

Title: 4600

Louvre Operation: Motor x 2

Control Method: Remote and Post Mount

Colour: Traffic White RAL 9016
Anthracite Grey RAL 7016

Lighting: LED Strip

Power Requirements: 10 Amp circuit

Material: Powder Coated Aluminium

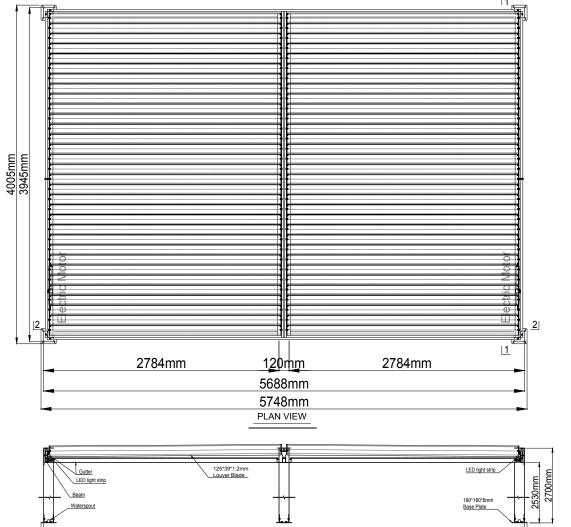
Recommended Foundation: Concrete*

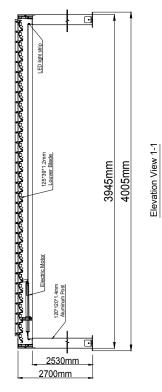
* Check with your local council

This pergola is intended as a semi-permanent structure - Please contact your local council for semi-permanent structure approval requirements.











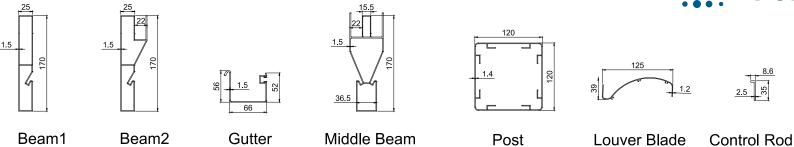
120mm 120nm 2664mm 2664mm 5688mm

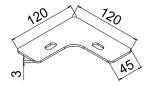
> 5748mm Elevation View 2-2

This pergola is intended as a semi-permanent structure - Please contact your local council for semi-permanent structure approval requirements.

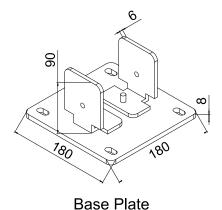


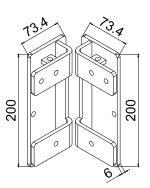




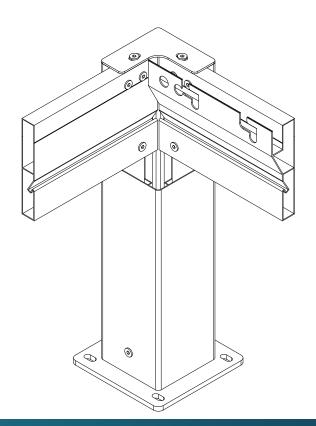


Post Top Cover





Post + Beam Connector





Vortex Pergola™ 4600 Packaging Info.

Vortex Pergolas

Delivered in individual cartons

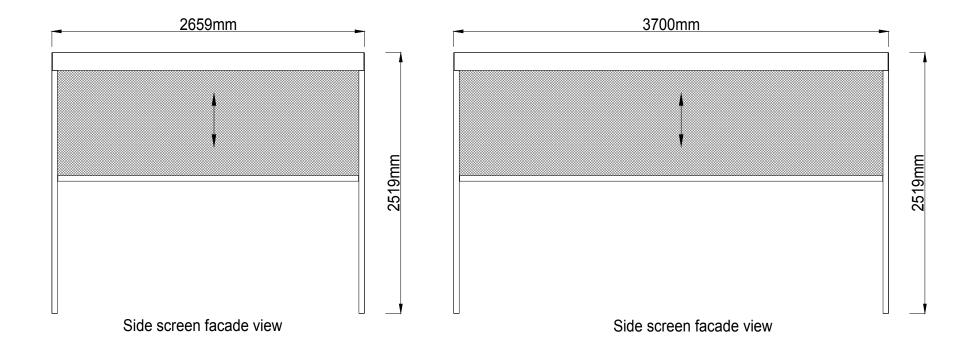
Standard Dimension (meters)		Packing Box Size (mm)		Total	Carton	N.W	G.W	Volume	Description				
Width	Length	Height	Width	Length	Height	Package/ Set	No.	(kgs)	(kgs)	СВМ	Description		
			200	4010	200		1/8	48	52	0.16	Beam/Gutter/Control Rod/Motor		
			205	3895	200		2/8	38	42	0.16	Beam		
			356	2843	450		3/8	39	44	0.46	Louver Blades		
4	,		356	2843	450	8 -	4/8	39	44	0.46	Louver Blades		
4	6	2.7	356	2843	450		5/8	39	44	0.46	Louver Blades		
			356	2843	450		6/8	52	56	0.46	Louver Blades		
			270	2970	265		7/8	43	47	0.21	Post/Accessories		
					270	2735	145		8/8	19	23	0.11	Post
Optional Pergola Privacy Blinds Packaging													
	3	2.7	170	2825	220	1	21	25	21	25	Guided Zip Track Blind		
	4	2.7	170	3810	220	1	26	31	26	31	Guided Zip Track Blind		

The included anchors are for the standard concrete foundation design detailed in this document and certified by independent Engineers. Any other foundation type, including a wood deck, will require you to seek advice from an Engineer, which will stipulate the fasteners that are required.



Optional Pergola Privacy Blinds









This pergola is intended as a semi-permanent structure - Please contact your local council for semi-permanent structure approval requirements.

NOTICE

Equipotential Bonding Compliance Obligation

This product is subject to Equipotential Bonding compliance in accordance with the Australian and New Zealand Standards (AS/NZS 3000: 2018 Electrical Installations) otherwise known as the Wiring Rules. If this product is installed within arms reach of a body of water including spa, swim spa or pool, then Equipotential Bonding MUST be performed by a licensed electrical person prior to the product being used. This is a mandatory requirement. As the purchaser of this product, you are responsible for ensuring compliance with this requirement at your own expense.





Drainage around your pergola

In most cases, you will need to install drainage around your pergola or gazebo if the roof is fully closed or can be closed. We always recommend checking local council regulations before you purchase or install a pergola.

- Your council may require you to install drainage around a pergola with fully closing louvres to catch the rainwater that flows across the louvres and down through the posts.
- Your council may also require water to be redirected to the household stormwater system, such as the downpipe system from your house.

Depending on your local regulations, you may not be allowed to let the water come out of the water spouts at the bottom of the pergola posts and onto the ground without drainage to catch and redirect it to the household stormwater system.

If you are installing your spa on an existing or new pad, you should consult with a building certifier before any installation to determine the requirements.





Frequently Asked Questions

This section is designed to provide a simplified overview of current regulations in reference to Vortex Pergolas™. It is not state specific and therefore is not a complete guide.

We advise you to seek independent advice for your individual site requirements.

Do I need council consent to install a pergola?

This depends on the state you live in and the value of your complete project. Please contact your local council for the complete details.

Can I install my Pergola onto a deck?

Yes, however, the engineering that has been done is based on a concrete footing. If you wish to put the pergola on a deck, you must have the foundation certified by an engineer.

Do I need engineering for my pergola?

Spa World provides engineering documents on the following pages. The engineering is based on standard concrete foundations. Any variation from the standard foundation will require re-engineered certification.

Do I need an Electrician for the installation of my Pergola?

Yes, a licenced electrician is required to hardwire the electrical supply to the motorised pergola. The cable can be hidden by running it through the posts for a tidy finish.

How Many motors are on the Vortex pergolas?

3300 = 1

3400 = 2

4600 = 2

How far do the louvres open?

Roughly 90°

How long does it take to install a pergola?

