYANAGAR
PIN CODE - 388 120

Prof. Vishvakumar B. Patel
Meditile mounting for
Structure Enng. Department
SCALE: V.DRG-NO: 388120
1:100 V.DRG-NO: 388120
SMP-SM-1216.10
 (Sheet 4 of 17)

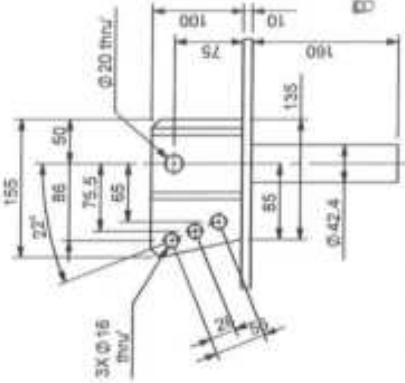
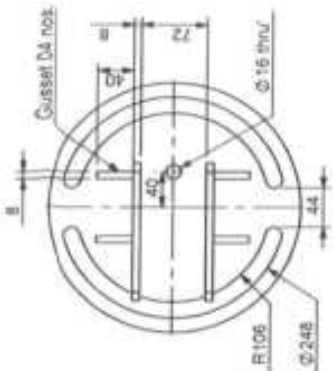
PART NO.	TITLE	9 nos. Meditile mounting for Structure Enng. Department
DRN BY	Faiz	07.02.20
CHD BY	Faiz	-
APPD BY	D.R.P.	-

01.08.20	10	Single pole design and other multiple reinforcement	Faiz	D.R.P.
Date	Rev.	Description	DRN BY	APPD BY

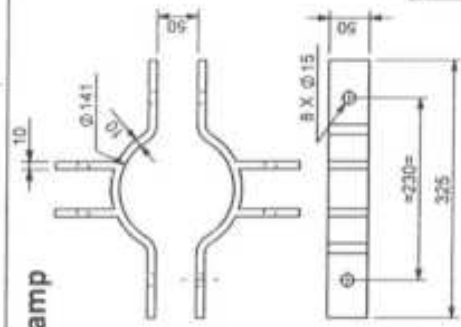
1) Main column



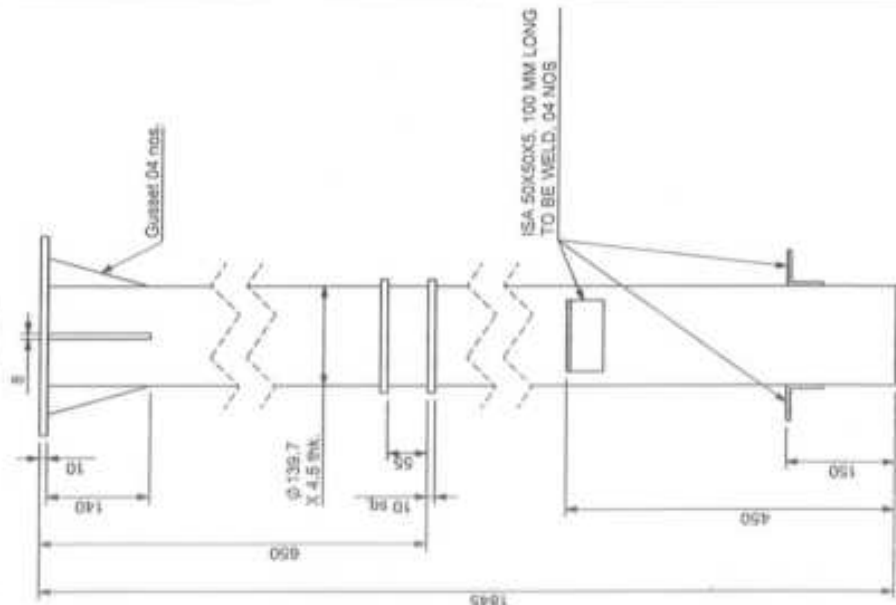
2) Rotating plate



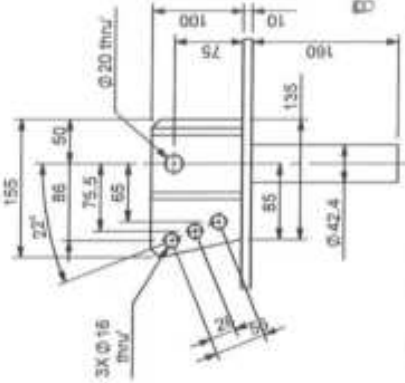
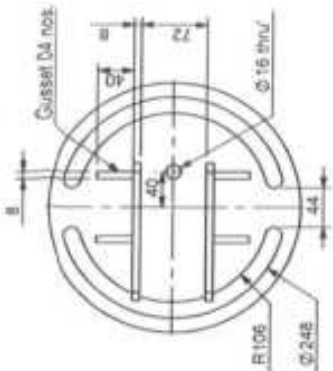
3) Rotating clamp (2 nos.)



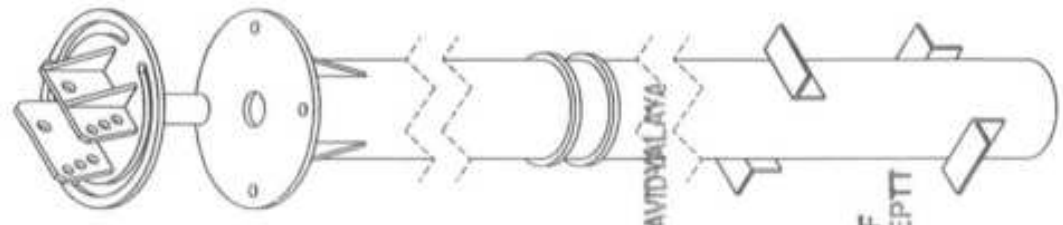
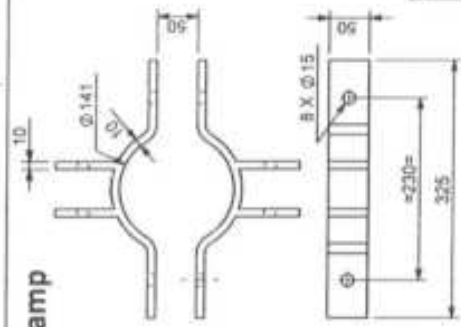
1) Main column



2) Rotating plate



3) Rotating clamp (2 nos.)



Principal
PRINCIPAL
 BIRLA VISHVAKARMA MAHAVIDYALAYA

Prof.
PROFESSOR & HEAD OF
STRUCTURAL ENGG. DEPTT
B. V. MAHAVIDYALAYA
VALLABH CHIVANAGAR
MIN. CODE 368 120

Prof.
Prof. Vishalkumar B. Patel

PART NO. 15.9 nos. Module mounting
 Assistant Professor, Department of
 Structural Engg.

