



**ESCUELA UNIVERSITARIA DE INGENIERÍA
TÉCNICA AERONÁUTICA
INGENIERÍA GRÁFICA**

PROYECTO N° 1

TÍTULO: Diseño de estructura soporte de ala delta

Autora: María Lecina Blázquez (junio 2008)

OBJETIVO:

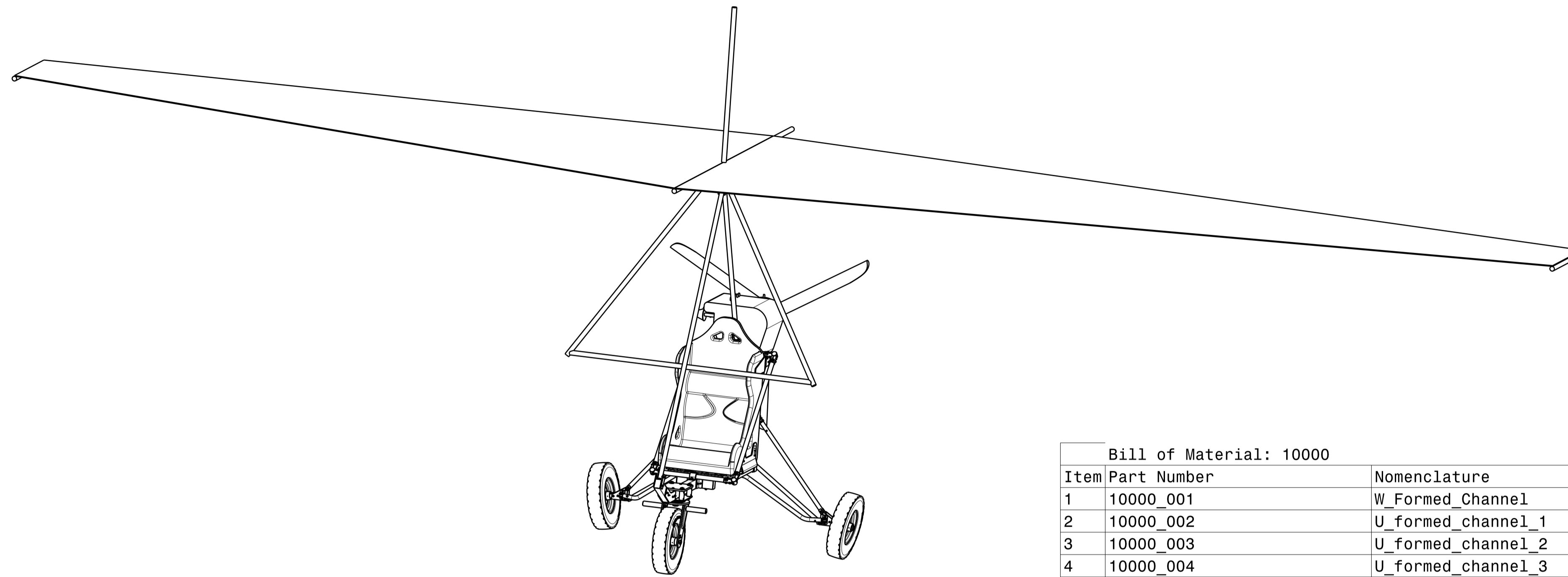
El presente proyecto trata del diseño de una estructura tubular (Trike) para soportar la estructura comercial de un ala delta motorizada.

El principal criterio de diseño es maximizar el uso de elementos comerciales, con calidad aeronáutica, para facilitar las posibilidades de montaje y reducir procesos de fabricación, permitiendo una configuración tipo “kit” de montaje.

La realización de los planos se ha tratado desde el punto de vista del montaje incorporando tanto los elementos a fabricar como los proporcionados por los suministradores haciendo especial hincapié en las listas de piezas.

Bibliografía:


Normas UNE



Bill of Material: 10000

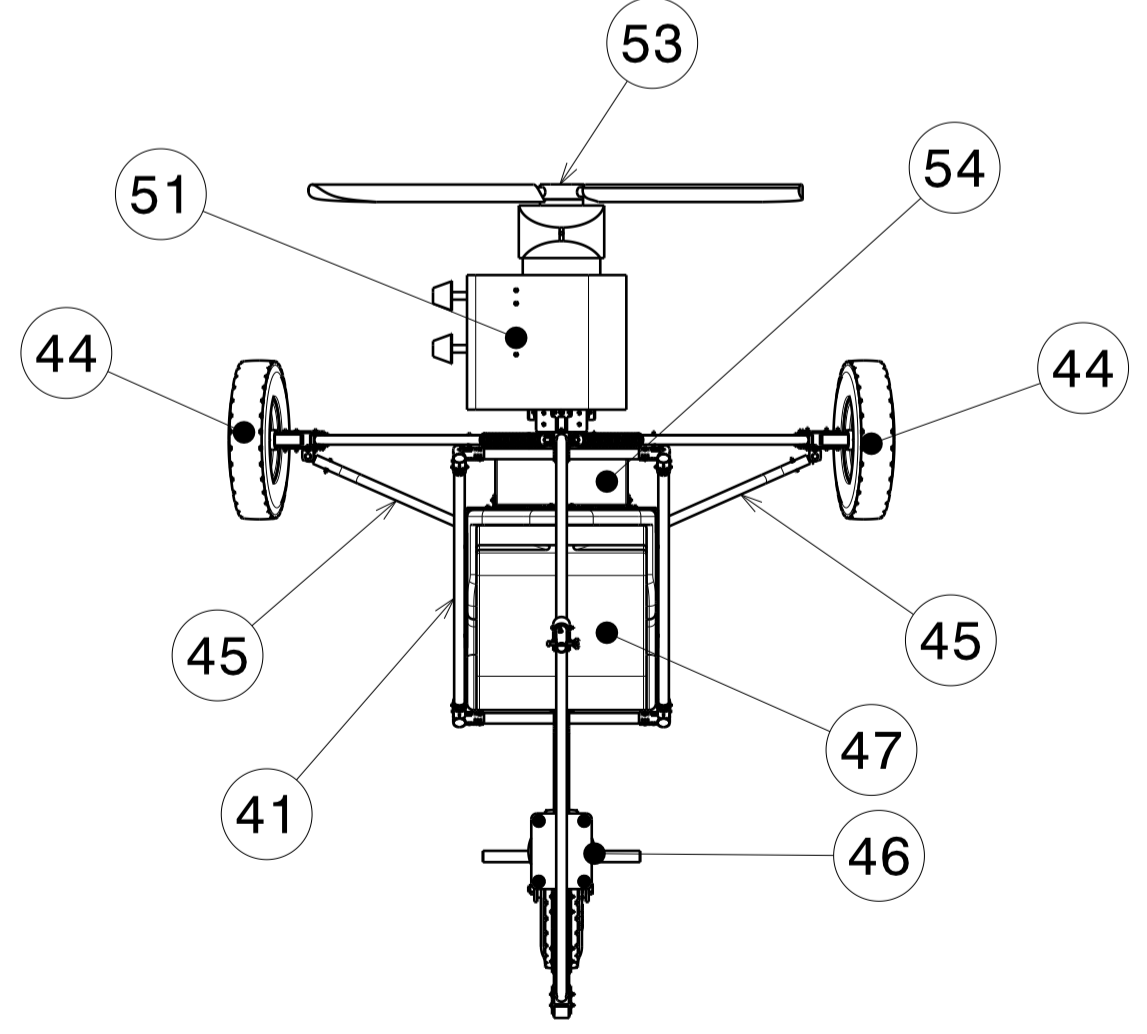
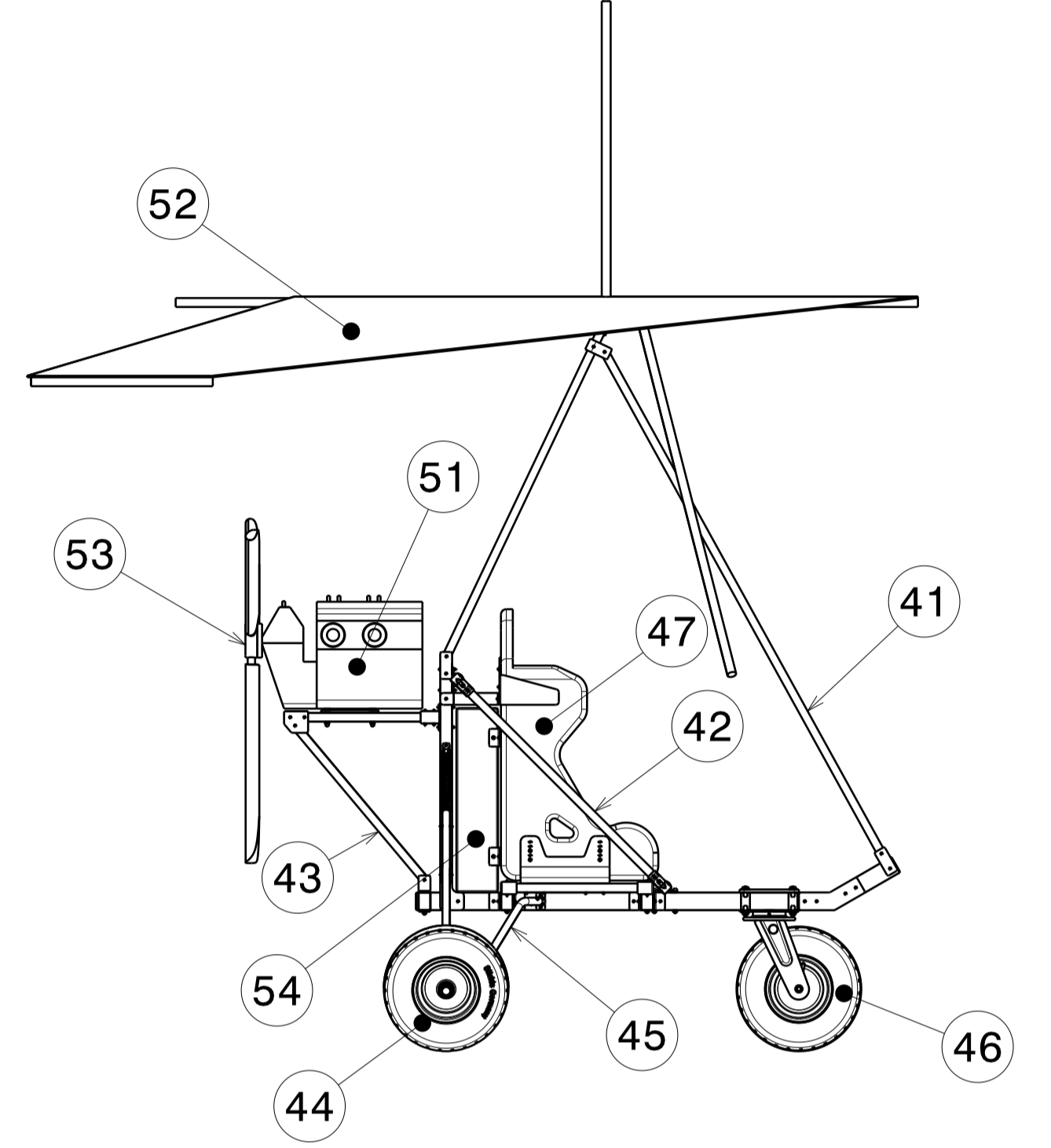
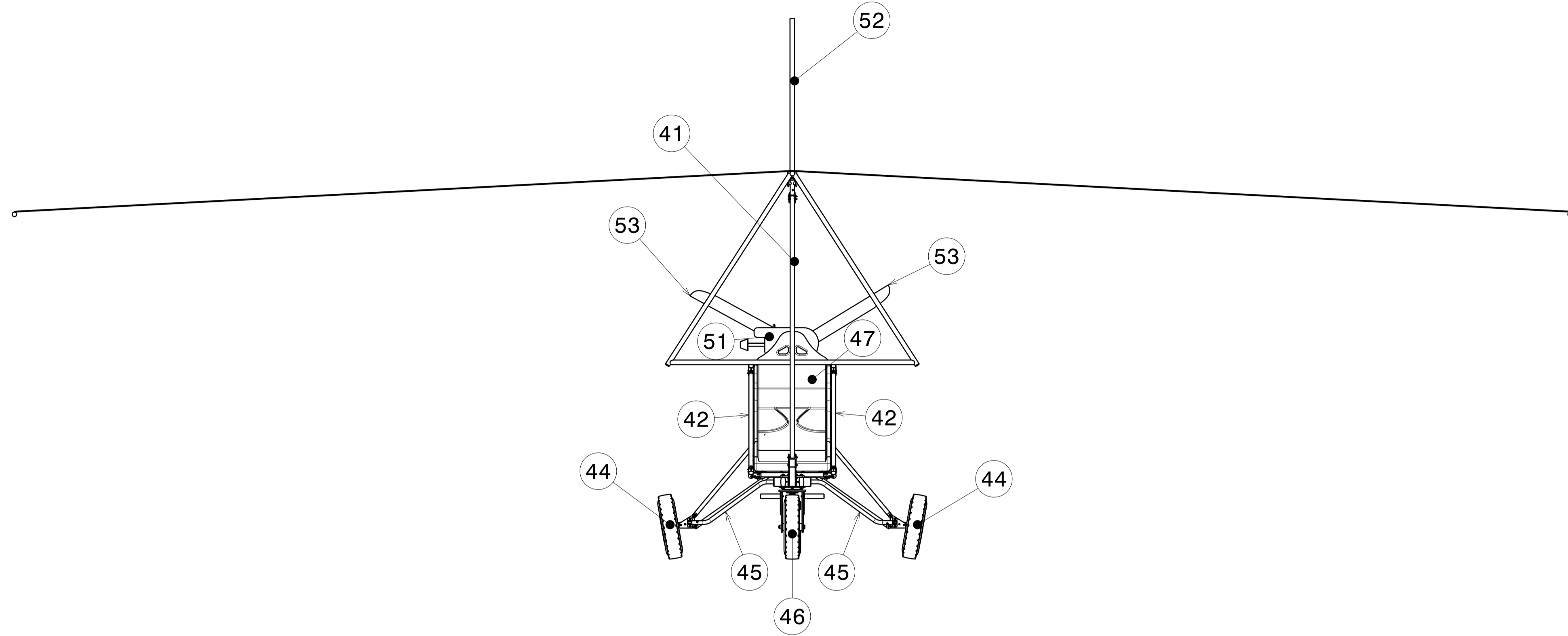
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3	10000_003	U_formed_channel_2	4
4	10000_004	U_formed_channel_3	2
5	10000_005	W_Formed_Channel_2	1
6	10000_006	Seat_support	1
7	10000_007	U_formed_channel_1	2
8	10100_013	Plate_2	4
51	Rotax_503_UL	Engine	1
52	KISS450	Wing	1
53	GSC_3blades_60"/13°	Fixed_pitch_wood_propeller	1
54	HULK_30L_019249	Fuel_tank	1
55	KCLBH10-20-FC12-MC5-TC4-LKC	Hinge_Pin	8
56	PIPS6-0_5-28	Extruded_stainless_steel_tubing	1
57	PIPS6-0_5-40	Extruded_stainless_steel_tubing	13
58	PIPS10_1-28	Extruded_stainless_steel_tubing	1
59	RBXS-D34-L30-V28	Rubber_bushing	2
60	FWASM-D15-V5_5-T1	Special_Washer	8
151	FWRBS-D15-V6-T10	Rubber_washer	4
152	SLW10	Spring_Washers	4
153	CHNS5	Wing_nut	1
154	CHNS8	Wing_nut	1
61	ISO_4762_M5x15_A2_70	Hexagon_socket_head_cap_screw_ISO_4762_M5x15_A2_70	4
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67	ISO_4762_M8x80_A2_70	Hexagon_socket_head_cap_screw_ISO_4762_M8x80_A2_70	2
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72	DIN_934_M10_A2_70	Hexagon_Nut_DIN_934_M10_A2_70	4
73	DIN_125_5.3_A2_70	Washer_DIN_125_5.3_A2_70	26
74	DIN_125_8.4_A2_70	Washer_DIN_125_8.4_A2_70	11
41	10100	general_structure	1
42	10200	safety_frame	1
43	10300	engine_support	1
44	10400	Common_Back_Landing_gear	2
45	10500	Stabilizer_back_landing_gear	2
46	10600	Front_landing_gear	1
47	10700	Seat_assembly	1