Each installation will vary based on many factors including, location, foundations, workers availability and experience etc. As a guide, a pergola can take 4-6 hours with 3 people.

Do Vortex Pergolas have a wind rating/classification?

Yes, you can find that on the following pages.

What grade of aluminium is used in the Vortex Pergolas?

6063-T5. (Detailed information available in the following pages)

Are the pergolas available in a lower height model?

Unfortunately, we cannot provide custom sizes.

Am I able to attach the pergola to an existing structure, such as a house?

We recommend that you discuss this option with your builder/ engineer.

Can we have changing colours in the LED Lighting?

Unfortunately, we are unable to offer this at this stage.

Do the Louvre's automatically close when it rains?

The louvres do not automatically close when it rains.

Does Spa World offer an installation service for Pergolas?

Unfortunately, Spa World is unable to offer an installation service. Please talk with your sales consultant and they can provide installation contractor options.





Installation Video

Please follow the URL or scan the below QR code with your smart device camera to access the installation video. https://www.qrs.ly/pfcwvr3



Please note that the instruction assembly steps detailed in the video may be slightly different from the manual, however, either is fine to use.



Vortex Pergolas™ Limited Warranty

Vortex Leisure Pty Ltd owns the Vortex Pergolas™ brand

5-year structural warranty

Vortex Leisure Pty Ltd warrants the structural integrity of the pergola frame against defects in workmanship and materials for 5 years subject to the limitations, conditions and exclusions expressed in this warranty.

1-year lighting warranty

Vortex Leisure Pty Ltd warrants against any defects in the LED lighting supplied by Vortex Leisure Pty Ltd for a period of 1 year from date of delivery. This warranty does not cover damage to the lights caused by incorrect use.

1-year motor warranty

Vortex Leisure Pty Ltd warrants the motor against defects in materials and workmanship for a period of 1 year from date of delivery. This warranty does not cover damage to the motor caused by incorrect use or installation.

1-year electronic components warranty

Vortex Leisure Pty Ltd warrants electronic control systems against defects in materials and workmanship for a period of 1 year from date of delivery.

1-year pergola blinds warranty

Vortex Leisure Pty Ltd warrants the pergola blinds against defects in materials and workmanship for a period of 1 year from date of delivery. The blinds must remain retracted when not in use. High winds can damage the blinds and this damage will not be covered under warranty. Fading and weathering of the surface will occur naturally over time, and are not considered defects and will not be covered under warranty.

1-year louvre roof warranty

Vortex Leisure Pty Ltd warrants the louvre roof and its components against defects in materials and workmanship for a period of 1 year from date of delivery. Fading and weathering of the surface may occur naturally over time, and are not considered defects.

1-year powder coat warranty

Vortex Leisure Pty Ltd warrants the powder coat for a period of 1 year from the date of delivery. Fading and peeling may naturally occur over time and will not be covered under warranty. Damage caused to the powder coat due to improper use will not be covered under warranty. Disposal of any component replaced under warranty will be the owners responsibility.

Warranty coverage

Warranty coverage begins at the delivery date. Vortex Leisure Pty Ltd only extends this warranty to the original purchaser and only if the pergola has been purchased through an authorised Vortex Leisure Pty Ltd reseller. Written notice of the defect and proof of purchase must be provided to Vortex Leisure Pty Ltd or it's nominated representative within 14 days of the defect occurring. If the pergola is required to be returned to Vortex Leisure Pty Ltd for rectification all freight costs shall be pre-paid by the customer. Repair or replacement of any defective product is at the sole discretion of Vortex Leisure Pty Ltd. To action warranty service contact the authorised Vortex Leisure Pty Ltd reseller you purchased from. If you are unable to obtain satisfactory service from your reseller written notification must be provided to Vortex Leisure Pty Ltd within 14 days of the defect occurring.

Pergola Installation

We recommend that the pergola is installed by qualified builder.

Electrical connection

Any required electrical work must be carried out by a licensed electrician. Vortex Leisure Pty Ltd reserve the right to ask for proof that the pergola has been installed by a qualified electrician.

Warranty exclusions

- 1. Damage resulting from improper maintenance.
- Damage caused to the pergola by improper use and natural fading from sunlight.
- 3. Acts of God.
- 4. Issues arising from incorrect installation or is built on an unlevel surface.
- Damage caused by incorrect electrical installation, brownouts, voltage spikes or operating pergola out of +/-10% of voltage range.
- Commercial use reduces all warranties to maximum 6 months
- Damage caused by relocation of the pergola from its original installed location.
- 8. Damage caused by third party carriers.
- 9. Drain or gutter leakage.
- 10. Remote batteries are excluded from the warranty.

Limitations

This warranty is the only warranty offered by Vortex Leisure Pty Ltd and excludes any other implied or oral undertakings. Except as described above, this warranty does not cover defects or damage due to normal wear and tear, improper installation, alteration without Vortex Leisure Pty Ltd prior written consent, accident, acts of God, misuse, abuse, commercial or industrial use, use of an accessory not approved by Vortex Leisure Pty Ltd, failure to follow Vortex Pergolas™ or Owner's Manual, or repairs made or attempted by anyone other than an authorised representative of Vortex Leisure Pty Ltd. Vortex Leisure Pty Ltd or its agents will not be liable for any incidental or consequential loss or injury. Vortex Leisure Pty Ltd will not be liable for costs associated with but not limited to building alterations, removal costs, delivery costs or labour costs associated with the replacement or repair of pergola and parts.





Certificate of Compliance

BARRASON'S ENGINEERS

Structural and Civil Consultants



Building Act 1993 Section 238(1)(a) Building Regulations 2018 Regulation 126

CERTIFICATE OF COMPLIANCE FOR PROPOSED BUILDING WORK

This certificate is issued to

TBA

This certificate is issued in relation to the proposed building work at:

N/A – the Vortex 4600 Aluminium Pergola

Nature of proposed building work

Construction of a *new building/*extension/*alteration/*change of use/*demolition/*removal/*reerection of a building

Building classification as per NCC 2019

Part of building: 4x6 m Aluminium Gazebo BCA Classification: 10a

Prescribed class of building work for which this certificate is issued:

Design or part of the design of building work relating to *Structural matter*

Documents setting out the design that is certified by this certificate

Document no.	Document date	Type of document	No of Pages	Prepared by
2010071	19/11/20	Structural Assessment Report	16	Barrason's Engineers
GE2032JO	10/07/20	Drawings (isometric view, elevation view, connections)	3	AlunoTec

The design certified by this certificate complies with the following provisions of Building Act 1993, Building Regulations 2018 or National Construction Code Volume 2

Act, Regulation or NCC	Section, Regulation, Part, Performance Requirement or other provision
NCC 2019 Volume 2	Part 3.2, 3.4 & 3.11 of the NCC Vol2-2019 including relevant Australian Standards: AS1170.0, AS/NZ1170.1-2002, AS/NZ1170.2-2011, AS1664.1, AS4100, AS4055, AS4673

BARRASON'S ENGINEERS

Structural and Civil Consultants



I prepared the design, or part of the design, set out in the documents listed above.

I certify that the design set out in the documents listed above complies with the provisions set out above.

I believe that I hold the required skills, experience and knowledge to issue this certificate and can demonstrate this if requested to do so.

Engineer:

Name: Andrew Barraclough Registrations: FIEAUST, CPEng, NER, RBP

email: admin@barrasons.com.au Qualifications: BEng MEng PhD

Business licensing authority registration number: PE0000600 RPEQ 22822

Signed: Date of issue of certificate: 01/03/2022



19 November 2020

Reference: 2010071

Attention: Tony Jones, SPA WORLD

Dear Tony,

Re: Structural Assessment of 4x6 Aluminium Gazebo from AlunoTec

This report is a structural assessment of the **4x6** metre aluminium gazebo manufactured by AlunoTec and is intended solely for the use by Spa World Australia.

The structural frame of the gazebo will be stable when built on a residential site classed up to the following residential wind categories: **N3** and **C1**.