DRN BY Faiz D.R.P. **SCALE** DRG. NO. 07.02.20

CHD BY Faiz D.R.P. **SCALE** DRG. NO. 07.02.20

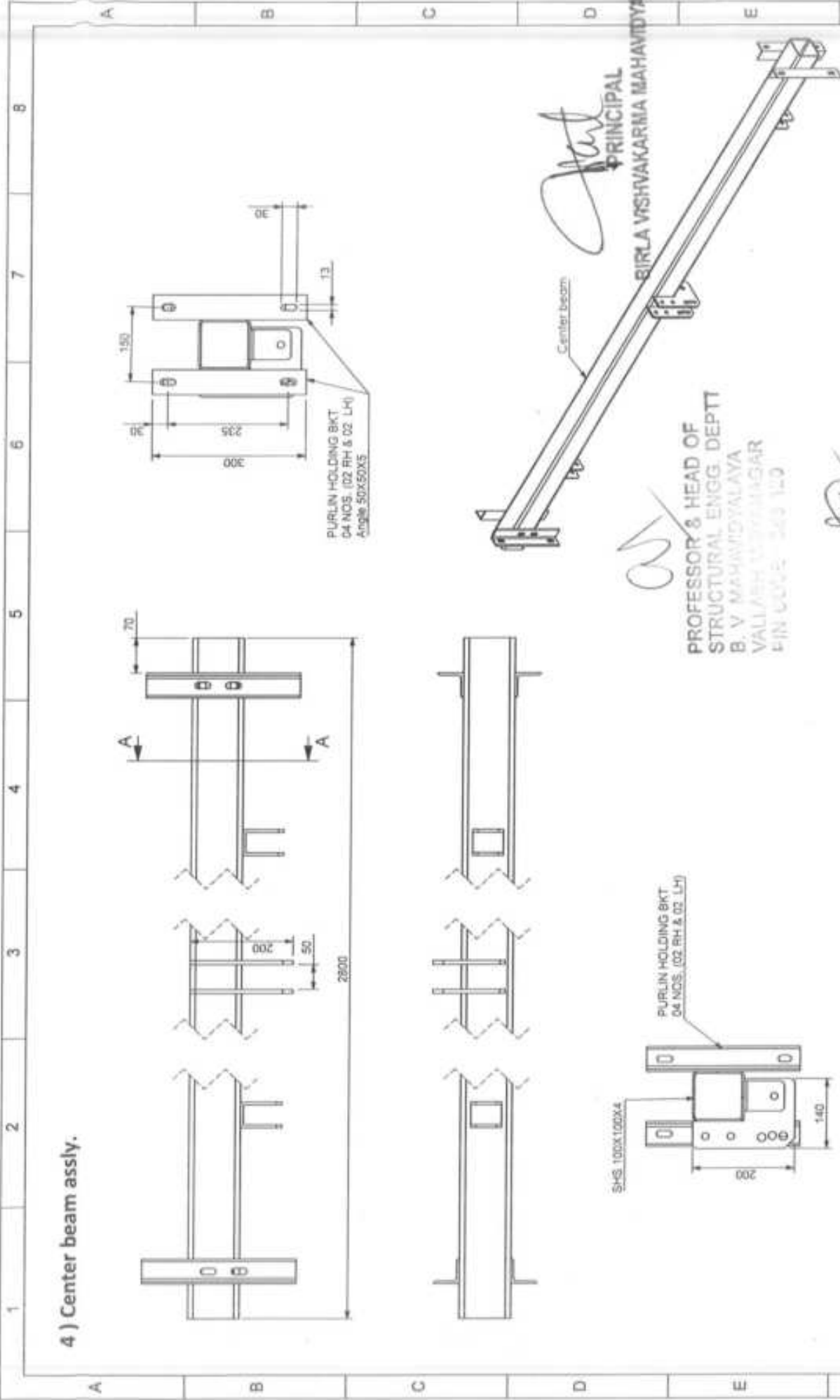
APPD BY D.R.P. **SCALE** DRG. NO. 07.02.20

SMP-SM-1216.10
 (Sheet 5 of 17)

FORMA 100 (A) (17/04/04)

Date	Rev.	Description	DRN BY	APPD BY	Faiz	D.R.P.
01.08.20	10	Single pole design and other multiple reinforcement	Faiz	D.R.P.		

SUPERSEDES NO. >



4) Center beam assly.

SECTION A-A
SCALE 1 : 10

01.08.20	10	Single pole design and other multiple reinforcement	Faiz	DRN BY	APPD BY	5	6	8
Date	Rev.	Description		DRN BY	APPD BY	5	6	8
				DRN BY	APPD BY	5	6	8
				DRN BY	APPD BY	5	6	8

Prof. Vishwajit Kumar B. Patel
Assistant Professor
Structural Engg. Department

PROFESSOR & HEAD OF
STRUCTURAL ENGG. DEPTT
B. V. MAHAVIDYALAYA
VALLABH VIDYANAGAR
PIN CODE - 360 110

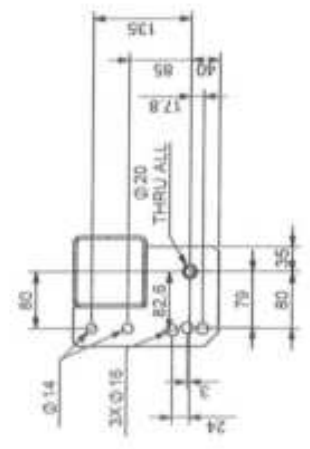
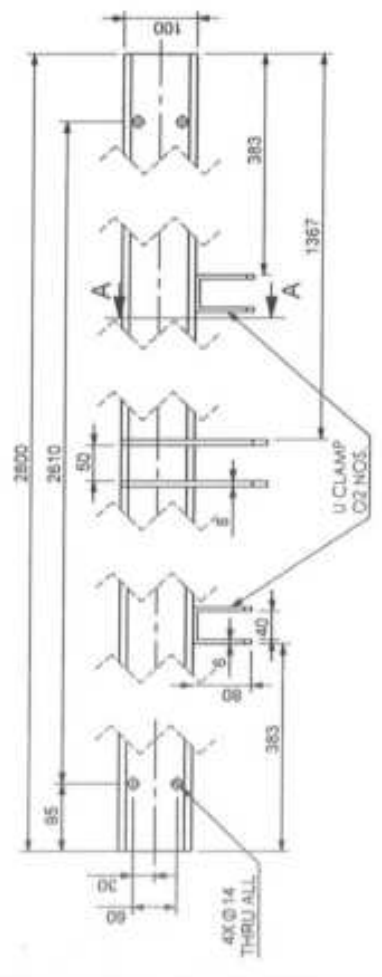
PRINCIPAL
BIRLA VISHVAKARMA MAHAVIDYALAYA

TITLE 9 nos. Module mounting structure

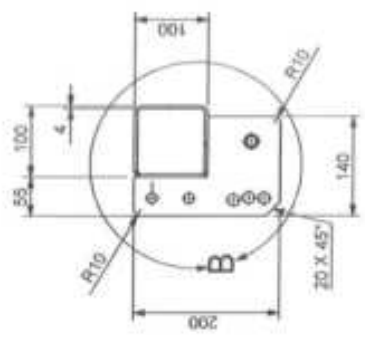
DRG. NO. SMP-SM-1216.10
(Sheet 6 of 17)

SUPERSEDES NO :