DESTINACION/NAME	ESPECIFICACION/SPEC.	ESPECIFICACION/SPEC.
RUGOSIDAD SUPERFICIAL SURFACE TEXTURE 3.2 ✓/✓/✓	ISO 1302	TOLERANCIA GENERAL GENERAL MANUFACTURING TOLERANCES FINO/FINE MEDIO/MEDIUM BASTO/COARSE X ISO 2768
TRATAMIENTO SUPERFICIAL SURFACE TREATMENT -	-	ISO 2768-ML
TRATAMIENTO TERMICO HEAT TREATMENT -	-	TOL. DE FORMA Y POSICION FORM AND POSITION TOLERANCE ISO 1101
MATERIAL MATERIAL -	-	TOL. ANGULARES Y LINEARES ANGULAR AND LINEAR TOLERANCES ISO 406


1.0	Initial Issue	28/02/08
EDICION ISSUE	REFERENCIA DE NOTA DE CAMBIO CHANGE NOTE REFERENCE	FECHA DATE
 E.U.L.T. Aeronáutica		
ESCALA SCALE -		DIMENSIONES EN DIMENSIONS IN mm A1
MLB_TRIKE		
NOMBRE NAME M. LECINA		CODIGO/CODE 10000
ELABORADO PREPARED	HOJA DE SHEET 1 OF 1	

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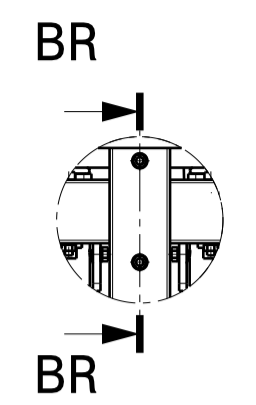
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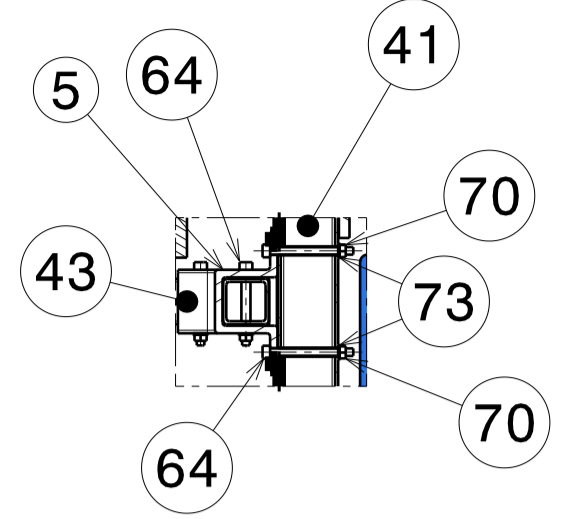
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TRATAMIENTO SUPERFICIAL SURFACE TREATMENT	-	-	MEDIO/MEDIUM	ISO 2768
TRATAMIENTO TERMICO HEAT TREATMENT	-	-	BASTO/COARSE	ISO 1101
MATERIAL	-	-	TOL. DE FORMA Y POSICION FORM AND POSITION TOLERANCE	ISO 406
			TOL. ANGULARES Y LINEARES ANGULAR AND LINEAR TOLERANCES	

1.0	Initial Issue	28/02/08
EDICION ISSUE	REFERENCIA DE NOTA DE CAMBIO CHANGE NOTE REFERENCE	FECHA DATE
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		2 OF 8