Ultimate Limit State wind speed: **50 m/s** Serviceability Limit State wind speed: **32 m/s**

The design is in accordance with the following standards: AS1170.0, AS1170.1, AS1664.1, AS4055.1.

Design Assumptions and Limitations

- This design assumes that the louvres and any attached side screen will be open on days of strong wind.
- It is assumed any attached side screen will be removed by the wind before the wind load is strong enough to destabilise the structure.
- A conservative simplified profile of the beam elements has been designed
- The aluminium louvres are non-structural and have not been assessed in this design
- It is assumed that a swim spa sits beneath the gazebo and that no goods or materials will be stored under the gazebo that block more than 50% of the cross-section exposed to the wind.
- This design has not considered snow loads if constructing in areas exposed to snow contact this office for further guidance.

The computations for the gazebo follow.









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Structural Member Properties

Cross-section profiles of structural members are contained in Drawing 3 provided by AlunoTec.

Material properties

The members are constructed from Grade 6063-T5 Aluminium of below properties:

Property	Fty	Ftu	Fcy	Fsu	Fsy	Fbu	Fby	E
Strength (MPa)	110	152	110	90	62	317	179	70,000

Calculated Structural Properties

Column:

120 x 120 x 1.4 mm RHS length 2700 mm

2700
653
1516418
1516418
2335512
48.18955
48.18955
60
25273.63
25273.63
1.55536
0.53954
1.253361
0.79775
1
1.12
120
1.4
120

Simplified Beam:

170 x 25 x 1.5 mm RHS length 4000 mm

Lb (mm)	4000
A (mm²)	609.0015
lxx (mm ⁴)	1696741
lyy (mm ⁴)	74500.5
J (mm ⁴)	245019.7
rx	52.78355
ry	11.06039
ct=cc (mm)	85
Zcx (mm³)	19961.66
Zcy (mm³)	5960.04
٨	
S1	
S2	
Øcc	
kt	1
kc	1.12
b (mm)	25
t (mm)	1.5
h (mm)	170









Calculated Buckling Constants for Temper 5 Designation

Columns

Simplified Beam

Вс	119.264	Вс	119.264
Dc	0.492	Dc	0.492
Сс	99.330	Сс	99.330
			•
Вр	134.288	Вр	134.288
Dp	0.588	Dp	0.588
Ср	93.608	Ср	93.608
Bt	132.002	Bt	132.002
Dt	3.624	Dt	3.624
Ct	*	Ct	*
Bbr	194.517	Bbr	194.517
Dbr	1.256	Dbr	1.256
Cbr	103.260	Cbr	103.260
Btb	198.003	Btb	198.003
Dtb	10.371	Dtb	10.371
Ctb	95.687	Ctb	95.687
Bs	75.864	Bs	75.864
Ds	0.250	Ds	0.250
Cs	124.542	Cs	124.542
k1 (flat plate compression)	0.35	k1 (flat plate compression)	0.35
k2 (flate plate compression)	2.27	k2 (flate plate compression	2.27
k1 (flat plate bending)	0.50	k1 (flat plate bending)	0.50
k2 (flat plate bending)	2.04	k2 (flat plate bending)	2.04









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Design Loads

G + Q

Dead load (G): self-weight Live load (Q): 0.25 kPa

Wind Loads

Residential Wind Speed Category in accordance with AS4055.1

Ultimate Limit State Wind Speed: **50 m/s** Serviceability Limit State Wind Speed: **32 m/s**

Wind Load on Monoslope Free Roof with 0° pitch

Roof height	2700 mm
Roof depth	6000 mm
h/d ratio	0.45
Roof area	24 m ²
C _{pw} – uplift	-0.3
C _{pl} – uplift	-0.4
C _{pw} – down	0.4
C _{pl} – down	0
K _a	1
K _I	1
Kp	1
C _{fig} critical case	-0.4
$ ho_{air}$	1.2 kg/m ³
C _{dyn}	1
Critical Uplift Pressure ULS	-0.60 kPa
Critical Uplift Pressure SLS	-0.246 kPa

Wind Load on Side Beams

Cpe	0.8
ULS Wind pressure	1.20 kPa
SLS Wind pressure	0.49 kPa

Wind Load on Columns

I	2700
b	120
I/b	22.5
K _{ar}	0.85
Ki	1
bV _{des⊕} ULS	6
bV _{des⊕} SLS	3.84
C _d ULS – conservative	1.2
C _d SLS – conservative	1.2
Cfig ULS	1.02
Cfig SLS	1.02
ULS Wind pressure	1.53 kPa
SLS Wind pressure	0.627 kPa









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Modelled Load Combinations

Case 1 – ULS: 1.35G

Case 2 – ULS: 1.2G + 1.5QCase 3 – ULS: $1.2G + W_u$ Case 4 – ULS: $W_u - 0.9G$

Case 5 – SLS: 1G Case 6 – SLS: W_s - G

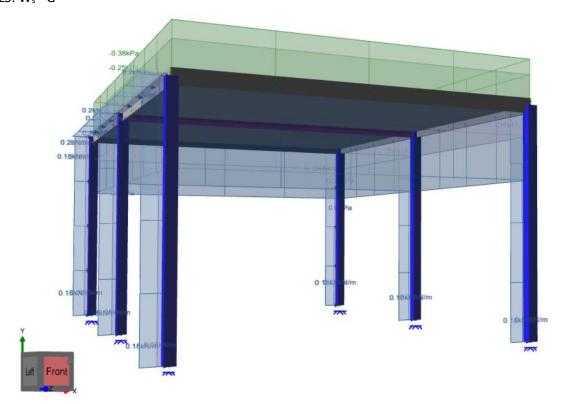


Figure 1 - Load cases applied with wind in the X direction

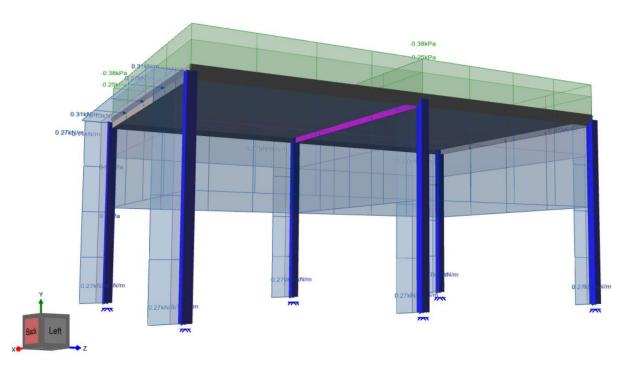


Figure 2 - Load cases applied with wind in the Z direction









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Modelled Results - Wind from X

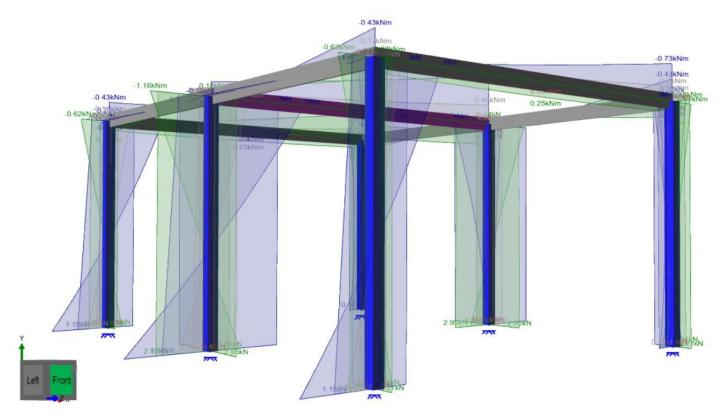


Figure 3 - Reaction Forces & Moments

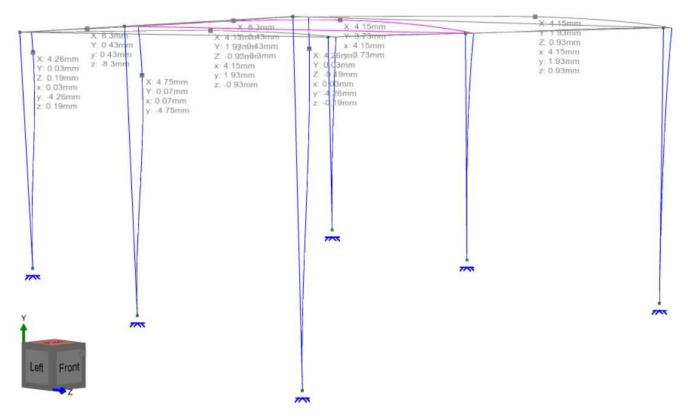


Figure 4 - Displacement Results









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Modelled Results - Wind from Z