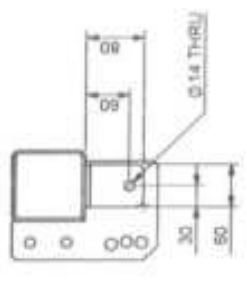
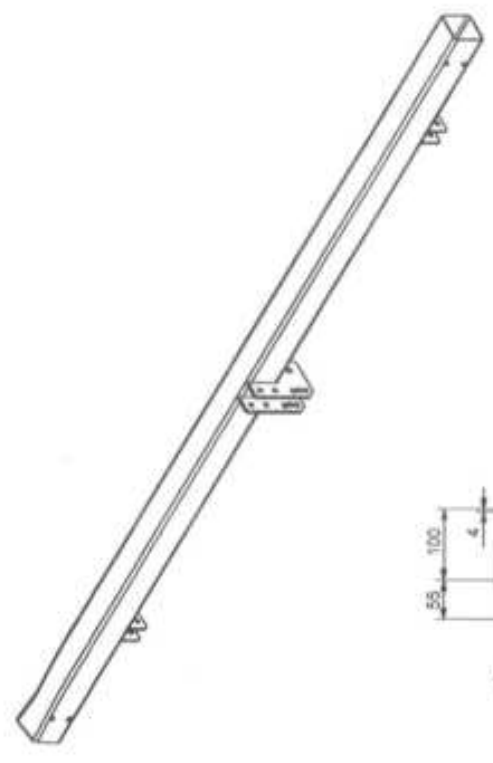
4) Center beam



DETAIL B
SCALE 1 : 10



SECTION A-A
SCALE 1 : 10



PROFESSOR & HEAD OF
STRUCTURAL ENGG. DEPTT
B. V. MAHAVIDYALAYA
VALIYAD
KANNUR
KERALA

(Signature)
PRINCIPAL

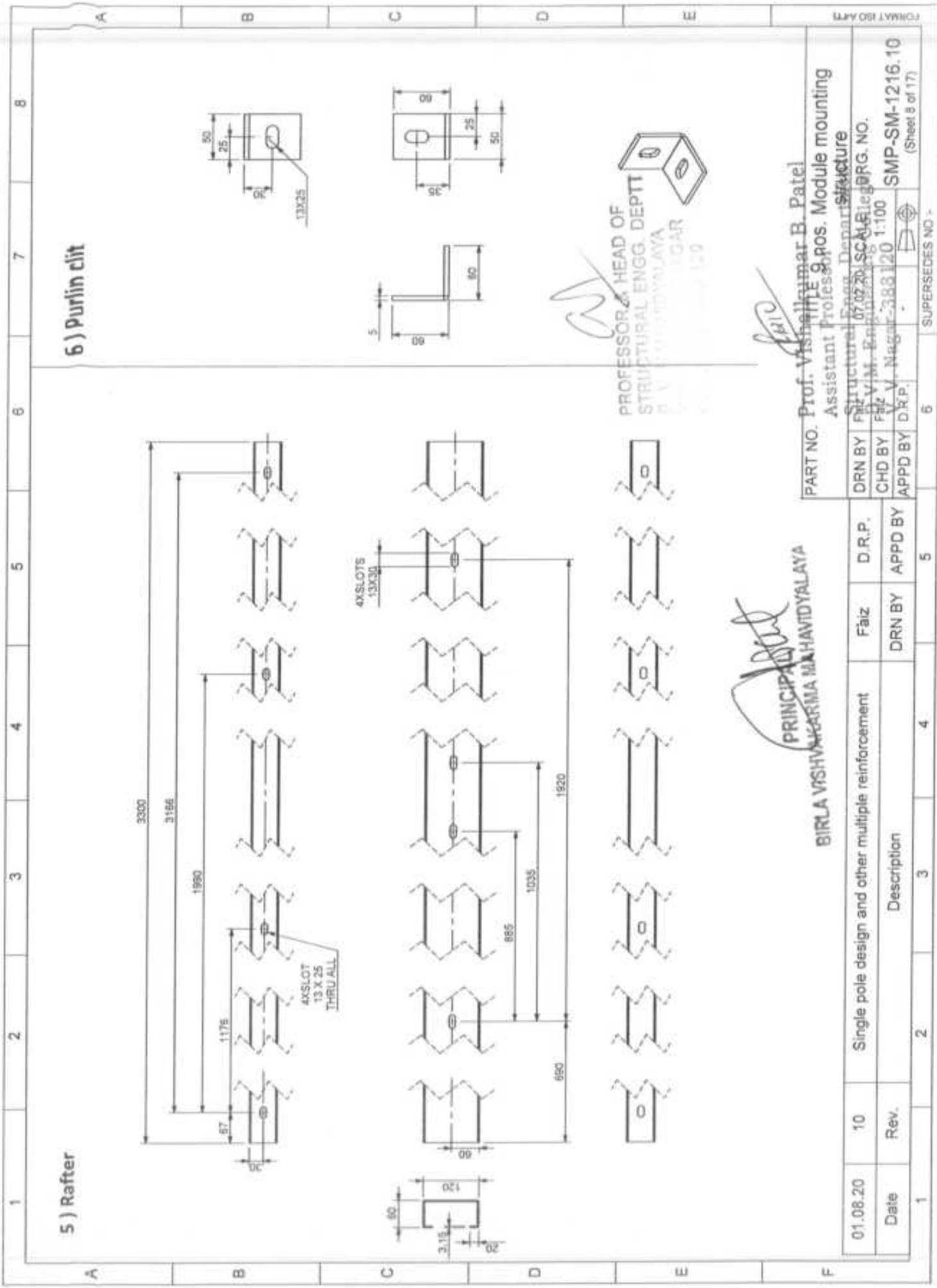
BIRLA VISHVAKARMA MAHAVIDYALAYA

Prof. VISHNUKUMAR B. PATIL
Assistant Professor
D. R. Prudh. Deptt. of Civil Engg.
B. V. Mahavidyalaya, Valiyad, Kannur, Kerala

DRN BY: DR. P. J. CHANDRAN
APPD BY: DR. P. J. CHANDRAN

01.08.20	10	Single pole design and other multiple reinforcement	Drn By: DR. P. J. CHANDRAN	07.02.20	SCALE 1:100	DRG. NO. SMP-SM-1216.10
Date	Rev.	Description	DRN BY: DR. P. J. CHANDRAN	APPD BY: DR. P. J. CHANDRAN	SCALE 1:100	SMP-SM-1216.10 (Sheet 7 of 17)