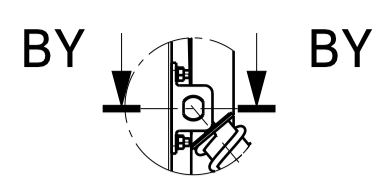
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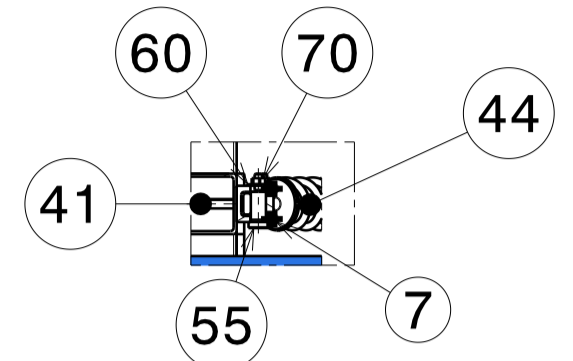
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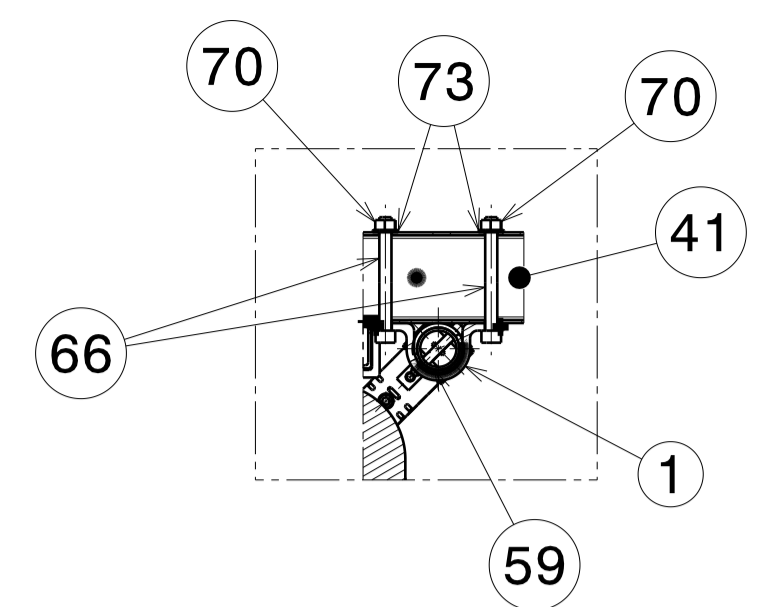
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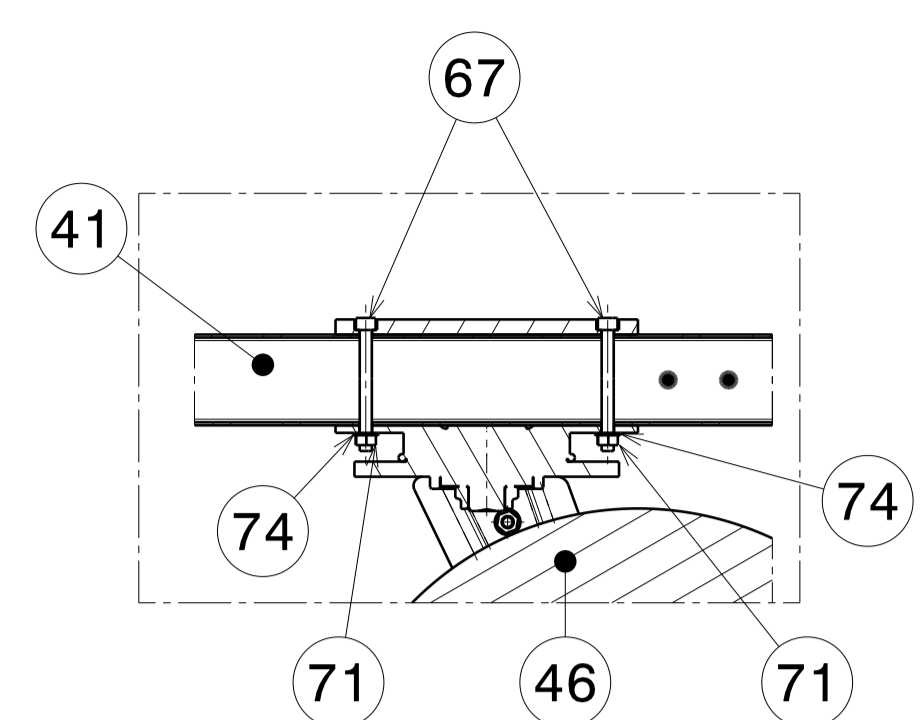
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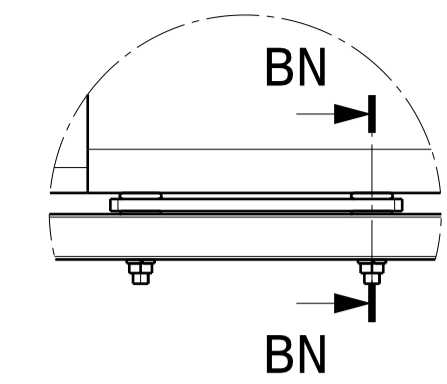
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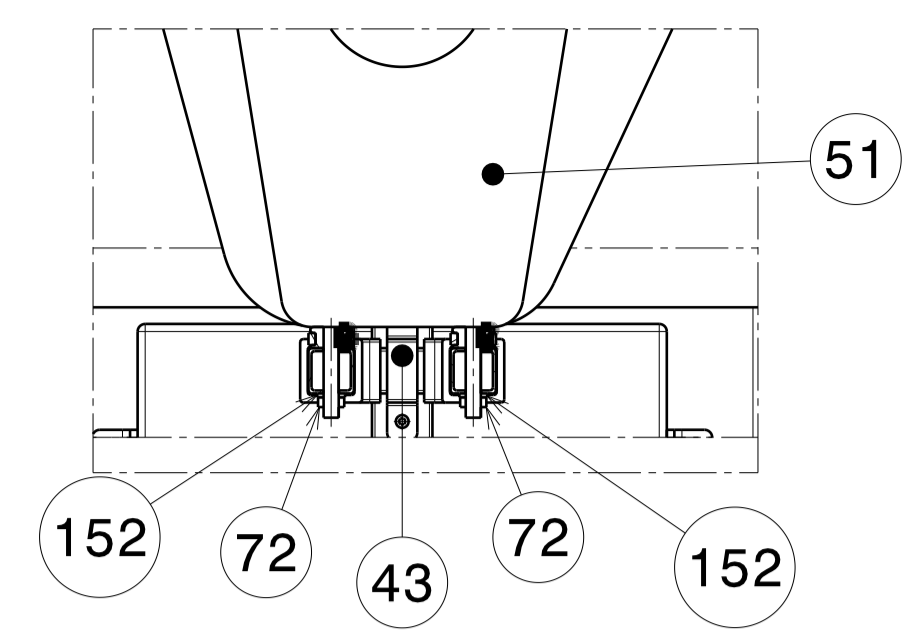
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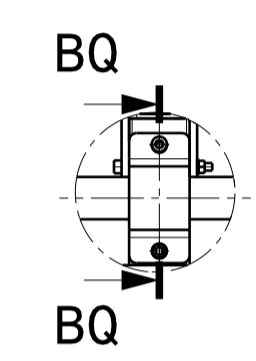
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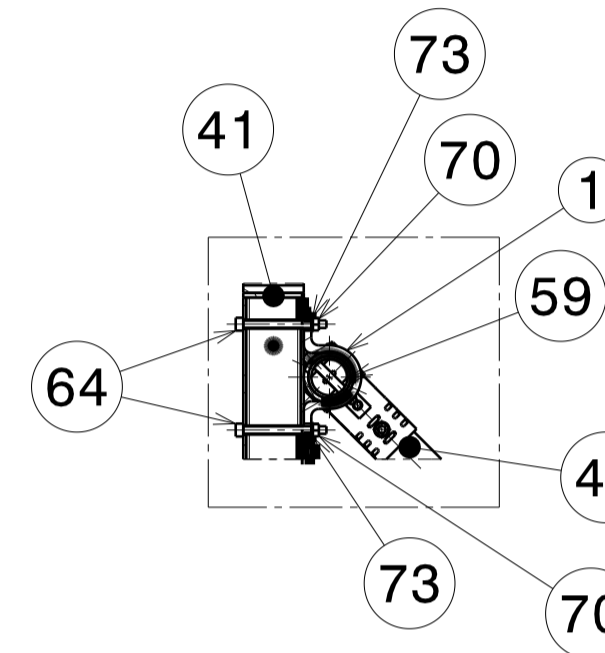
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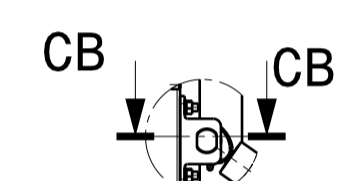
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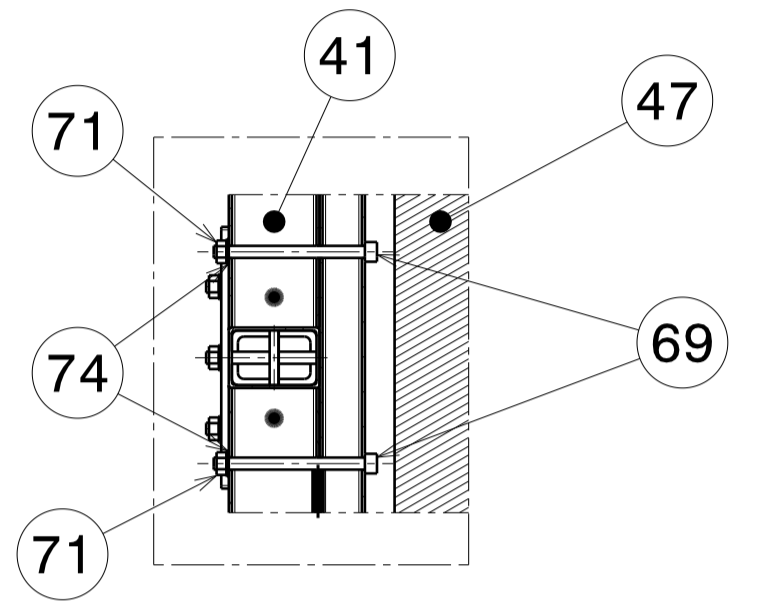
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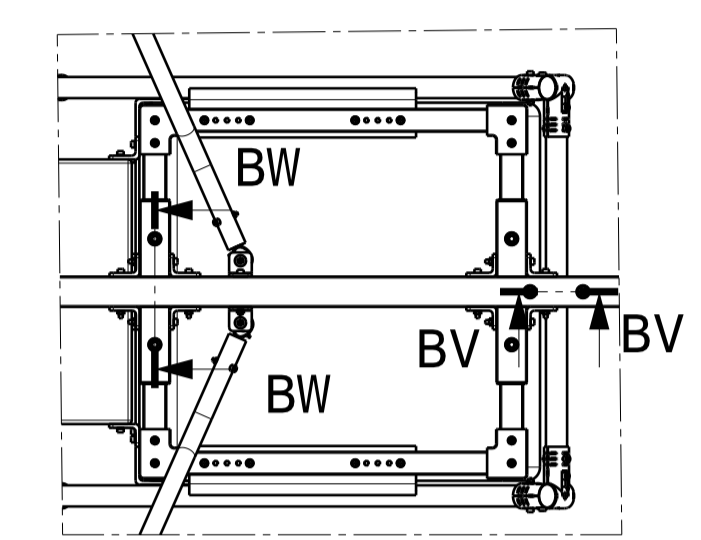
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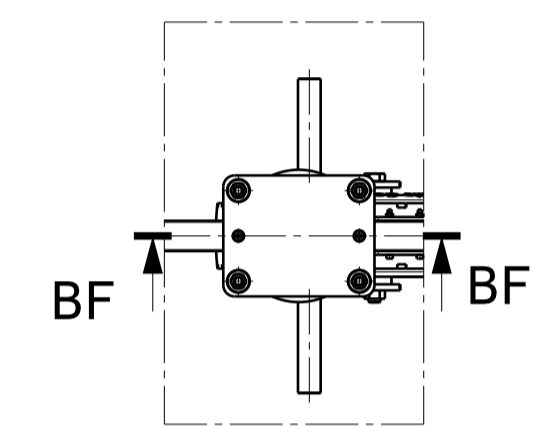
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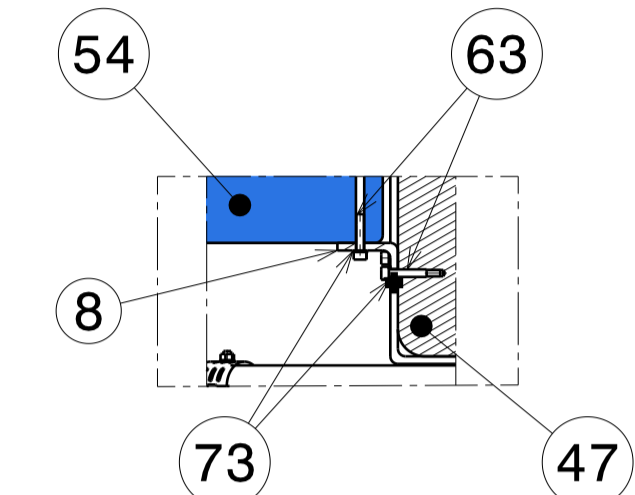
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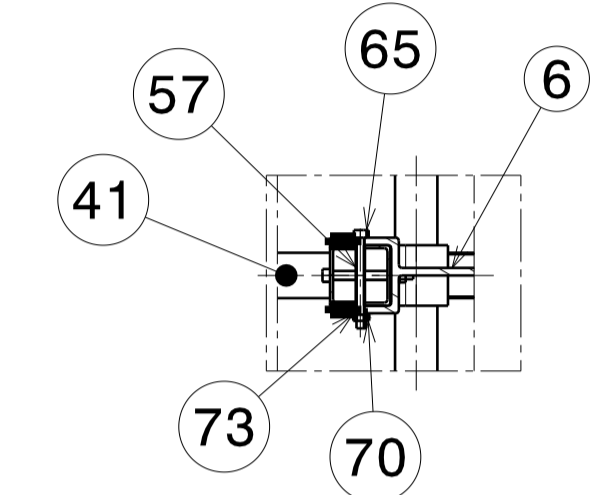
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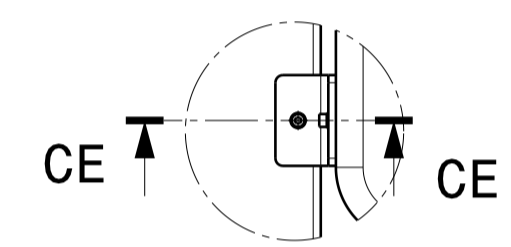
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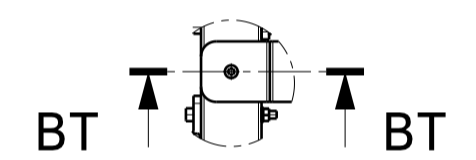
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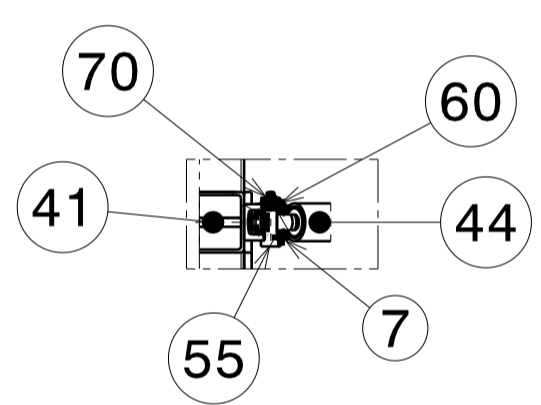
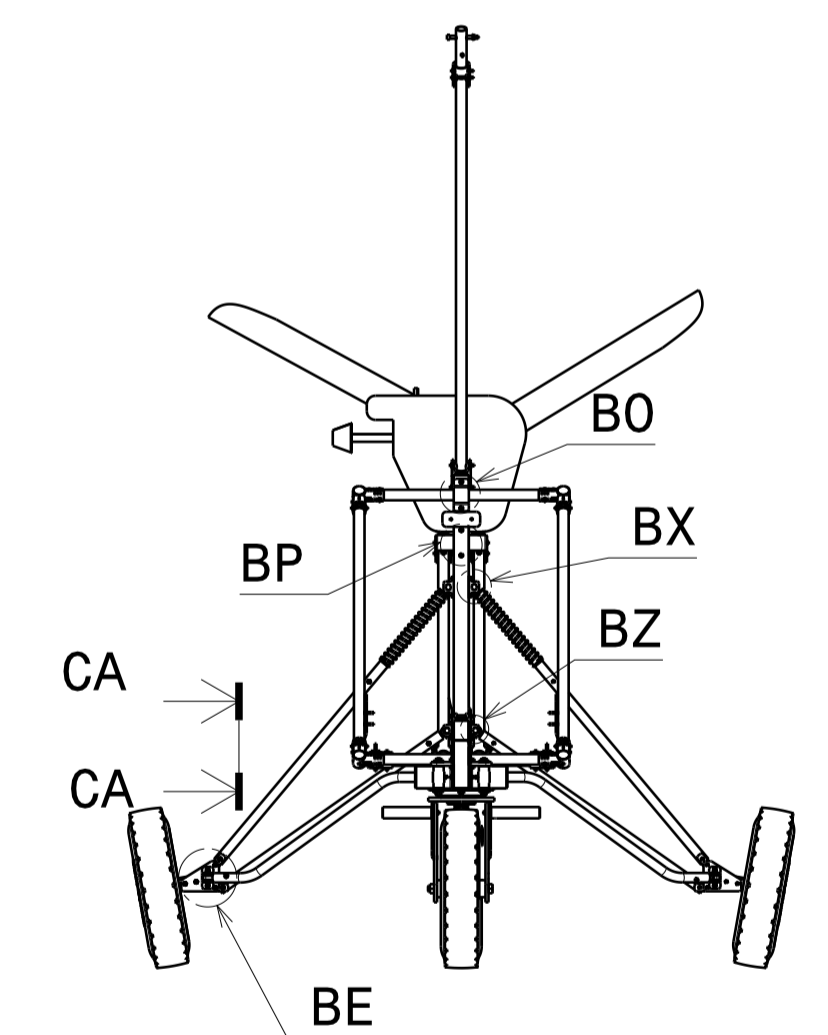
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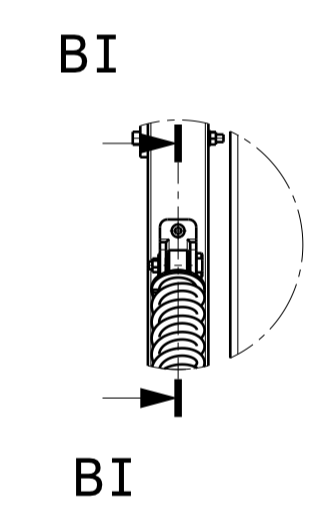