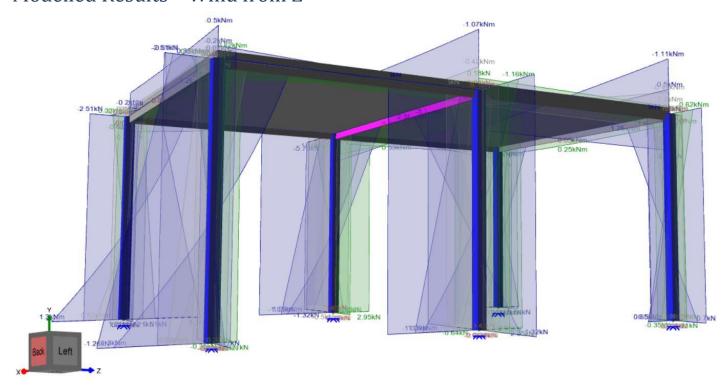


Figure 5 - Reaction Forces & Moments

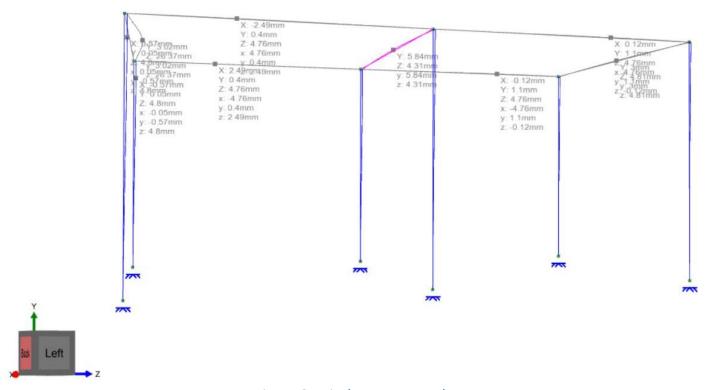


Figure 6 - Displacement Results









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Calculated Design Stresses

Beams

Gross cross-sectional area	A_g	609.0015	mm^2	
In-plane elastic section modulus	Z_{cx}	19961.659	mm^3	
Out-of-plane elastic section modulus	Z_{cy}	5960.04	mm^3	
Axial load compression	Pc	0	kN	
Axial load tension	P_{t}	0	kN	
In-plane Moment	M_{x}	0.73	kNm	
Out-of-plane moment	M_{y}	0.02	kNm	
Shear force	V	0.25	kN	
Stress axial compression	$\mathbf{f}_{a.c}$	0	MPa	
Stress axial tension	$\mathbf{f}_{a.t}$	0	MPa	
Stress from in-plane bending	\mathbf{f}_{bx}	36.570107	MPa	
Stress from out-of-plane bending	\mathbf{f}_{by}	3.3556822	MPa	
Stress from shear force	f_s	0.410508	MPa	

Columns

Gross cross-sectional area	A_g	653	mm^2
In-plane elastic section modulus	Z_{cx}	25273.633	$\rm mm^3$
Out-of-plane elastic section modulus	Z_{cy}	25273.633	${\rm mm^3}$
Axial load compression	P_c	2.95	kN
Axial load tension	P_{t}	3.98	kN
In-plane Moment	M_x	1.99	kNm
Out-of-plane moment	M_{y}	0	kNm
Shear force	V	1.58	kN
Stress axial compression	$f_{a.c}$	4.517611	MPa
Stress axial tension	$\mathbf{f}_{a.t}$	6.0949464	MPa
Stress from in-plane bending	\mathbf{f}_{bx}	78.738184	MPa
Stress from out-of-plane bending	f_{by}	0	MPa
Stress from shear force	f_s	2.4196018	MPa

Deflection Results

Beam

Modelled Deflection	L/250	Result
8.3 mm	16	PASS

Column

Modelled Deflection	L/500	Result
4.75 mm	5.4	PASS









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Calculated Factored Limit Stresses

Overview

Beams

Stress Type	<u>Clause</u>	ØFL (MPa)
Tension in beams – rectangular tubes	3.4.3	104.50
Bearing – bolts in slotted holes	3.4.7	113.37
Compression in columns	3.4.8	21.74
Compression in columns components	3.4.10.1	93.30
Compression in beams – in-plane rectangular tube	3.4.15	90.84
Compression in beams – out-of-plane rectangular tube	3.4.15	88.80
Compression in beam components – uniform compression	3.4.17	93.30
Compression in beam components – own plane bending	3.4.22	85.71

Columns

Stress Type	<u>Clause</u>	ØFL (MPa)
Tension in beams – rectangular tubes	3.4.3	104.50
Bearing – bolts in slotted holes	3.4.7	113.37
Compression in columns	3.4.8	36.27
Compression in columns components	3.4.10.1	44.17
Compression in beams – in-plane rectangular tube	3.4.15	95.67
Compression in beams – out-of-plane rectangular tube	3.4.15	95.67
Compression in beam components – uniform compression	3.4.17	44.17
Compression in beam components – own plane bending	3.4.22	105.47

Tension Capacity

Beam

Factored Limit Stress (ØFL)	Yield	Ultimate
ф	0.950	0.900
Kt		1.00
Factored tension stress in beams (MPa)	104.5	136.8

|--|

Column

Factored Limit Stress (ØFL)	Yield	Ultimate
ф	0.950	0.900
Kt		1.000
Factored tension stress in beams (MPa)	104.5	136.8

f _a /F _a (tension)	0.0583 PASS
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Factored Bearing Stress on Bolts in Slotted Holes

Factored Limit Stress (ØFL)	Yield	Ultimate
Factored bearing stress bolts in holes (MPa)	113.36667	149.69444

Uniform Compression Capacity

Beam

Axial Compression of member

k (effective length factor)	2.2	
L (unsupported length)	4000	mm
r (radius of gyration about axis of buckling)	52.78355	
λ (slenderness parameter)	2.104	
Øcc	0.875	
Dc* (buckling formula constant for compression in		
columns)	39.013579	
S1*	0.53954	
S2*	1.2533612	
ØFL for columns in axial compression	21.74	MPa

Uniform Compression in Flat Plate Components

b	22
t	1.5
b/t	14.666667
Øy	0.95
Øc	0.85
S1	26.054427
S2	49.943387
ØFL	93.304 MPa

3.4.8.2

For closed cross sections:

Largest slenderness ratio for flexural

buckling 166.72

f _a /F _A (compression)	0	PASS









Column

Axial Compression of member

k (effective length factor)	2.2
L (unsupported length)	2700
r (radius of gyration about axis of buckling)	48.18955
λ (slenderness parameter)	1.5553603
Øcc	0.7977504
Dc* (buckling formula constant for compression in columns)	39.013579
S1*	0.53954
S2*	1.253
ØFL	36.27 MPa

Uniform Compression in Flat Plate Components

b	117.2
t	1.4
b/t	83.71429
Øу	0.95
Øc	0.85
S1	26.05443
S2	49.94339
ØFL	44.17 MPa

3.4.8.2 For closed cross sections: Largest slenderness ratio for flexural

buckling 123.26324

f _a /F _A (compression)	0.125	PASS









Compression Capacity in Bending

Beam
In-plane & out-of-plane bending in general beam

Lb	4000
Zcx	19961.66
Zcy	5960.04
lxx	1696741
lyy	74500.5
J	245019.7
фу	0.95
фb	0.85
S1	21.80
S2	3854.05
LbZcx/.5 sqrt(IxxJ) in plane	247.67
LbZcy/.5 sqrt(IyyJ) our of plane	352.91
фFL in-plane (Fbx)	90.84
φFL out-of-plane (Fby)	88.80