SUPERSEDES NO. -



5) Rafter

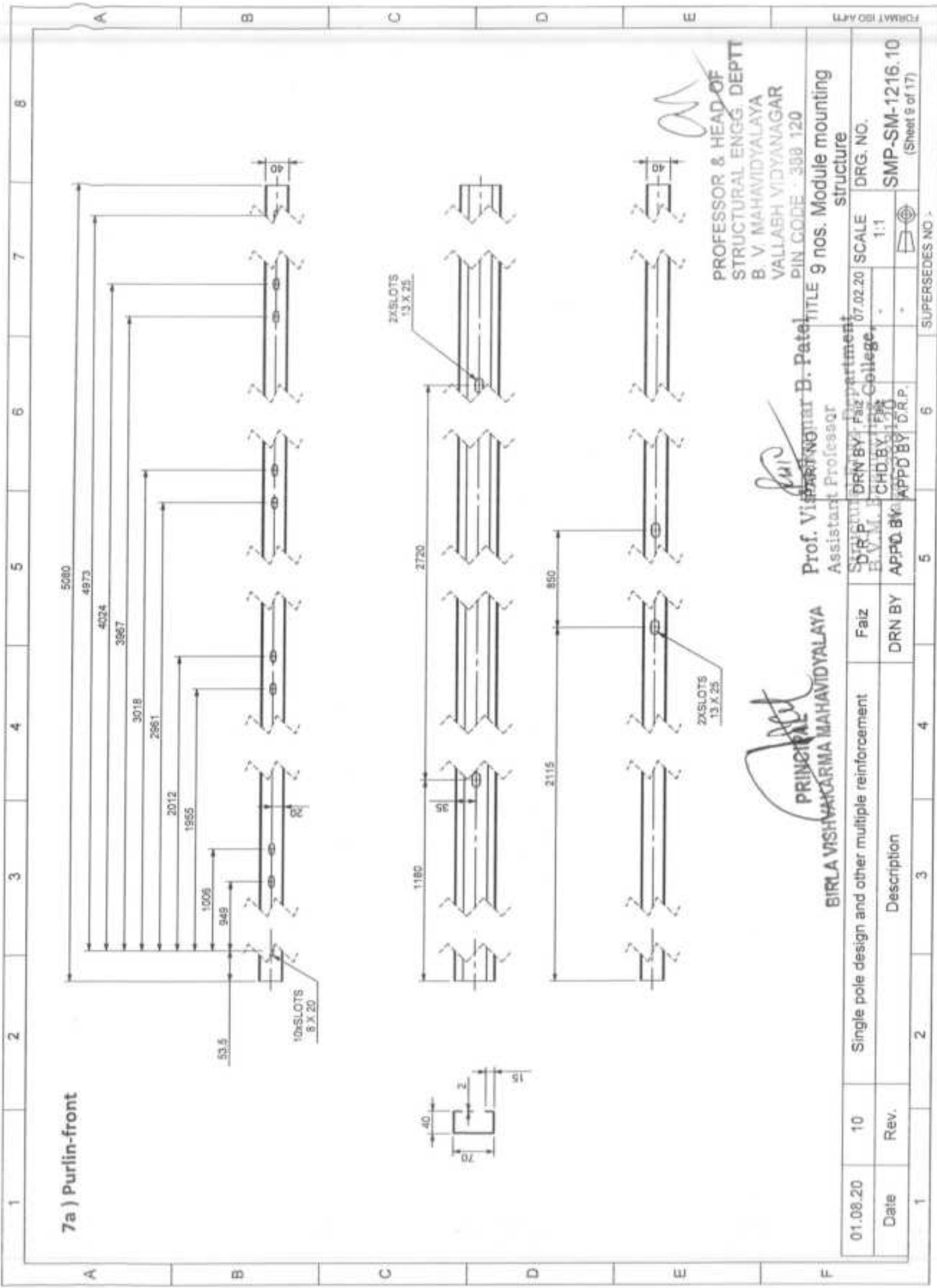
6) Purlin clut

PROF. VISHVAKUMAR B. PATEL
 ASSISTANT PROFESSOR, DEPT. OF STRUCTURAL ENGG. DEPT.
 BIRLA VISHVAKARMA MAHAVIDYALAYA
 V. NAGAR
 120

PRINCIPAL
 BIRLA VISHVAKARMA MAHAVIDYALAYA

PART NO. Prof. Vishv Kumar B. Patel	
Title 9 pos. Module mounting structure	
DRN BY	Structural Engg. Dept.
CHD BY	070720 SCA/16
APPD BY	Dr. V. M. Nagar
Scale 1:100	
SMP-SM-1216.10	
(Sheet 8 of 17)	

Date	Rev.	Description	DRN BY	APPD BY	Faiz	D.R.P.
01.08.20	10	Single pole design and other multiple reinforcement				



7a) Purlin-front

PROFESSOR & HEAD OF
 STRUCTURAL ENGS. DEPTT
 B. V MAHAVIDYALAYA
 VALLASH VIDYANAGAR
 PIN CODE - 398 120

Prof. Vishwanath B. Patel
 Assistant Professor

DRN BY: Faiz Department
 CHD BY: Faiz College
 APPD BY: D.R.P.

PRINCIPAL
 BIRLA VISHWAKARMA MAHAVIDYALAYA

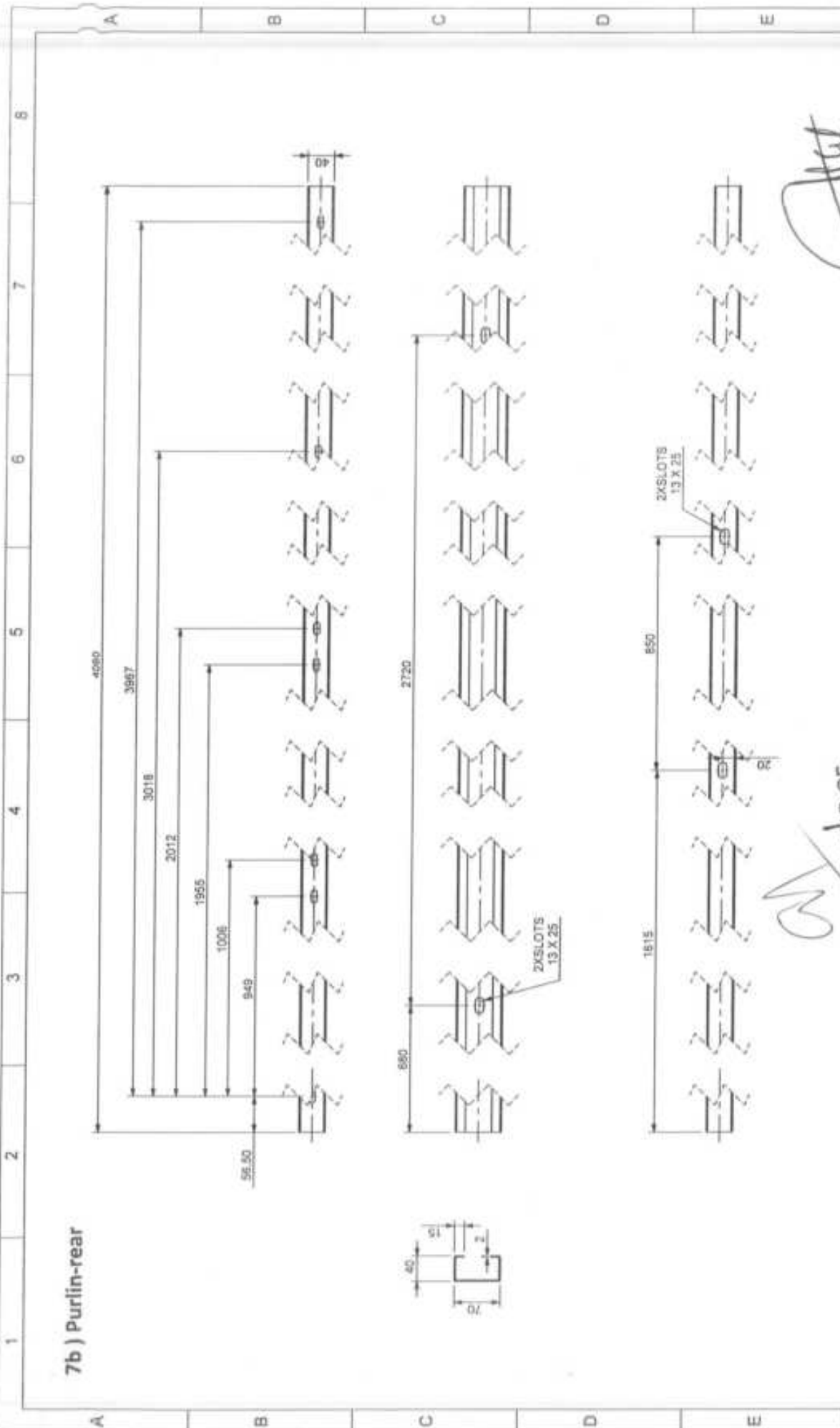
DRN BY: Faiz
 Description

01.08.20	10	Single pole design and other multiple reinforcement	Faiz
Date	Rev.	Description	DRN BY