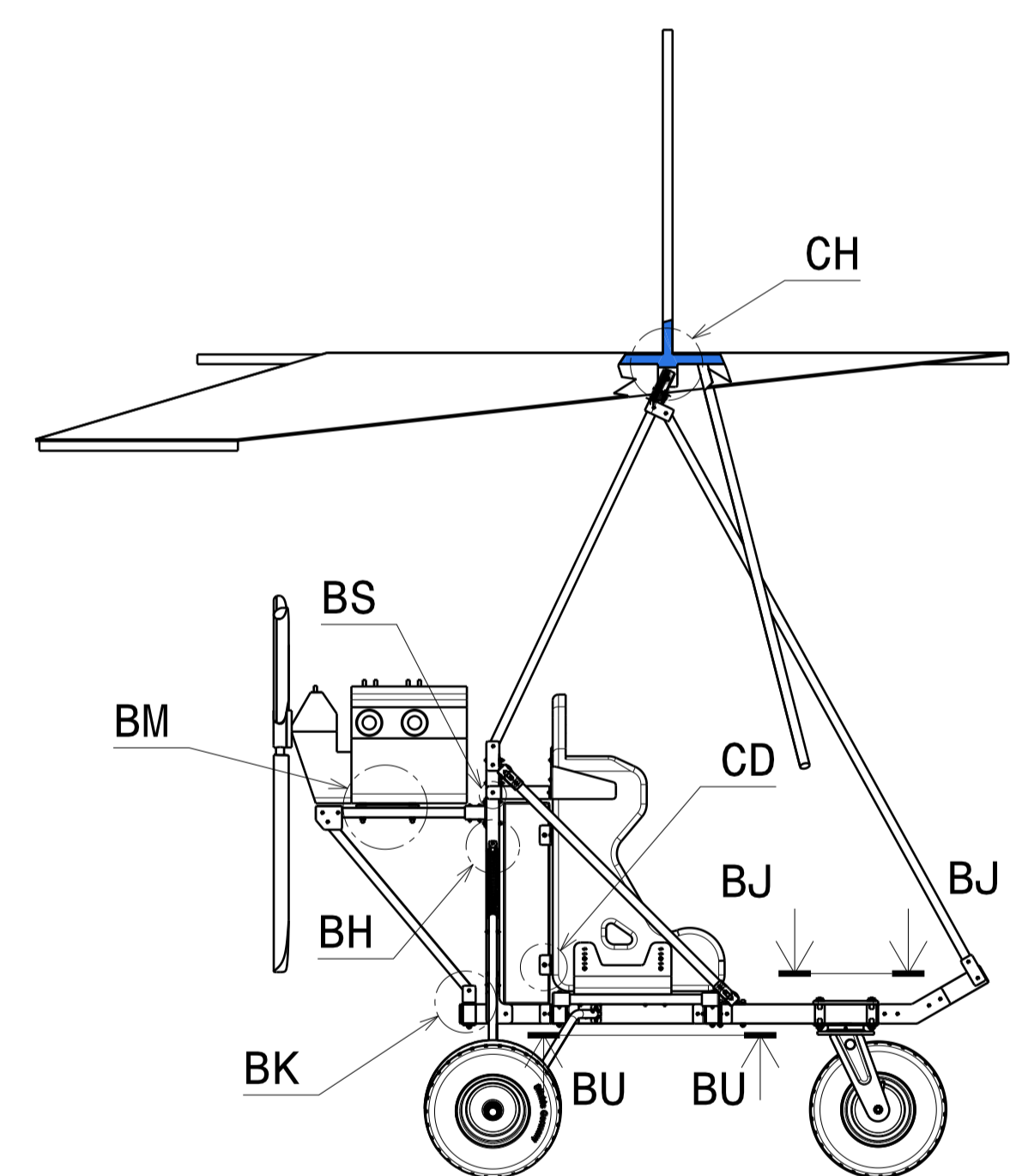
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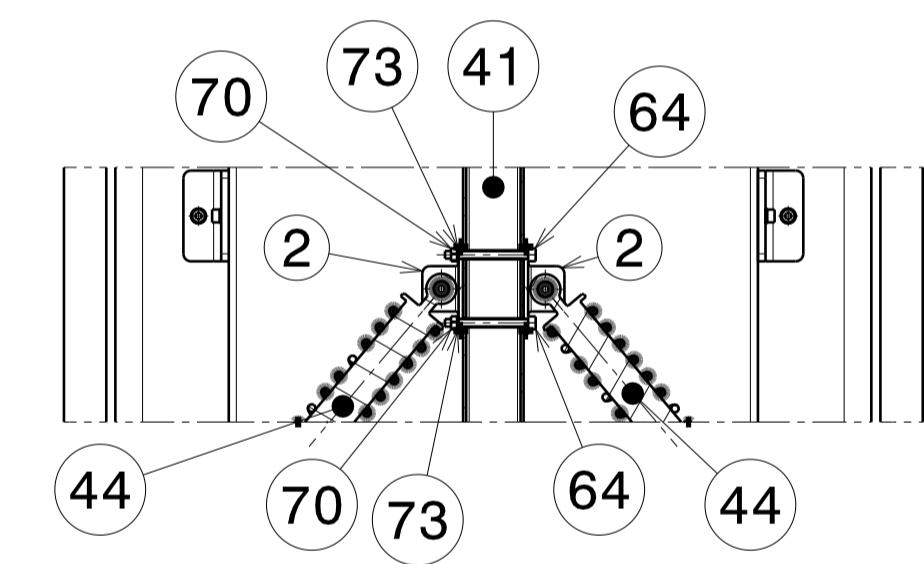
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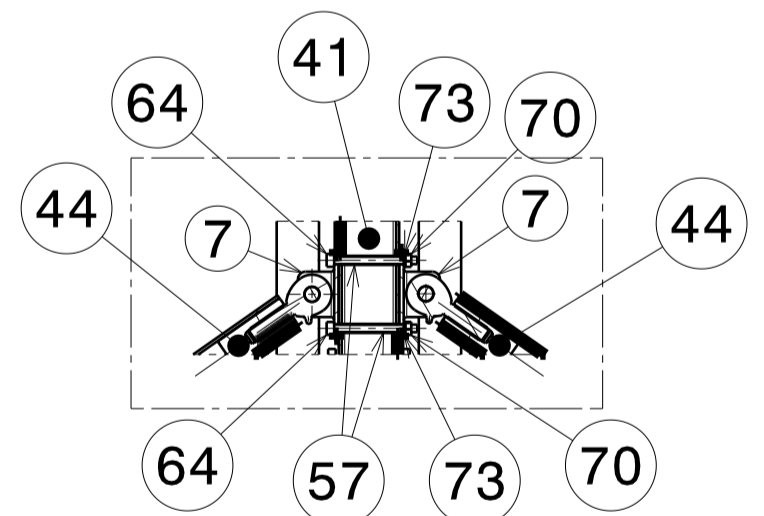
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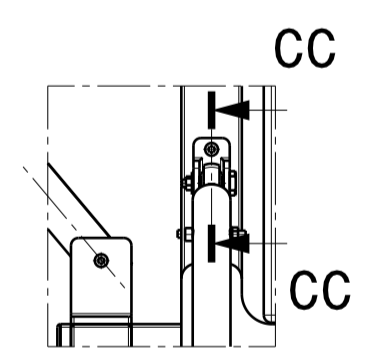
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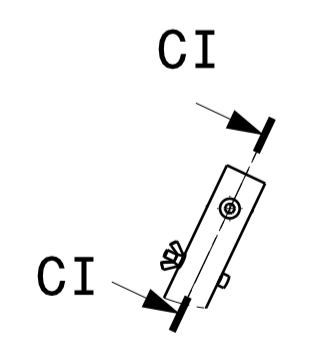
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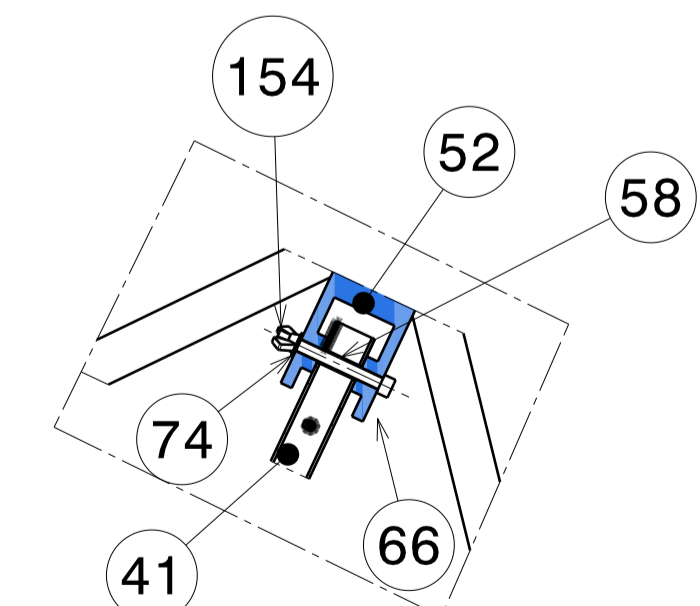
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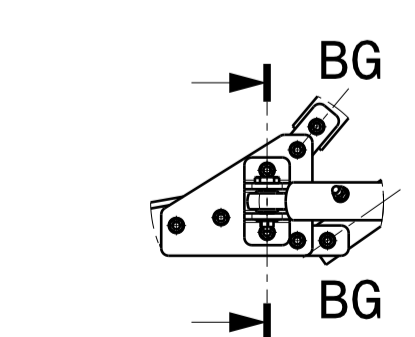
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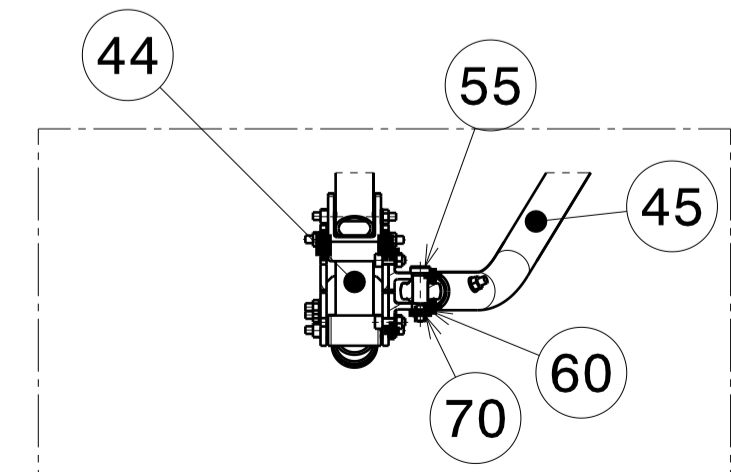
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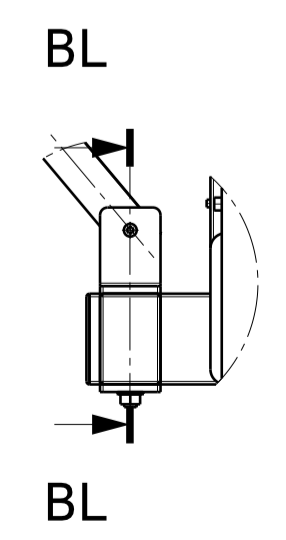
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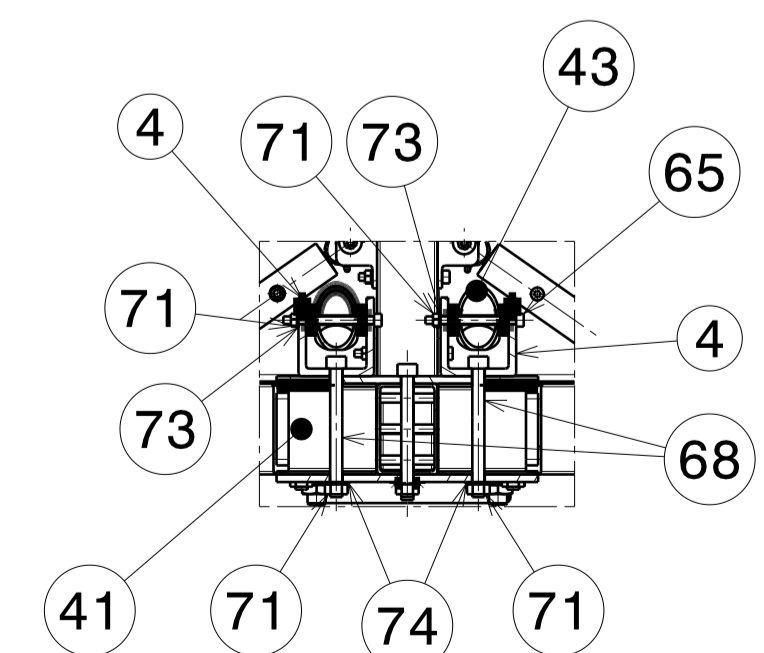
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Section view BG-BG
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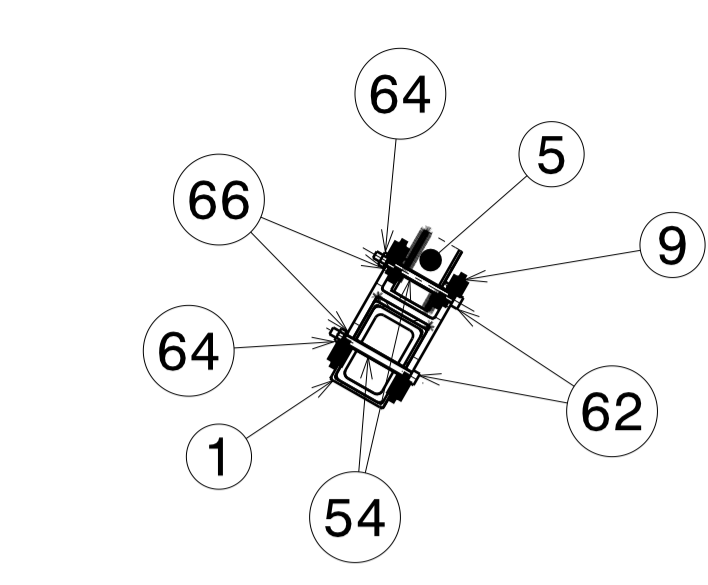
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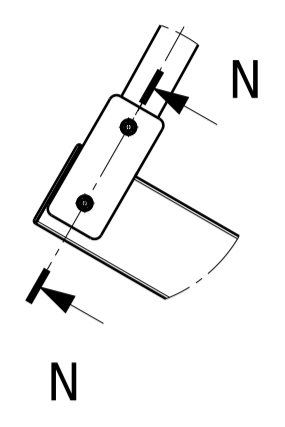
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	DESTINACION/ NOME	ESPECIFICACION/ SPEC.	ESPECIFICACION/ SPEC.
RUGOSIDAD SUPERFICIAL SURFACE TEXTURE	3.2 ✓ / ✓ / ✓	ISO 1302	TOLERANCIA GENERAL GENERAL MANUFACTURING TOLERANCES
TRATAMIENTO SUPERFICIAL SURFACE TREATMENT	-	-	FINO/FINE MEDIO/MEDIUM BASTO/COARSE
TRATAMIENTO TERMICO HEAT TREATMENT	-	-	ISO 2768
MATERIAL	-	-	TOL. DE FORMA Y POSICION FORM AND POSITION TOLERANCE
			ISO 1101
			TOL. ANGULARES Y LINEARES ANGULAR AND LINEAR TOLERANCES
			ISO 406