Uniform compression in component

b	22.00
t	1.50
b/t	14.67
фу	0.95
фb	0.85
S1	12.06
S2	49.94
φFL	102.41

Compression bending about own plane in component

h	167.00
t	1.50
h/t	111.33
фу	0.95
фb	0.85
S1	41.23
S2	115.59
φFL	85.71

Capacity check

f _{bx} /F _{bx}	0.403	PASS
f_{by}/F_{by}	0.04	PASS









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Column

In-plane & out-of-plane bending in general beam

Lb	2700
Zcx	25273.63
Zcy	25273.63
lxx	1516418
lyy	1516418
J	2335512
фу	0.95
фb	0.85
S1	21.80
S2	3854.05
LbZcx/.5 sqrt(IxxJ) in plane	72.52
LbZcy/.5 sqrt(IyyJ) our of plane	72.52
φFL (b) in-plane (Fbx)	95.67
φFL (b) out-of-plane (Fby)	95.67

Uniform compression in component

b/t	83.71
фу	0.95
фb	0.85
S1	12.06
S2	49.94
φFL	44.17

Compression bending about own plane in component

h/t	83.71
фу	0.95
фb	0.85
S1	41.23
S2	115.59
φFL	105.47

Capacity check

fbx/Fbx	0.823	PASS
fby/Fby	0.00	PASS









Calculated Combined Axial Load & Bending Ratios

Beam

Combined Compression & Bending	0.44	PASS
Combined Tension & Bending	0.44	PASS

Column

Combined Compression & Bending	0.95	PASS
Combined Tension & Bending	0.88	PASS

Shear Capacity in Webs

Beam

Øy	0.95
Øv	0.8
Øvp	0.9
h	167
t	1.5
h/t	111.33333
S1	33.375518
S2 (intersecting h/t)	97.780895
фFL	28.54 MPa

fs/Fs	0.0144	PASS
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Column

Øvp	0.9
h	117.2
t	1.4
h/t	83.714286
S1	33.375518
S2 (intersecting h/t)	88.900865
φFL	44.8 MPa

fs/Fs	0.054	PASS









Local Buckling Stress in Beam

Clause	<u>Fcr</u>	Øγ	<u>ØfL</u>	<u>Fec</u>	Øy*Fcr	ØFrb (MPa)
3.4.17	1254.5702	0.95	102.41	25861.87671	1191.8417	102.4129
3.4.22	124.16459	0.95	85.71	25861.87671	117.95636	85.71395

Weighted Average of element cross-section: 90.83 MPa Cannot exceed compressive stress in general beam: 90.84 MPa

Final local buckling check ratio of beam	0.44	PASS
--	------	------

Local Buckling Stress in Column

<u>Clause</u>	<u>Fcr</u>	<u>Øu</u>	<u>ØfL</u>	<u>Fec</u>	<u>Øu*Fcr</u>	ØFrc (MPa)
3.4.10.1	38.51	0.85	36.27	14.47	32.73	23.622

Weighted Average of element cross-section: 44.16 MPa

Cannot exceed compressive stress in general column: 36.27 MPa

Final local buckling check ratio of column	0.989	PASS
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Column Connection Check

M8 x 100 Expansion Bolt check:

Bolt Capacity in Shear

ØVf	7.26 kN
Ø	0.8
Vf	9.0768
fuf	400 MPa
kr	1
nn	1
Ac	36.6 mm ²

Bolt Capacity in Tension

ØNtf	11.71 kN
Ø	0.8
Ntf	14.64
As	36.6 mm ²
fuf	400 MPa









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Concrete Pull-out Capacity

Pull-out capacity	11.16 kN
Concrete grade	25 MPa
Shear strength	0.31 MPa
Embedded length	80 mm minimum

The column connections pass.

Regards,

Dr Andrew Barraclough

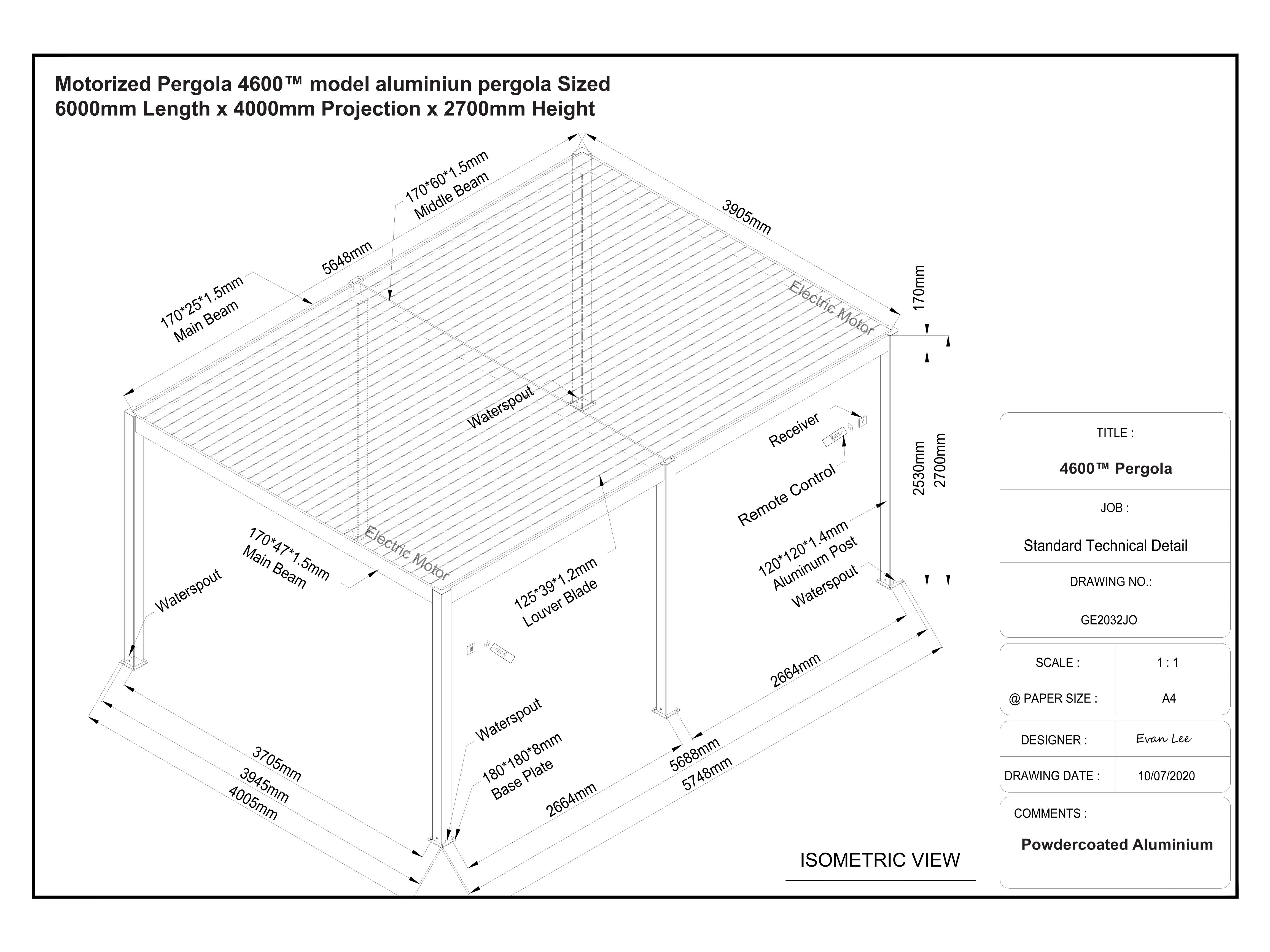
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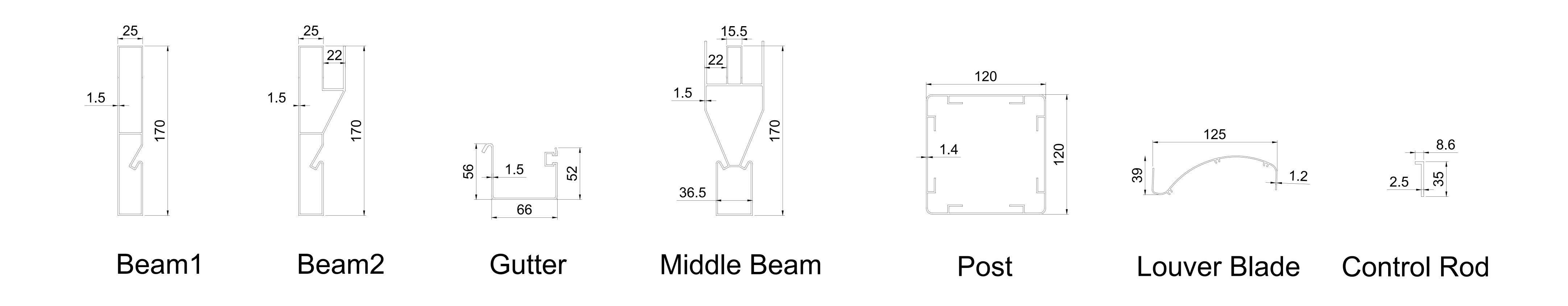