TITLE 9 nos. Module mounting structure

DRG. NO.
 SMP-SM-1216.10
 (Sheet 6 of 17)

SUPERSEDES NO. 6



7b) Purlin-rear

PROFESSOR & HEAD OF
STRUCTURAL ENGG. DEPTT.
B. V. MAHAVIDYALAYA
VALLABH VIDYANAGAR
PIN CODE - 548 120

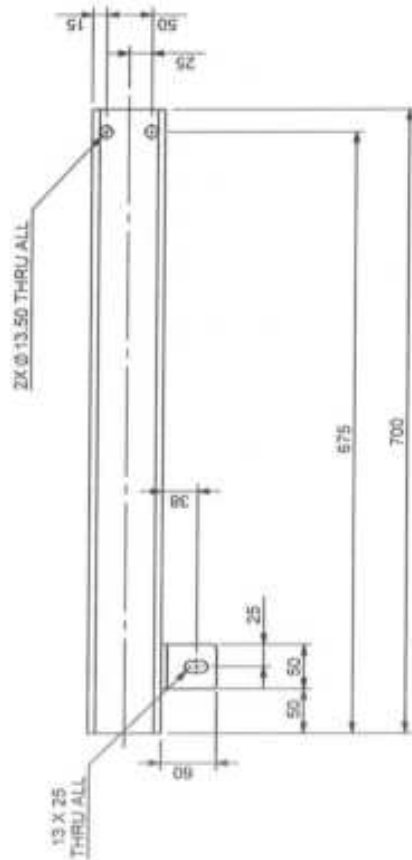
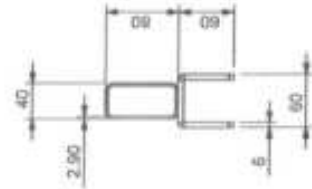
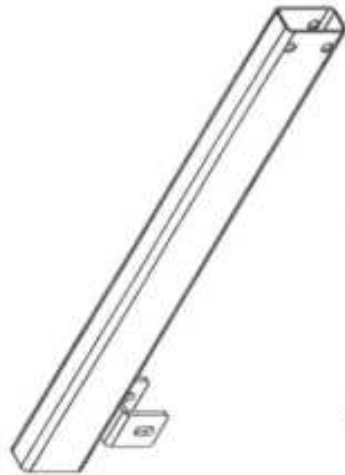
PRINCIPAL

BIRLA VISHVAKARMA MAHAVIDYALAYA

Prof. Vishwanath B. Patel TITLE 9 nos. Module mounting structure

01.08.20	10	Single pole design and other multiple reinforcement	Faiz	DRN BY: Faiz	Department: 02.20	SCALE	DRG. NO.
Date	Rev.	Description	DRN BY	APPR. BY: CHD BY: APPD BY:	1:50		SMP-SM-1216.10 (Sheet 10 of 17)

8) North south branching



PRINCIPAL

BIRLA VISHVAKARMA MAHAVIDYALAYA

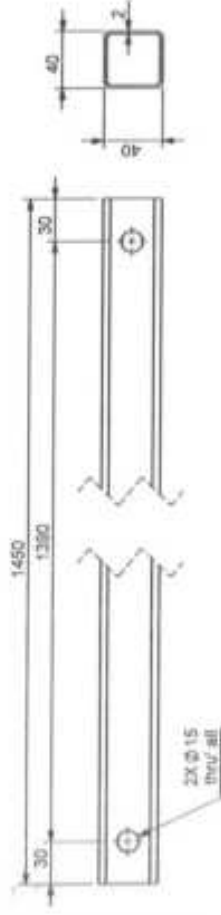
PROFESSOR & HEAD OF
STRUCTURAL ENGG. DEPTT.
B. V. MAHAVIDYALAYA
VALLASH VICHYANAGAR
PIN CODE : 585 120

Prof. Vishwam B. Patel
Assistant Professor

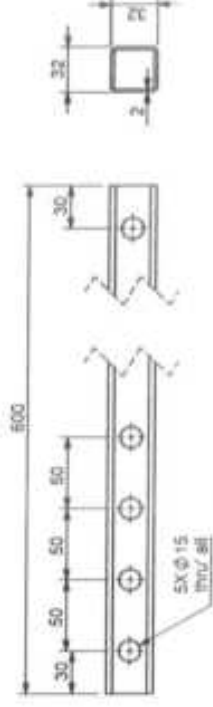
Department of
Structural Engineering College
V.V.M. Engineering College
SMP-SM-1216.10
(Sheet 11 of 17)

PART NO.		TITLE 9		SUPERSEDES NO.	
DRN BY	Faiz	DRN BY	Faiz	DRN BY	Faiz
CHD BY	Faiz	CHD BY	Faiz	CHD BY	Faiz
APPD BY	D.R.P.	APPD BY	D.R.P.	APPD BY	D.R.P.
01.06.20		10		Single pole design and other multiple reinforcement	
Date	Rev.	Description			
1	2	3	4	5	6