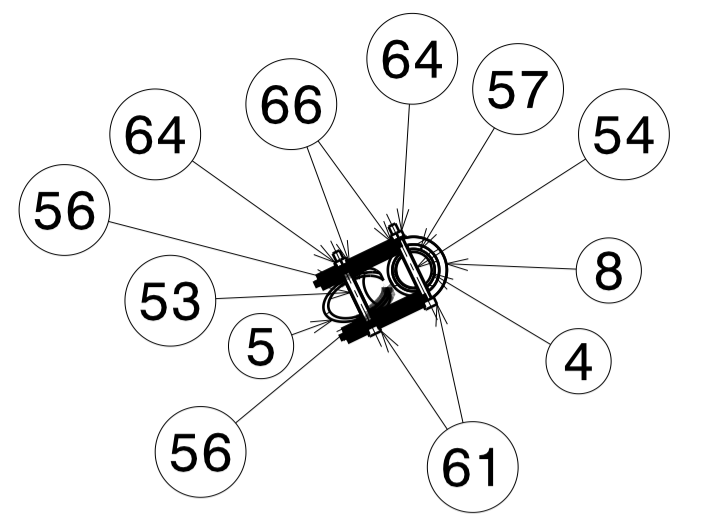
1.0	Initial Issue	28/02/08
EDICION ISSUE	REFERENCIA DE NOTA DE CAMBIO CHANGE NOTE REFERENCE	FECHA DATE
 E.U.L.T. Aeronautica		
ESCALA SCALE	1:20	DIMENSIONES EN DIMENSIONS IN
MLB_TRIKE		A1
TITULO / TITLE		
CODIGO / CODE	10000	HUJA DE SHEET 3 OF 8
ELABORADO PREPARED	M. LECINA	