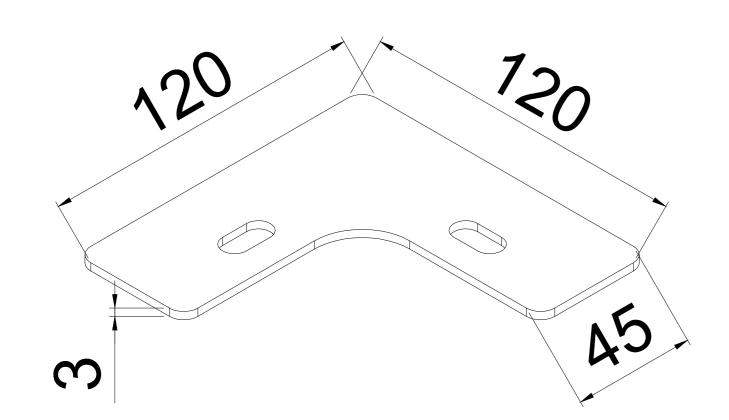




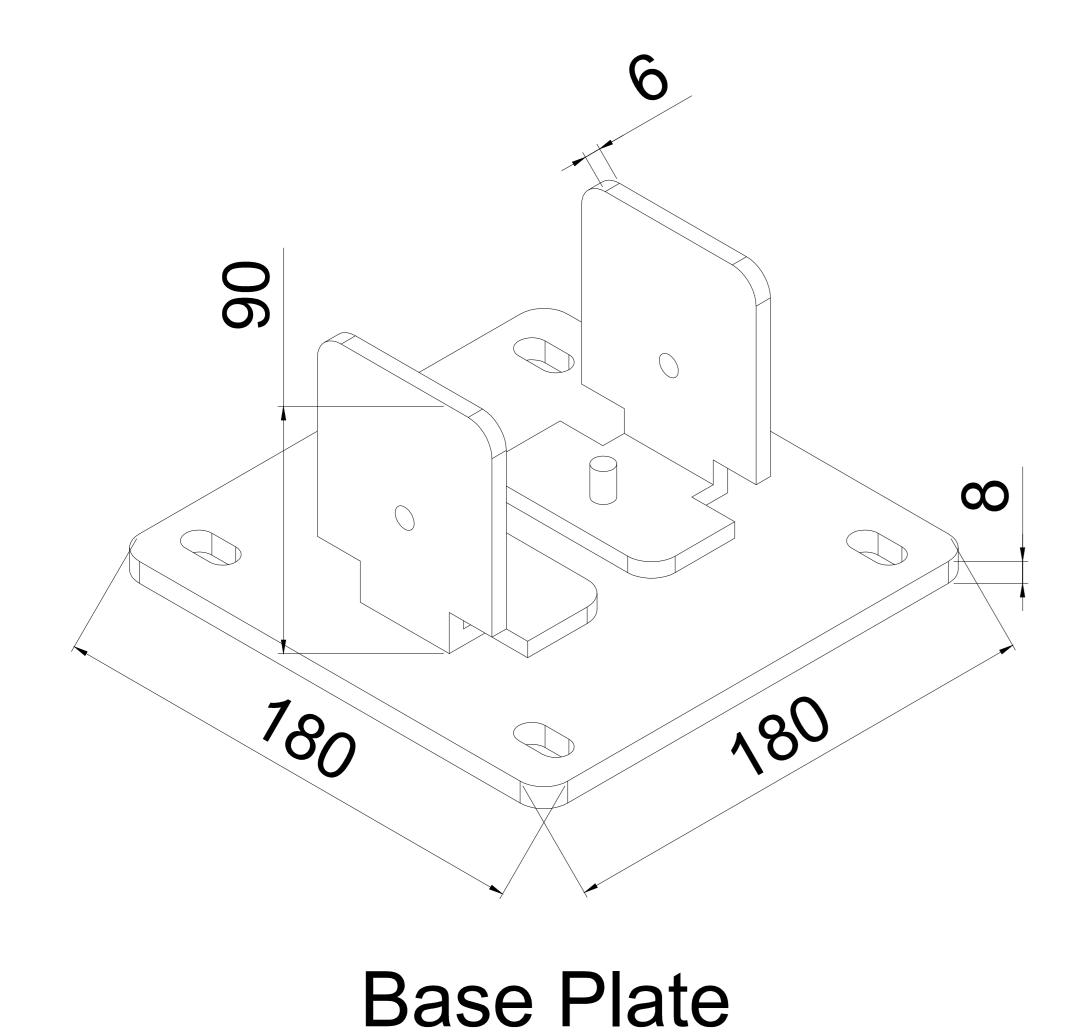


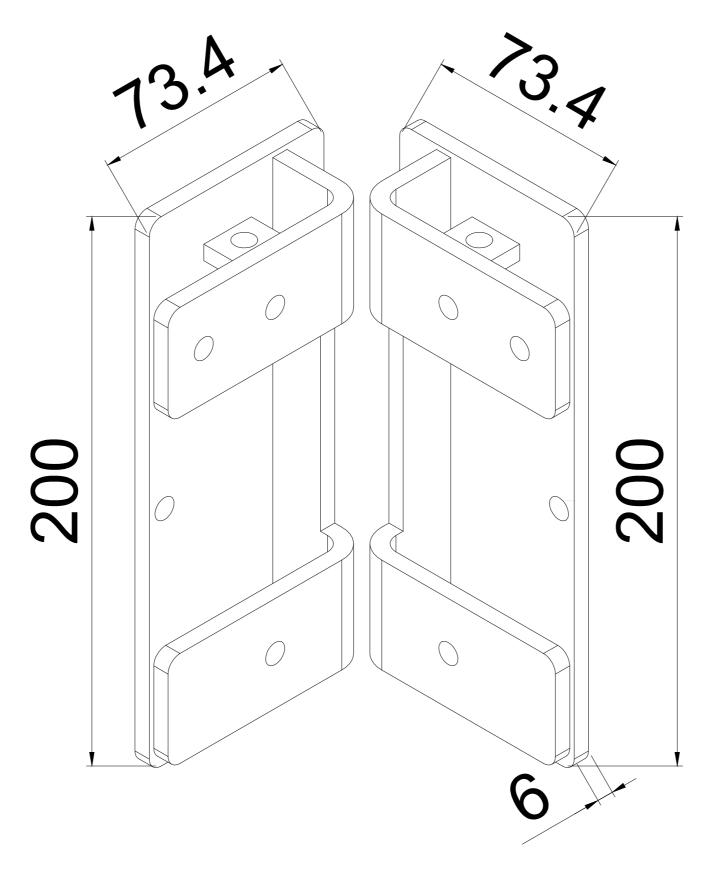
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