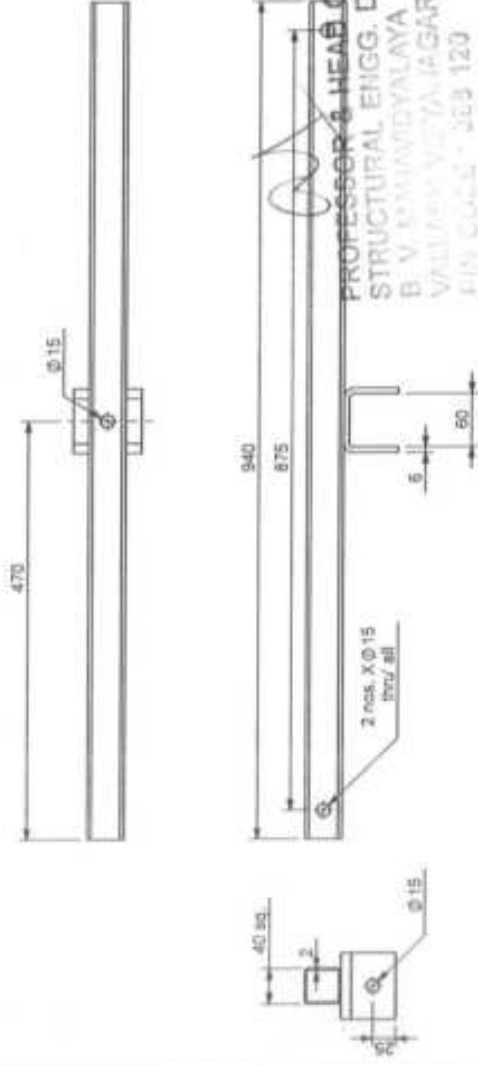
11) Rear tilt Support bottom



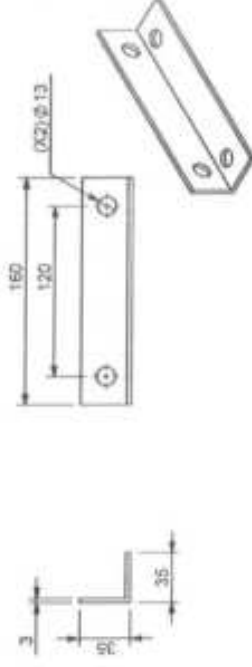
12) Rear tilt Support top



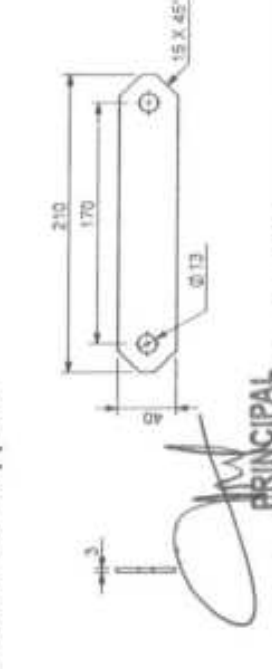
13) Sq. pipe for rear support



14) Angle for rear support



15) Flat for rear support



Date	Rev.	Description	1	2	3	4	5	6	7	8
01.08.20	10	Single pole design and other multiple reinforcement								

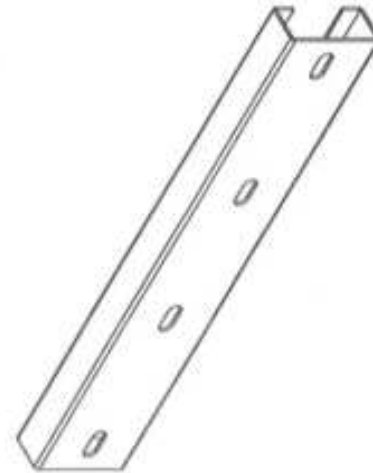
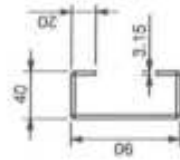
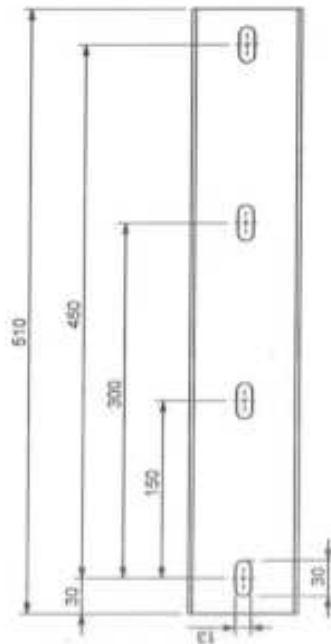
DRN BY: Faiz
CHK BY: Faiz
APPD BY: D.R.P.

DRG. NO. SMP-SM-1216.10
SCALE 1:5
07.02.20

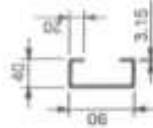
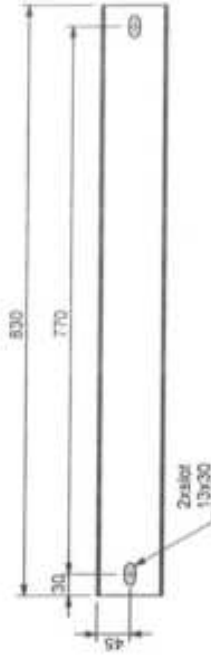
Supersedes No. 6

PRINCIPAL
BIRJANSHVAKARMA MAHARAJAYALAYA
Module mounting structure

16) Rafter bracing holder



17) Rafter bracing



PROFESSOR & HEAD OF
STRUCTURAL ENGG DEPTT
B. V. MAHARAJA
VALLABH VASTU-JAGAR
PIN CODE - 365 120

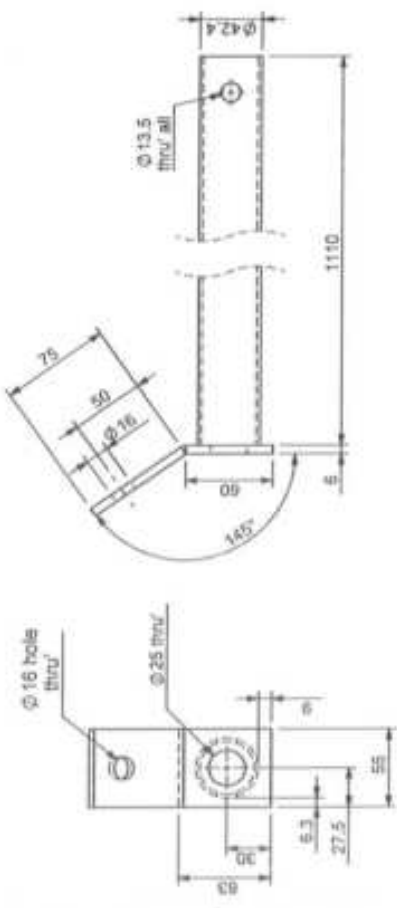
PRINCIPAL
BIRLA VISHVAKARMA MAHAVIDYALAYA

Prof. Vishwanumar B. Patel
TITLE 9 nos. Module mounting
structure I Engr. Department
SCALE B. V. PRG. NO Engineering College,
1:10 V.M.P. SM-1246/30
(Sheet 14 of 17)

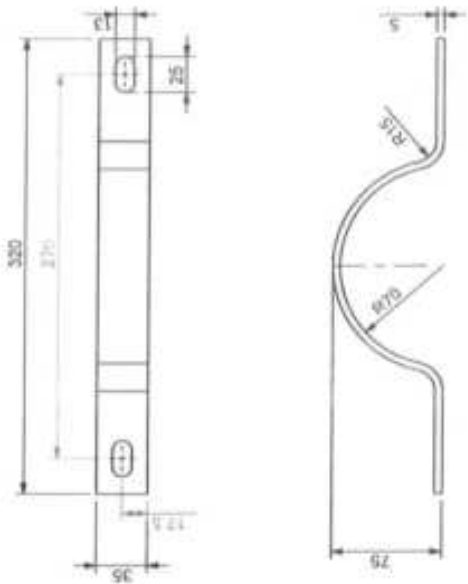
Date	Rev.	Description	DRN BY	APPD BY	D.R.P.	DRN BY	APPD BY	D.R.P.	CHD BY	APPD BY	D.R.P.	SCALE	TITLE
01.08.20	10	Single pole design and other multiple reinforcement	Faiz			Faiz			Faiz			07.02.20	07 nos. Module mounting