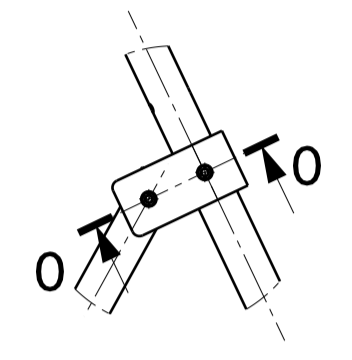
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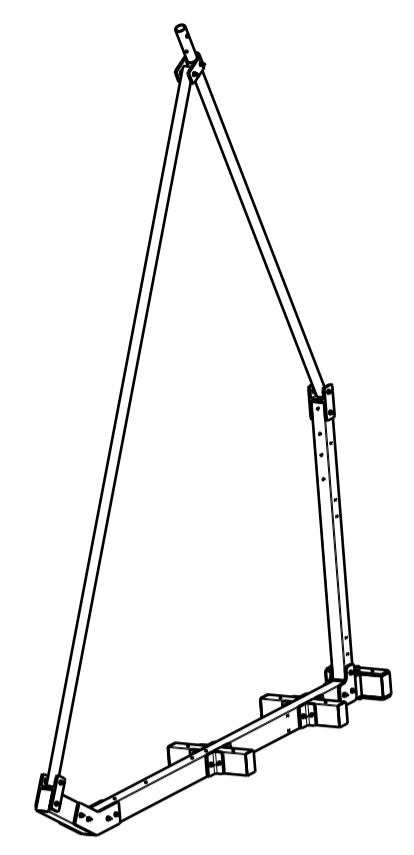
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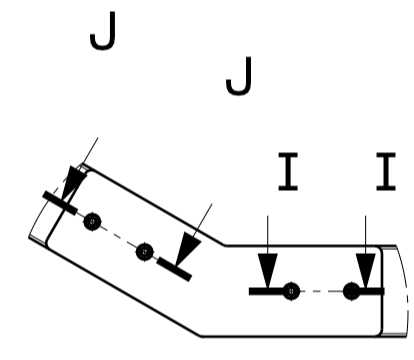
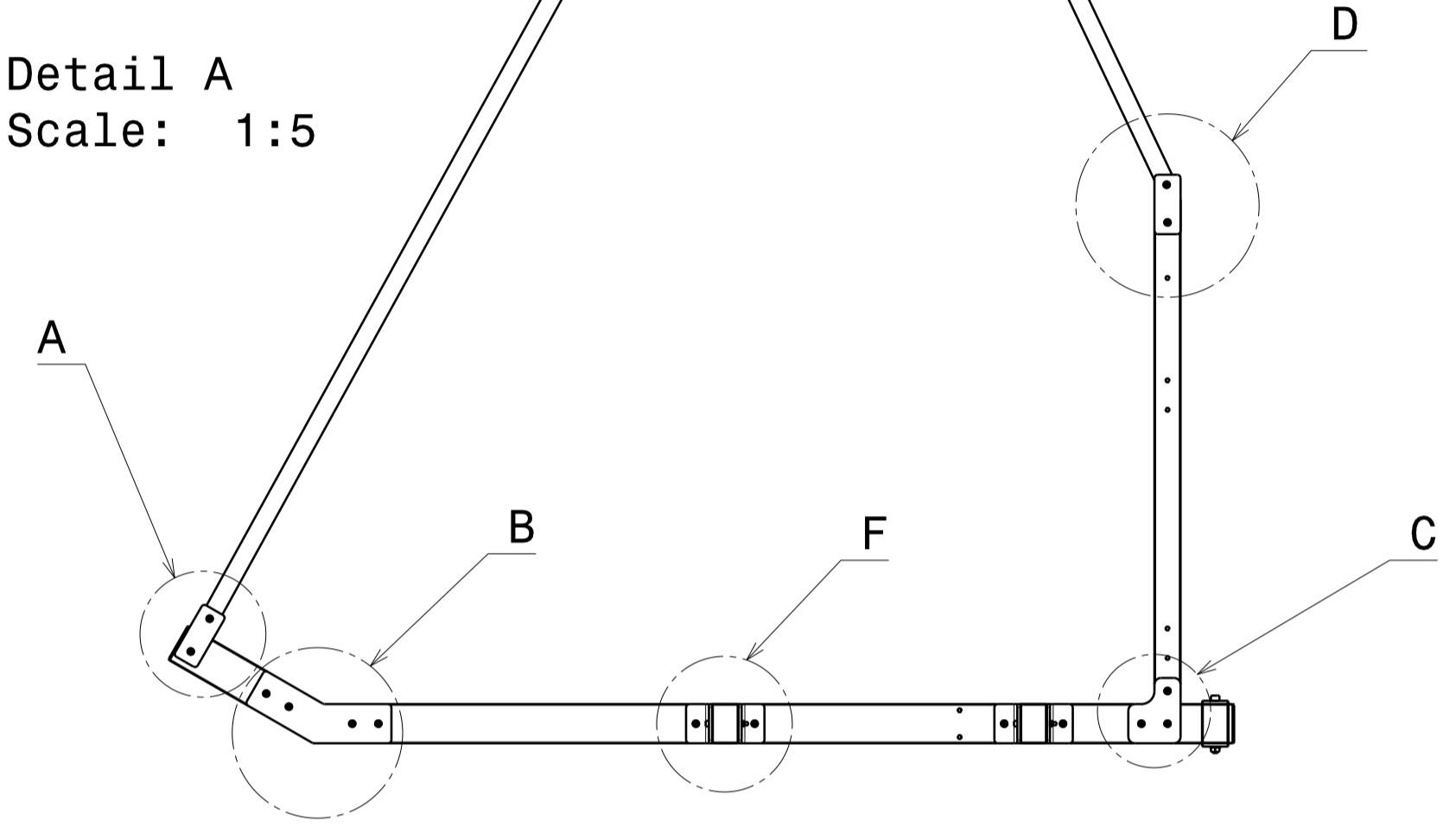
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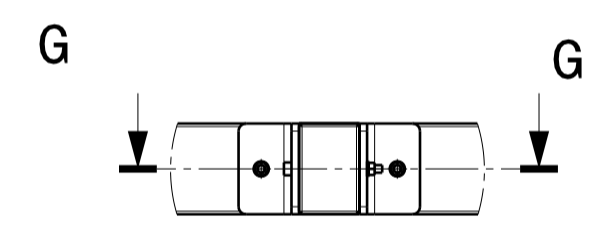
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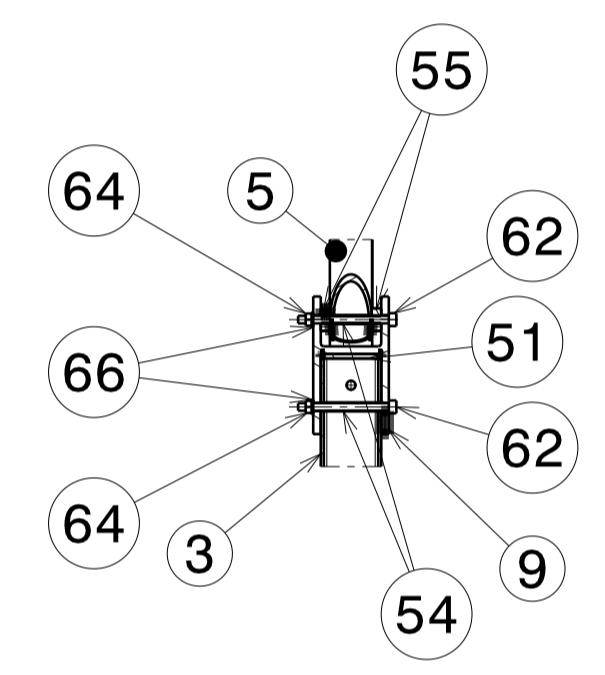
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6	10100_006	150° angle plate	2
7	10100_007	90° angle plate	2
8	10100_008	U Formed_channel	1
9	10100_009	H_formed_channel	2
10	10100_010	motor_assembly_Support	2
11	10100_011	plate	2
12	10100_012	Seat_assembly_support	4
13	10100_013	Plate_2	8
51	UNSET3-40-40	Rubber sheet	3
52	UNSET10-60-40	Rubber Sheet	8
53	PIPS6-0 5-34	Extruded stainless steel tubing	2
54	PIPS6-0 5-40	Extruded stainless steel tubing	19
55	FWRBS-D15-V6-T10	Rubber washer	4
56	FWRBS-D15-V6-T6	Rubber washer	2
57	RBXS-D34-L30-V28	Rubber_bushing	1
61	ISO_4762_M5x55_A2_70	Hexagon_socket_head_cap_screw_ISO_4762_M5x55_A2_70	2
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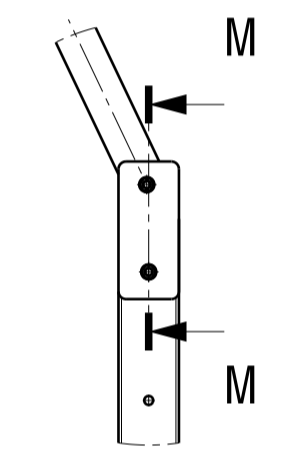
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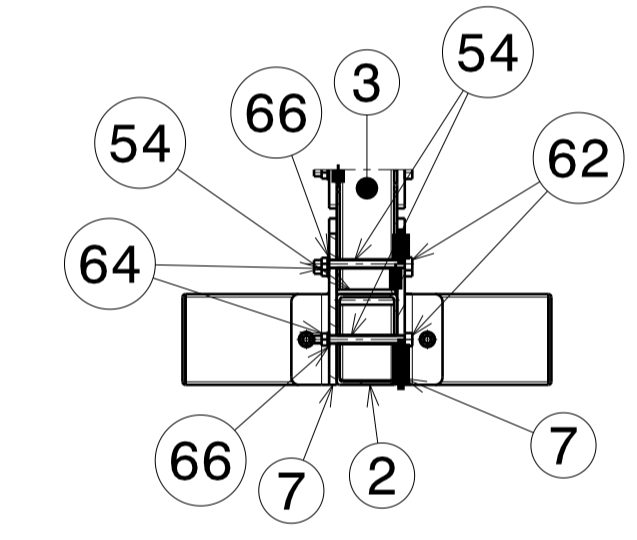
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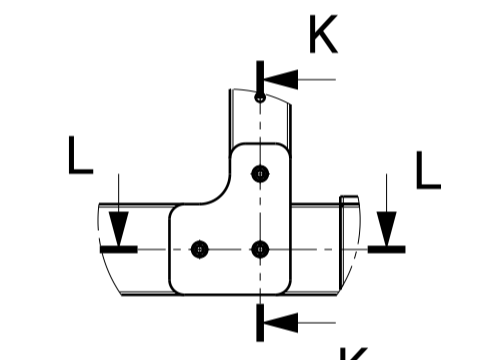
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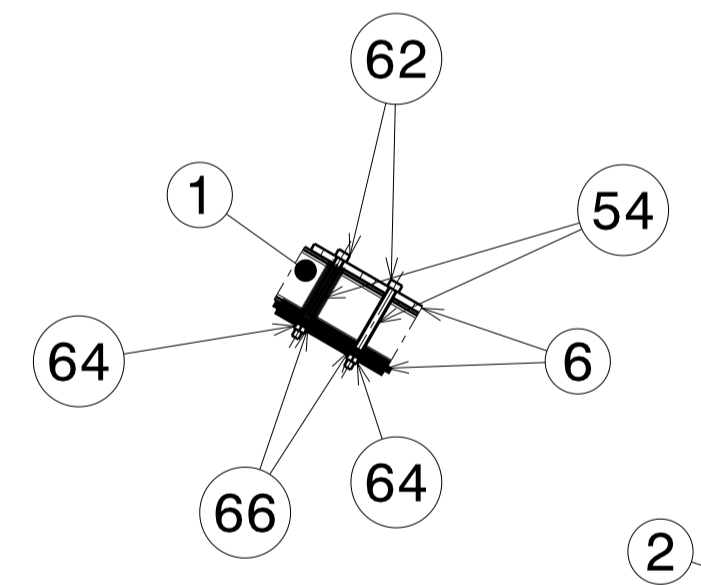
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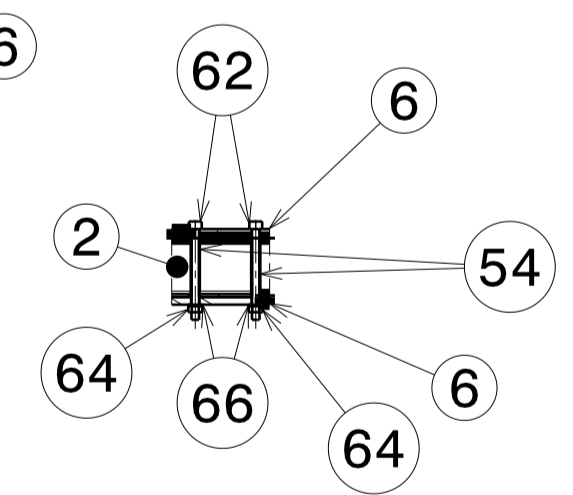
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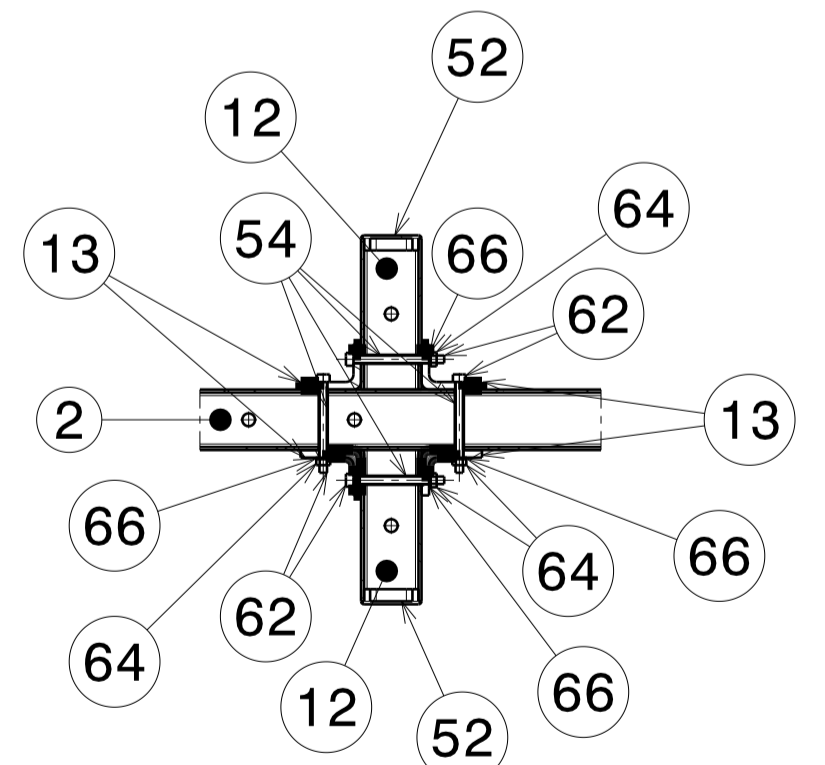
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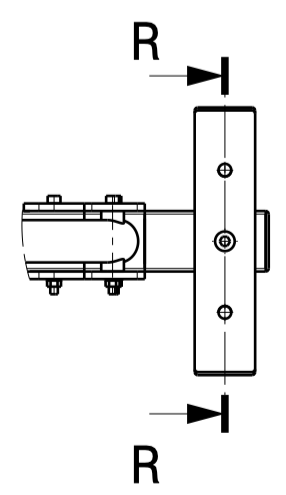
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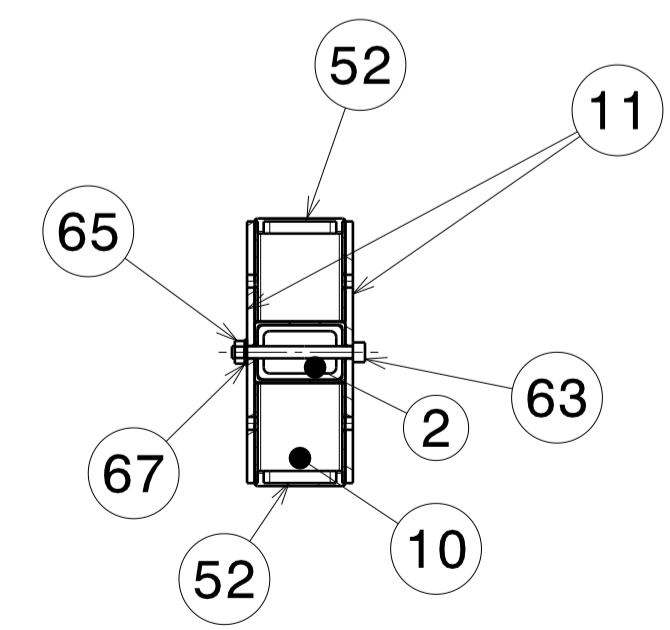
Section view I-I
Scale: 1:5