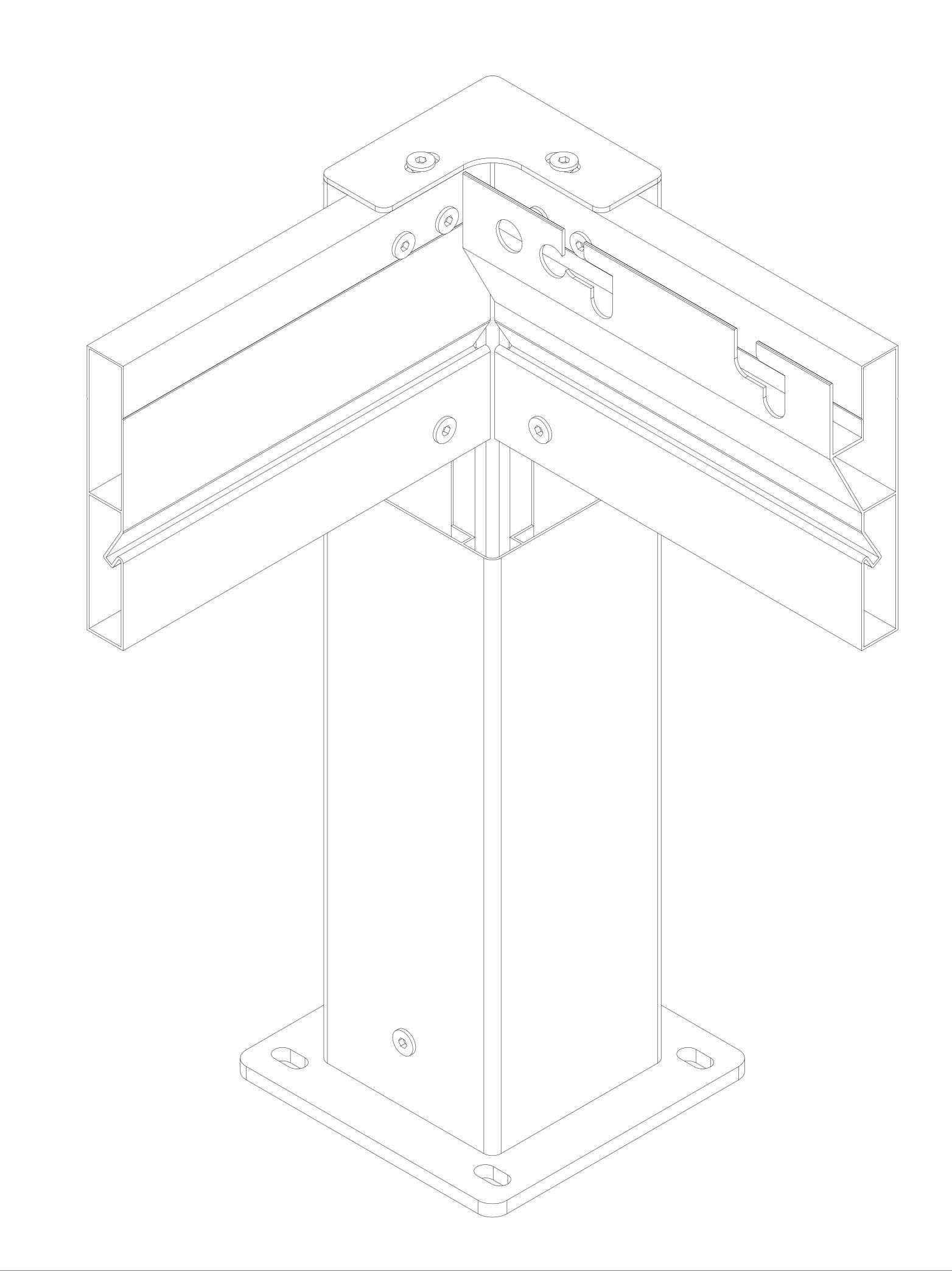


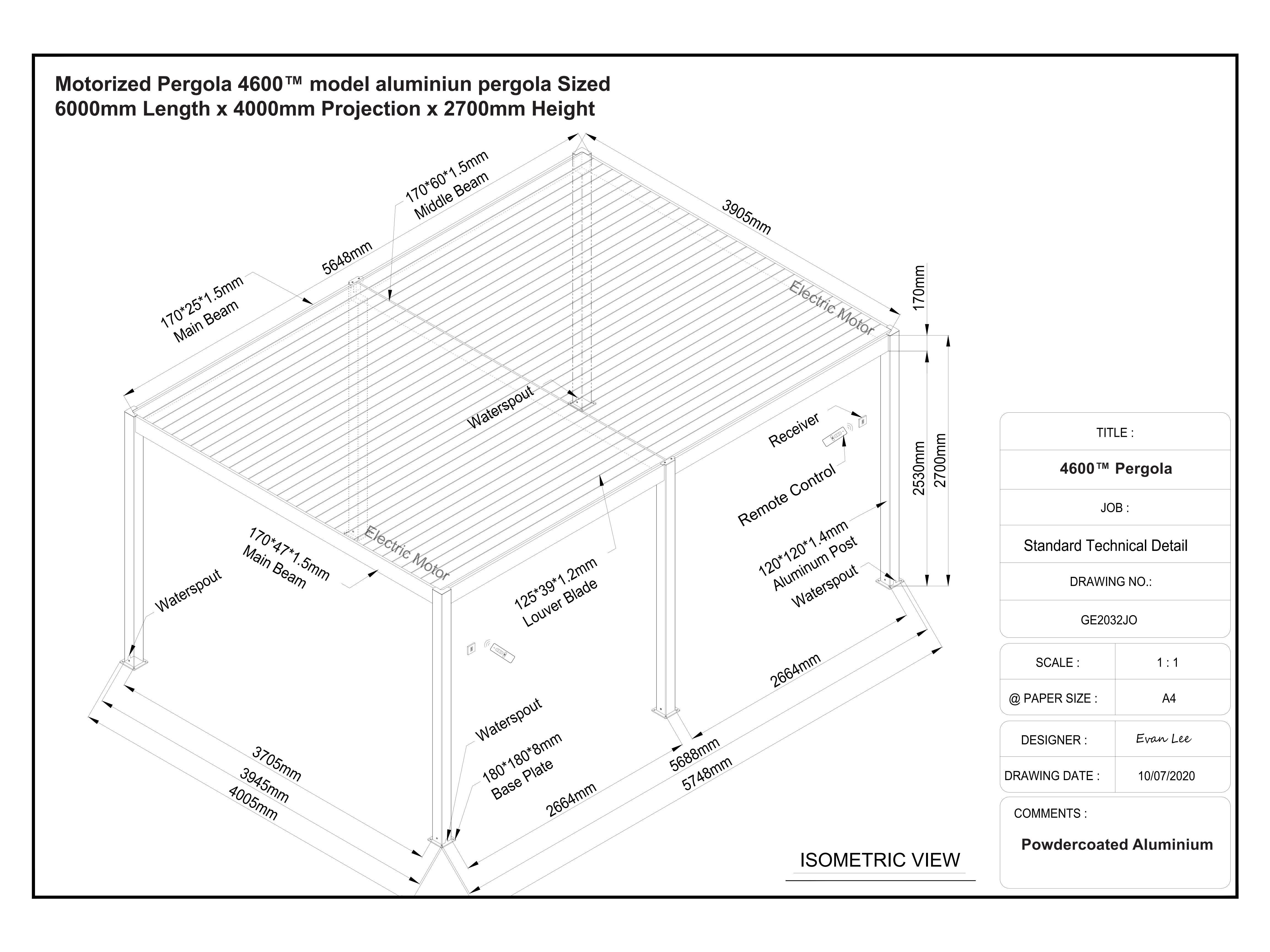
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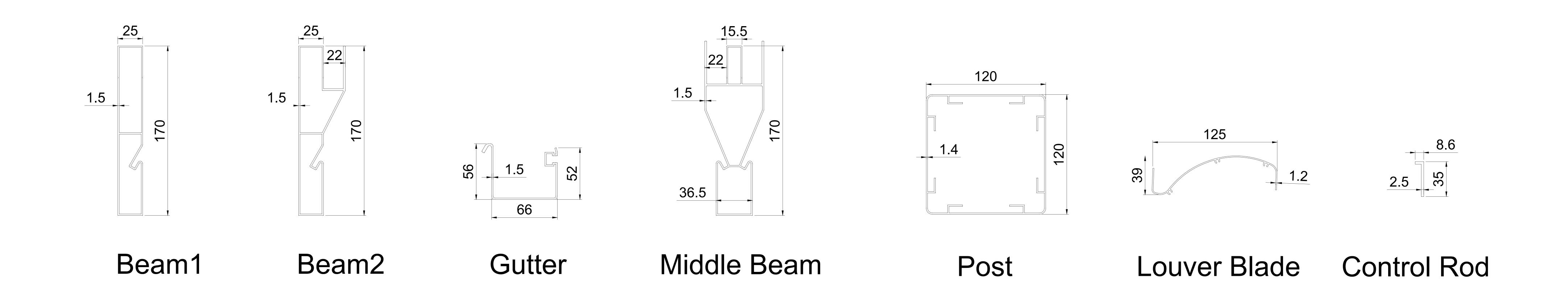