1 2 3 4 5 6 SUPERSEDES NO. 17

18) Bracing center beam



19) Controller clamp - rear

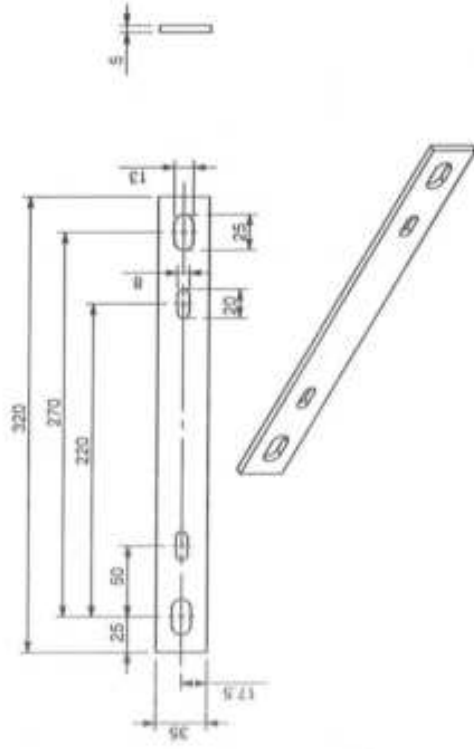


PROFESSOR & HEAD OF
STRUCTURAL ENGG. DEPTT
B. V. MAHAVIDYALAYA
VALURU, VADAVAGAR
PIN CODE: 523 153

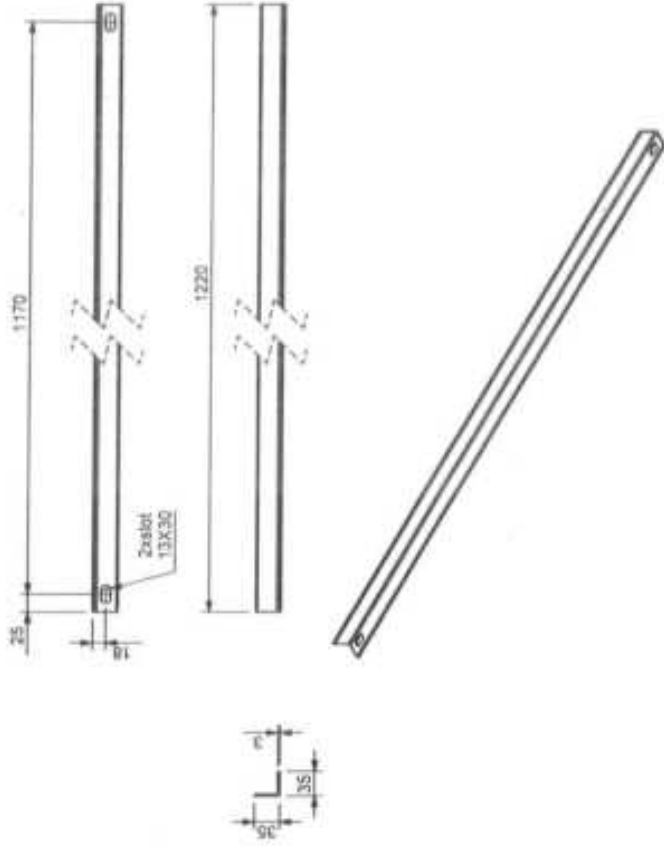
PRINCIPAL
DR. A. VISHVAKARMA MAHAVIDYALAYA

Prof. Vishal B. Patel Assistant Professor		TITLE 9 nos. Module mounting structure	
01.08.20	10	Single pole design and other multiple reinforcement	07.02.20
Date	Rev.	Description	SCALE 1:10
			DRG. NO. SMP-SM-1216.10
			(Sheet 15 of 17)
			SUPERSEDES NO. >

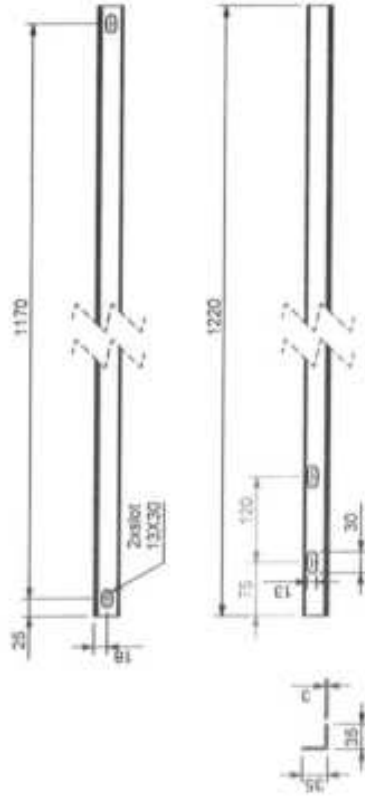
20) Controller clamp - Front



21a) Front sag angle



21b)Rear sag angle



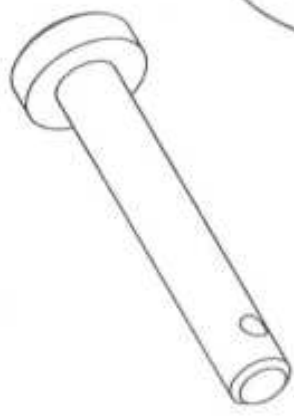
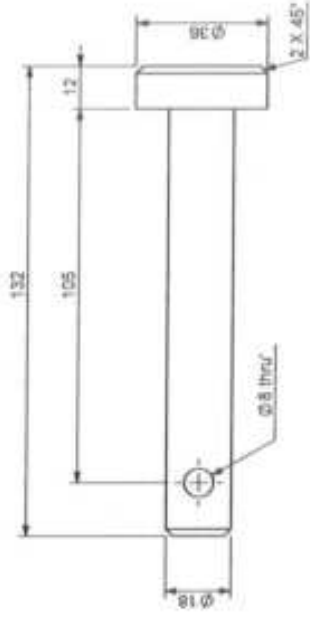

PRINCIPAL
BIRLA VISHVAKARMA MAHAVIDYALAYA
 BIRLA INSTITUTE OF TECHNOLOGY
 WILSON COLLEGE ROAD
 RAIPUR - 492 010
 CHHATTISGARH
 INDIA

Prof. Vishwakarma B. Patel
 Assistant Professor

01.06.20	10	Single pole design and other multiple reinforcement	Faiz Strudr.P.	DRN BY: Faiz Strudr.P.	07.02.20	SCALE	1:2	DRG. NO.	SMP-SM-1216.10
Date	Rev.	Description		DRN BY: V. N. G. BY: APPD BY: D.R.P.					(Sheet 16 of 17)

TITLE 9 nos. Module mounting structure
 SUPERSEDES NO.