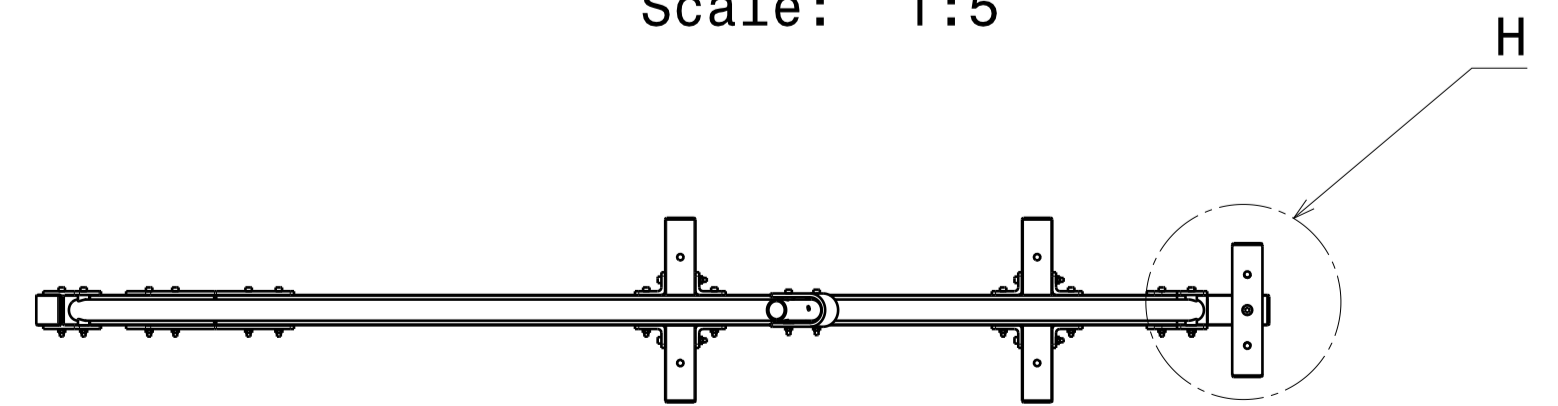
Section view G-G
Scale: 1:5



Detail H
Scale: 1:5



Section view R-R
Scale: 1:5

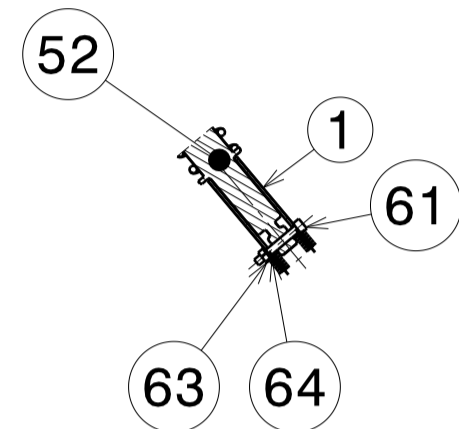
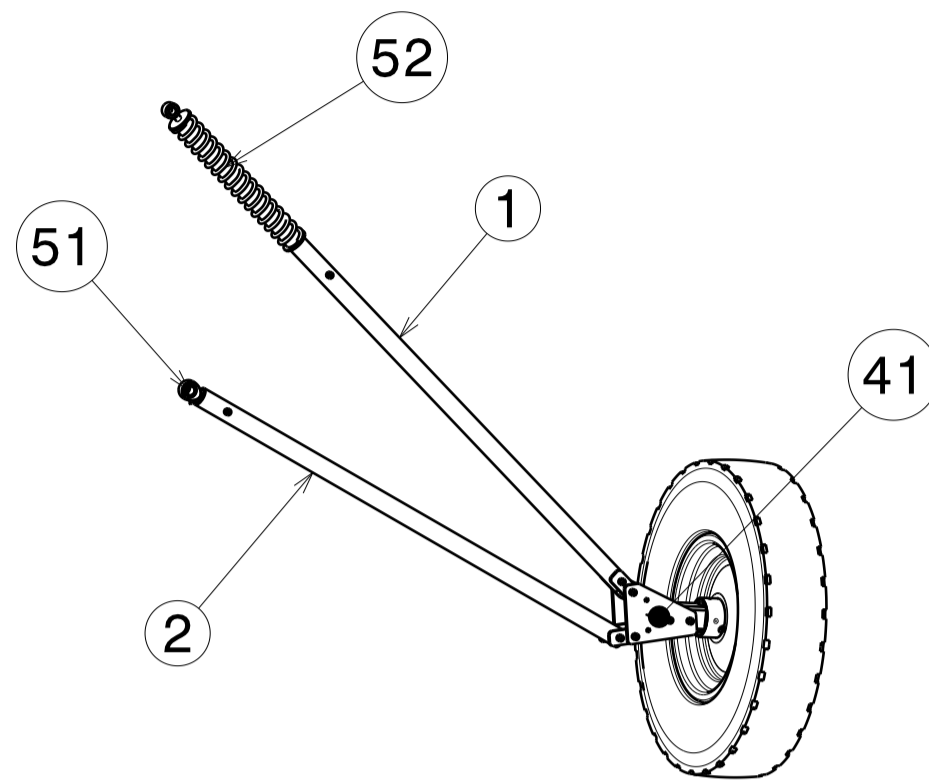


PROPIEDAD	DESTINACION/ NOME	ESPECIFICACION/SPEC.	TOLERANCIA GENERAL	ESPECIFICACION/SPEC.
RUGOSIDAD SUPERFICIAL SURFACE TEXTURE	3.2	ISO 1302	GENERAL MANUFACTURING TOLERANCES	FINO/FINE
TRATAMIENTO SUPERFICIAL SURFACE TREATMENT	-	-	ISO 2768-mL	MEDIO/MEDIUM
TRATAMIENTO TERMICO HEAT TREATMENT	-	-	TOL. DE FORMA Y POSICION FORM AND POSITION TOLERANCE	ISO 1101
MATERIAL	-	-	TOL. ANGULARES Y LINEARES ANGULAR AND LINEAR TOLERANCES	ISO 406

1.0	Initial Issue	28/02/08
EDICION ISSUE	REFERENCIA DE NOTA DE CAMBIO CHANGE NOTE REFERENCE	FECHA DATE
ESCALA SCALE	1:10	DIMENSIONES EN DIMENSIONS IN
TITULO / TITLE		A1
NOMBRE NAME		MLB_TRIKE
ELABORADO PREPARED	M. LECINA	CODIGO / CODE
10000		HUJA DE SHEET
		4 OF 8

**10400
COMMON BACK LANDING GEAR**

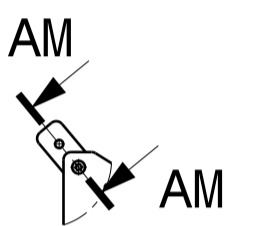
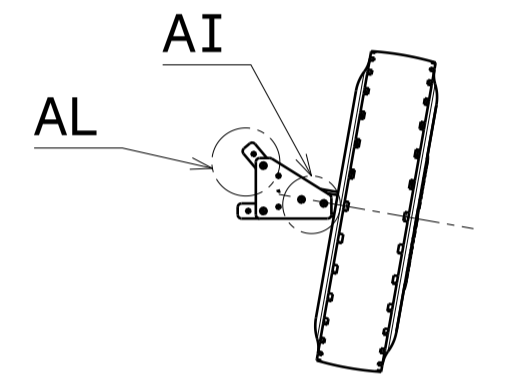
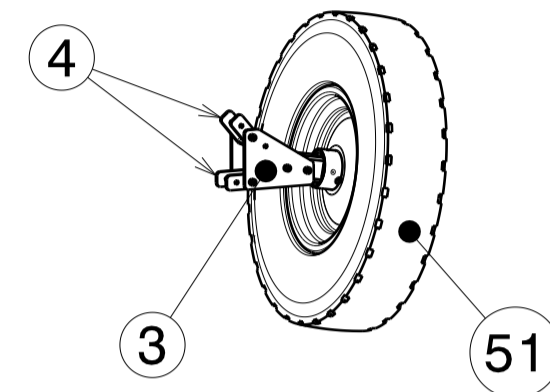
Bill of Material: 10400			
Item	Part Number	Nomenclature	Quantity
1	10400_001	upper_back_landing_gear	1
2	10400_002	lower_back_landing_gear	1
3	10400_003	internal_tube	1
51	PHS010	Rod_End_Bearing	1
52	DUAL_ROAD_A	Shock_Absorber	1
53	PIPS6-0_5-27	Extruded stainless steel tubing	2
61	ISO_4762_M5x35_A2_70	Hexagon socket head cap screw ISO_4762_M5x35_A2_70	2
62	ISO_4762_M5x45_A2_70	Hexagon socket head cap screw ISO_4762_M5x45_A2_70	2
63	DIN_934_M5_A2_70	Hexagon Nut DIN_934_M5_A2_70	4
64	DIN_125_5.3_A2_70	Washer DIN_125_5.3_A2_70	4
41	10410	Wheel_assembly	1



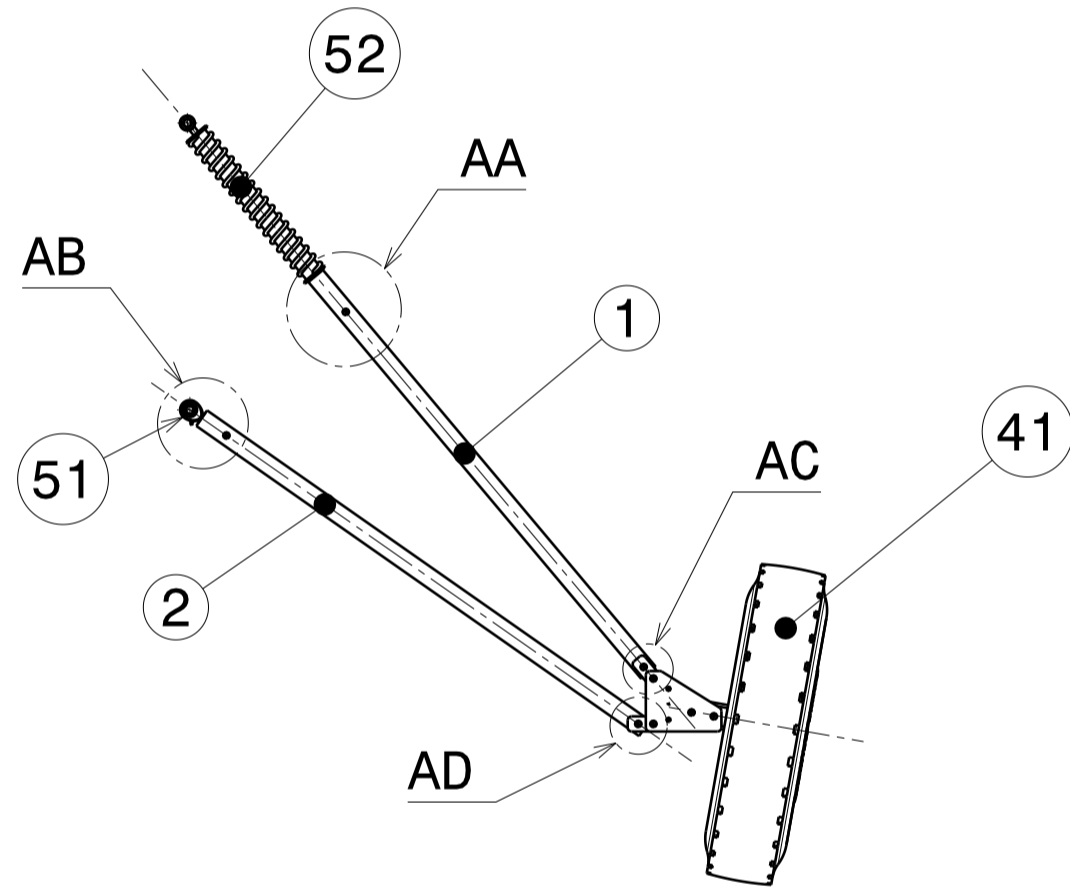
Section view AF-AF
Scale: 1:5

**10410
WHEEL ASSEMBLY**

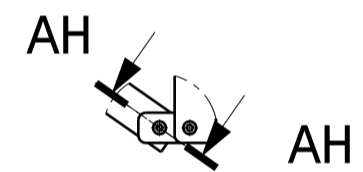
Bill of Material: 10410			
Item	Part Number	Nomenclature	Quantity
1	10410_001	Wheel_Shaft	1
2	10410_002	Wheel_Shaft_Stop	1
3	10410_003	Triangular_Plate	2
4	10410_004	U_Formed_channel	2
51	P_420_25-90K_Standard	Wheel	1
52	PIPS6-0_5-27	Extruded stainless steel tubing	2
61	ISO_4762_M5x55_A2_70	Hexagon socket head cap screw ISO_4762_M5x55_A2_70	4
62	DIN_934_M5_A2_70	Hexagon Nut DIN_934_M5_A2_70	4
63	DIN_125_5.3_A2_70	Washer DIN_125_5.3_A2_70	4