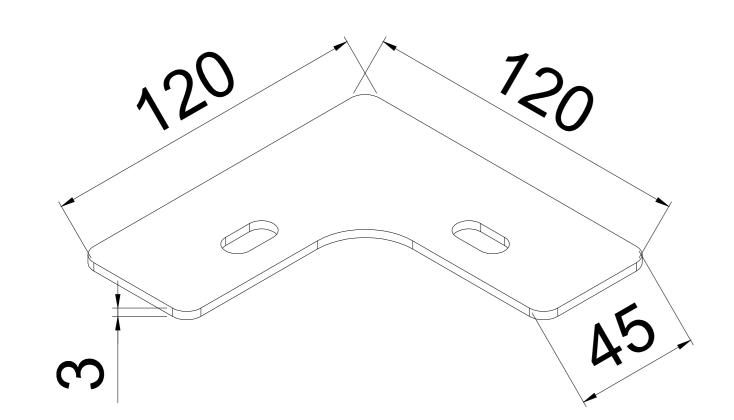
Post + Beam Connector



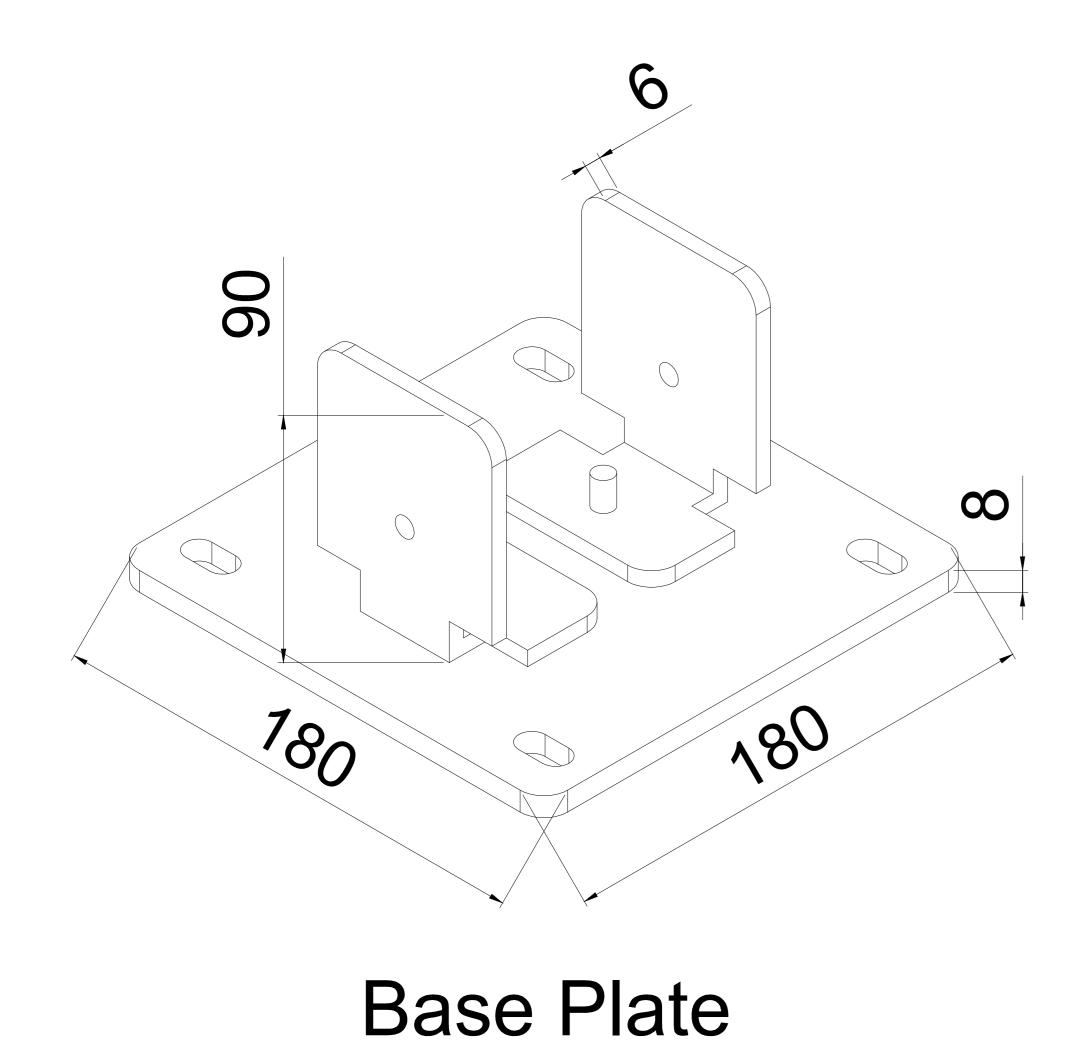


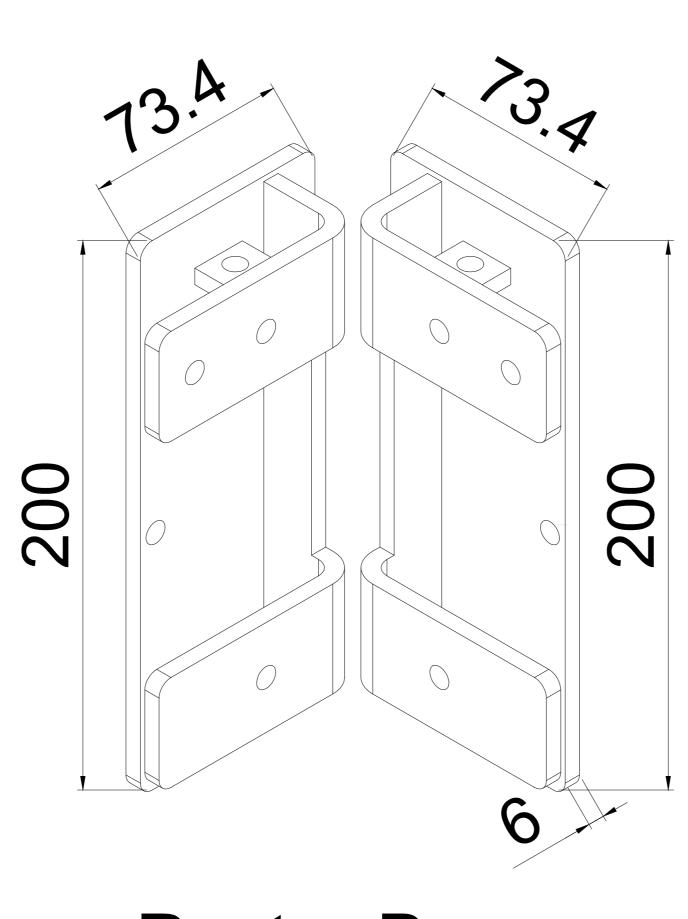
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Post Top Cover





Post + Beam Connector