22) Center pin



PRINCIPAL
BIRLA VISHVAKARMA MAHAVIDYALAYA

PROFESSOR & HEAD OF
STRUCTURAL ENGG. DEPTT
B. V. PRADEEP MALAYA
VALLATHOOR, KANNUR
PIN CODE - 613 139

Date	Rev.	Description	DRN BY	APPD BY	D.R.P.	DRN BY	APPD BY	D.R.P.	PART NO.	TITLE
01.06.20	10	Single pole design and other multiple reinforcement	Faiz		D.R.P.	Faiz			-	Prof. V. Pradeep Malaya Assistant structure
			Faiz			Faiz				07.02.20
										SCALE
										B.V.P.M.S
										BRG. NO. Department
										V.V.P.M.S
										Engineering College
										SMP-SM-1216.10
										(Sheet 17 of 17)
										SUPERSEDES NO.
										6

Prof. (Dr.) Indrajit Patel
Principal



Birla Vishvakarma Mahavidyalaya
BVM Engineering College
An Autonomous Institution
(Managed by Charutar Vidya Mandal)

NO.F/2004



11 November 2020

To,
Neety Euro Asia Solar Energy
E-153 GIDC Electronic Estate,
Beside Gujarat Petronet,
Sector -26, Gandhinagar- 382024
Gujarat

Subject: Evaluation of Module Mounting Structures for solar pumps – 9 and 10 panels mounting

Dear Sir,

You have submitted following drawings for Solar Photovoltaic Module mounting structures for solar water pumps for evaluation of their suitability for bearing a wind load of 150 Kms/hour:

Structure size	Drawing Number
9 Module MMS	SMP-SM-1216.10
10 Module MMS	SMP-SM-1217.10

The same have been evaluated as per IS 875-1964 for bearing a wind load of 150 Kms/hour and we here confirm that these drawings meet the requirements of IS 875-1964 for a wind load of 150 kms/hour

These designs were evaluated by us using Finite Element Analysis (FEA) for various parameters described in IS 875-1964 and found to be having a factor of safety of 2.0 or higher at wind load of 150 kms/hour.

Structure size	Drawing Number	Calculated Factor of Safety as per IS 875-1964
9 Module MMS	SMP-SM-1216.10	The Elements have been designed using guidelines as per IS 875-1964, the attached report shows that actual stress in elements are at least 2 times less than allowable stress. Hence, it has 2 FOS.
10 Module MMS	SMP-SM-1217.10	

Contd. on page - 2 -



2

We have also compared the designs of the structures which are provided in the tender No. NIT/Bid Document No. EESL / 06 / 2019-20/ KUSUM/ SWPS/ Phase-1/ Off Grid/ 192007012 dt 18-07-2019 (Section-4; Page-19 of 102 Clause 3.5.3) which we call as the 'Indicative MNRE design' with the structure and foundation designs as per following drawing numbers which we call the 'ALTERNATE design'.

Sr No	Structure size	Drawing Number
1	9 Module MMS	SMP-SM-1216.10
2	10 Module MMS	SMP-SM-1217.10

We hereby state that the improved technical features and advantages of the ALTERNATE design over the Indicative MNRE design.

Sr. No	Feature	Improvement in Alternate design	Advantage/Benefit
1	Factor of safety	MNRE design specifies the structure should be suitable for wind load of 150 Kms/hour. The alternate design has a factor of 2.0 or higher of all the structural members considering a wind load of 150 Kms/hour for various parameters described in IS 875-1964 and IS-800	Higher factor of safety would result in better reliability and longer life of the structure.
2	Use of all parts as per BIS standards	MNRE design has several parts as per attached table which are not as per IS 1161 whereas all the members used in ALTERNATE design are as per IS 1161. Refer annexure to this certificate	100% conformity of all parts to national standards resulting in better quality.
3	Shear force withstanding capability	The central member of MNRE design has a shear force withstanding ability of 8.0 KN/m, whereas the ALTERNATE design has a shear force withstanding ability of 11.5 KN/m. for 10 MMS design and 11.0 KN/m for 9 MMS design.	35% higher shear force withstanding ability of the central member would ensure higher strength and reliability of the ALTERNATE design
4	Shadow free area occupied by the structures	As per MNRE design 3 structures of 8 MMS and 1 Structure of 4MMS(total 4 structures),with 4 civil foundations, are required for 10 hp solar pump. In ALTERNATE design, just 3 structures (2 of 9 MMS and 1 of 10 MMS), with 3 civil foundations, are required.	25% less land use for 10hpsolar pump.
5	Foundation suitability for sandy soils.	As per MNRE, Annexure-1 of Circular No. F. No. 41/3/2018-SPV Division dated 17.7.2019 specifications of MMS – Specification of main parts point 1, Centre	Direct Piling design is preferable for soft soil type like sandy soil or soil having low bearing capacity (lower than 1.73g/cm ³).

Contd. on page -3 -




3

		<p>shaft, suggests the foundation can be with Base plate and J bolts or direct piling foundation design.</p> <p>The ALTERNATE design employs piling foundation type and such type of foundation is better suited for soft and sandy soils having density lower than 1.7g/cm³</p>	<p>Piling design also provides high uplift resistance to Wind loads. The structure having piling foundation has better alignment than the structure having 4 nos J-BOLT foundation.</p> <p>Alternate design structure of foundation is 200 mm above the ground level, to avoid water logging and longer life of structure.</p> <p>In J- Bolt foundation structure design, the entire load of the super-structure rests on J- Bolts which are 750 mm below ground level, whereas, in piling foundation, the main pole is 850 mm inside the RCC providing higher stability to the super-structure.</p> <p>Piling design prevents the users from installing the structures on their roof tops and other unsuitable sites.</p>
--	--	---	--

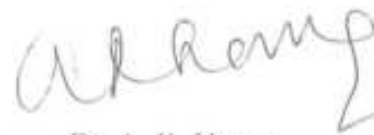
Thus, we state that the 'ALTERNATE design' of structures have several improvements over the ' Indicative MNRE design' as stated above and hence, the ALTERNATE design is an improved design.

We have certified similar design and drawings of MMS for Rotomag Motors and Controls Pvt Ltd through letter no F/71/925 dated - 07/08/2020 and Solex Energy Ltd through letter no F/71/926 dated- 10/08/2020.

Certified copy of each of the aforementioned drawings, including the drawing for the foundation are attached herewith.


Prof. Vishalkumar B. Patel
Asst. Prof.
BVM Engg. College,
V.V.Nagar


Dr. I. N. Patel
Principal
BVM Engg. College,
V.V.Nagar


Dr. A. K. Verma
Head, Structural Engg. Dept.
BVM Engg. College,
V.V.Nagar



Turning Solar Technology Into Practical Solutions.

20th November 2020

To,

The Director General,
DNRE and HAREDA,
Panchkula, Haryana

Subject: Submission of drawings of MMS for solar water pumps for Acceptance/Approval.

Ref: 1. LoA No. 2385-2391 dated 18.05.2020
2. EESL Tender No. EESL/06/2019-20/KUSUM/SWPS/Phase-1/10HP/Off-Grid/ 192012030 dated 20.12.2019.

Dear Sir,

We express our sincere thanks for issue of LoA for installation of 343 numbers of 10 Hp solar submersible water pumps in the State. We wish to confirm that we will work towards a speedy and successful implementation of the program.

As an ongoing and continuous improvement process, we propose to install 2 x 9 MMS and 1x10 MMS at each farmer site Accordingly, we wish to submit herewith our following drawings of MMS - 'module mounting structure:

1. 9 MMS SMP SM 1216.10
2. 10 MMS SMP SM 1217.10

Both the above MMS drawings have been certified by BVM Engineering College vide their letter no. F/2004 dated 11th November 2020 which are enclosed herewith for your ready reference. Improvement in these MMS is as follows:

- i) Centre pipe of full 1845 mm length, having the piling design, has been incorporated.

Submitted for your kind perusal and confirmation of acceptance of these MMS drawings for installation.

Thanking you in anticipation of an expedited favourable action,

Yours Sincerely,
For NEETY EURO ASIA SOLAR ENERGY,



Manoj Kumar Bhaskar
(Vice President – Operations)
(M) - 9099083421