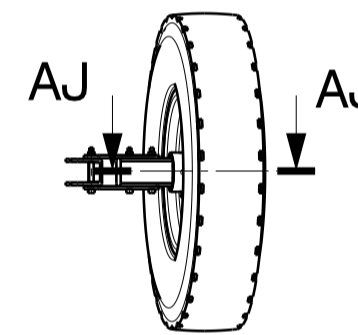
2(X) Detail AL
Scale: 1:5



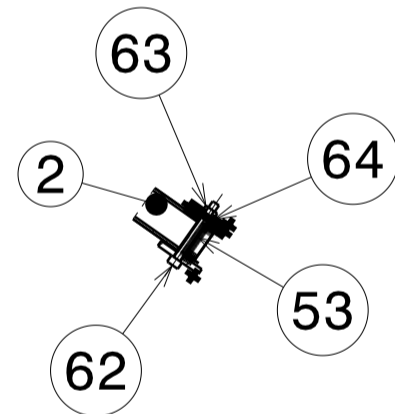
Detail AA
Scale: 1:5



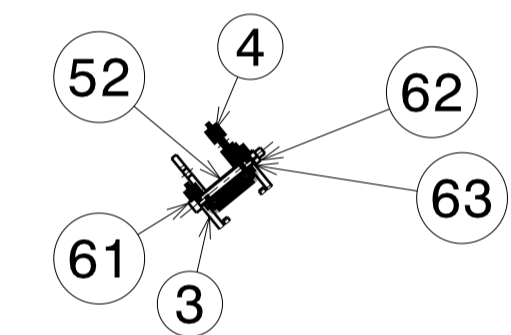
Detail AD
Scale: 1:5



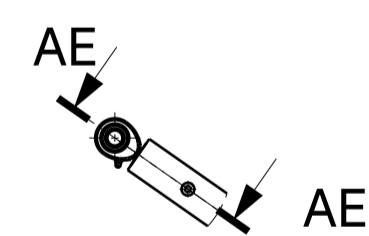
Top view
Scale: 1:10



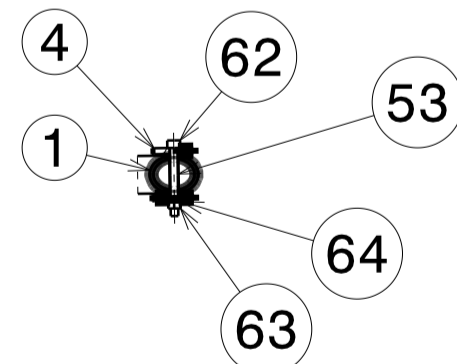
Section view AH-AH
Scale: 1:5



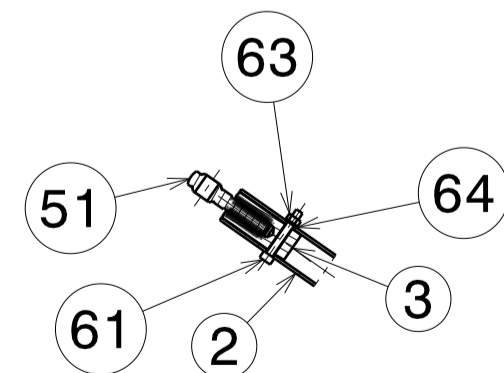
Section view AM-AM
Scale: 1:5



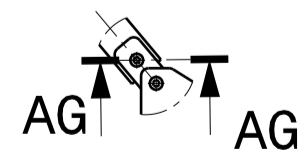
Detail AB
Scale: 1:5



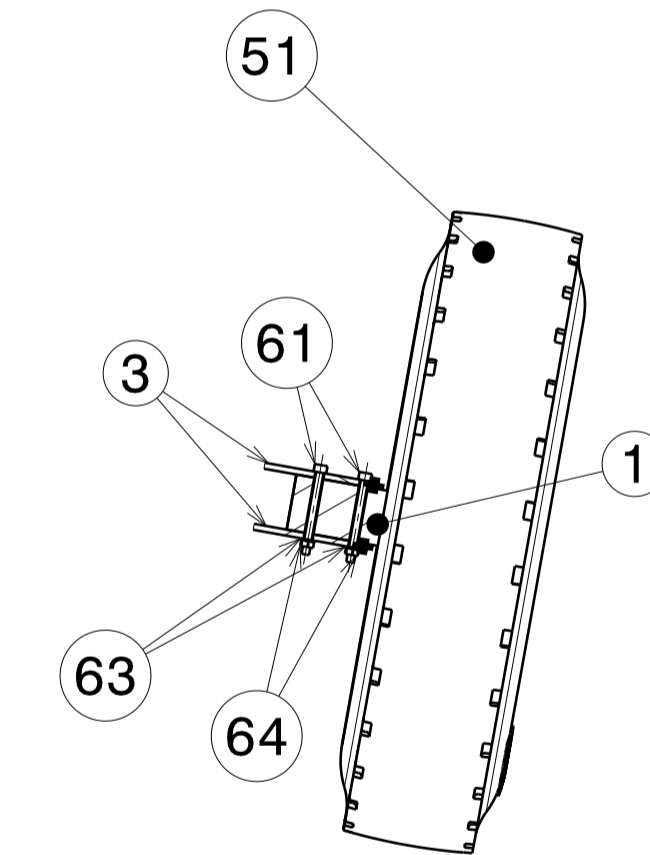
Section view AG-AG
Scale: 1:5



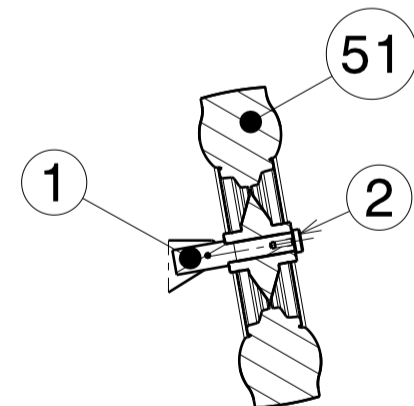
Section view AE-AE
Scale: 1:5



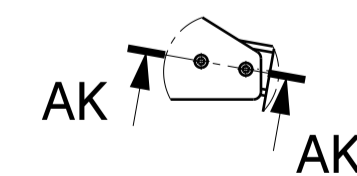
Detail AC
Scale: 1:5



Section view AK-AK
Scale: 1:5



Section view AJ-AJ
Scale: 1:10



Detail AI
Scale: 1:5

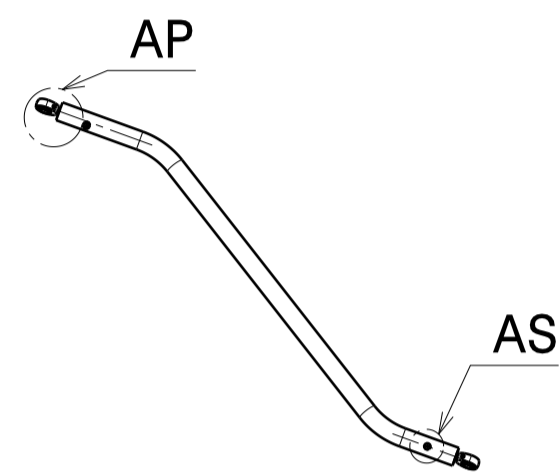
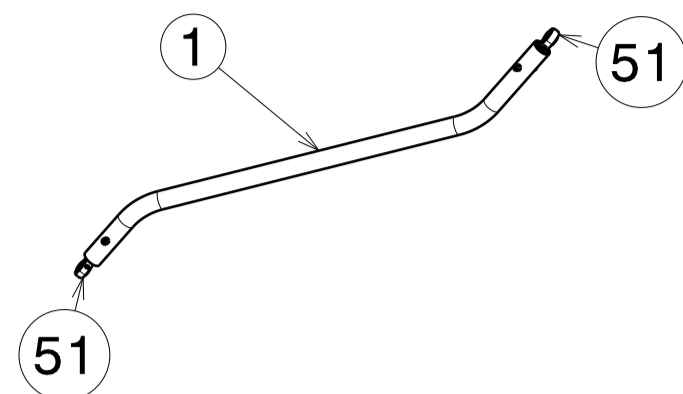
1.0	Initial Issue	28/02/08
EDICION ISSUE	REFERENCIA DE NOTA DE CAMBIO CHANGE NOTE REFERENCE	FECHA DATE
 E.U.L.T. Aeronáutica		
ESCALA SCALE		1:10
DIMENSIONES EN DIMENSIONS IN		mm
MLB_TRIKE		
TITULO / TITLE		A1
NOMBRE NAME		M. LECINA
CODIGO / CODE		10000
ELABORADO PREPARED		HOJA DE SHEET
		6 OF 8

DESTINACION/ NAME	ESPECIFICACION/SPEC.	ESPECIFICACION/SPEC.
RUGOSIDAD SUPERFICIAL SURFACE TEXTURE	3.2 ✓ / ✓ / ✓	ISO 1302
TRATAMIENTO SUPERFICIAL SURFACE TREATMENT	-	ISO 2768-ML
TRATAMIENTO TERMICO HEAT TREATMENT	-	ISO 1101
MATERIAL	-	ISO 406

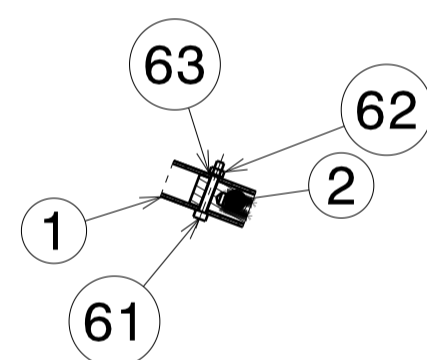
10500
STABILIZER BACK LANDING GEAR

Bill of Material: 10500

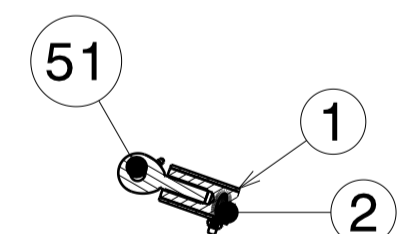
Item	Part Number	Nomenclature	Quantity
1	10500_001	Stabilizer_back_landing_gear	1
2	10400_003	internal_tube	2
51	PHS010	Rod_End_Bearing	2
61	ISO_4762_M5x35_A2_70	Hexagon socket head cap screw ISO_4762_M5x35_A2_70	2
62	DIN_934_M5_A2_70	Hexagon Nut DIN_934_M5_A2_70	2
63	DIN_125_5.3_A2_70	Washer DIN_125_5.3_A2_70	2



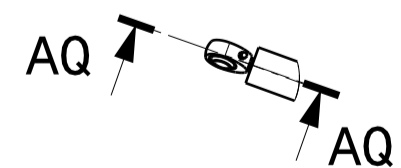
2(X) Detail AS
Scale: 1:5



Section view AT-AT
Scale: 1:5



Section view AQ-AQ
Scale: 1:5

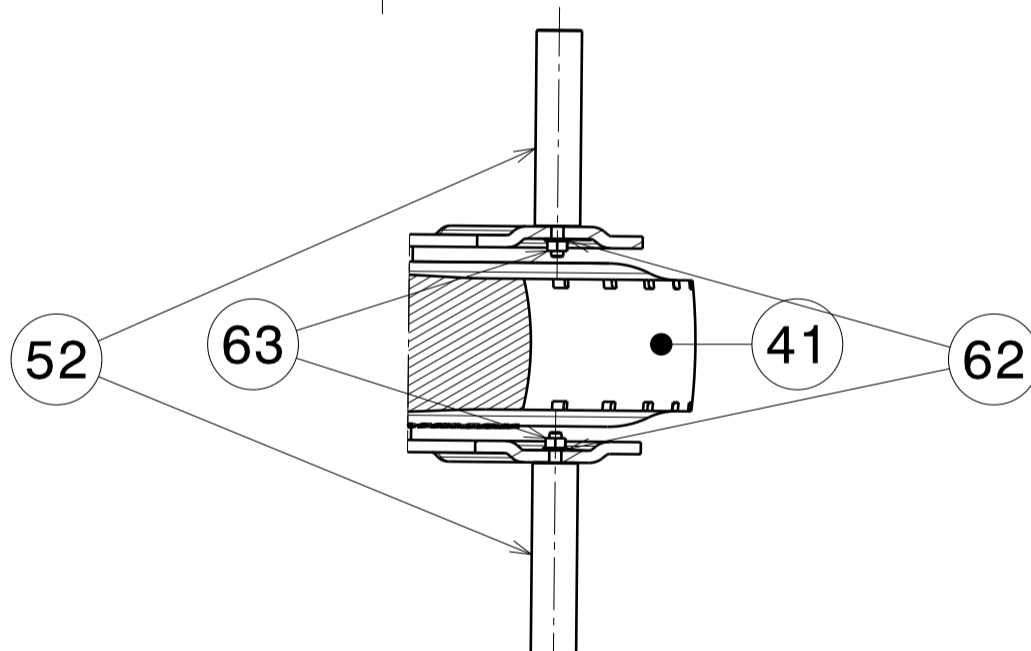
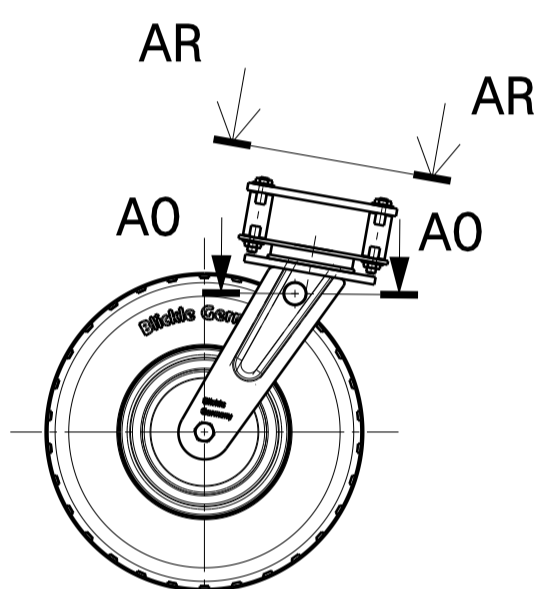
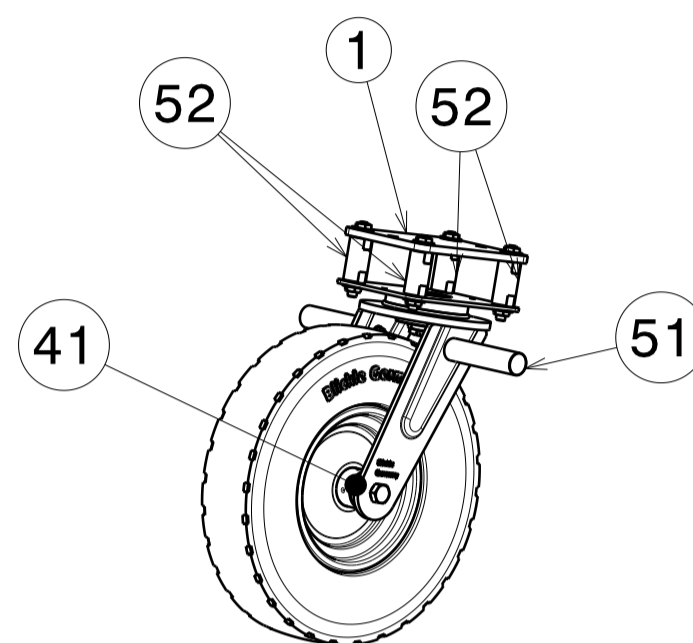


2(X) Detail AP
Scale: 1:5

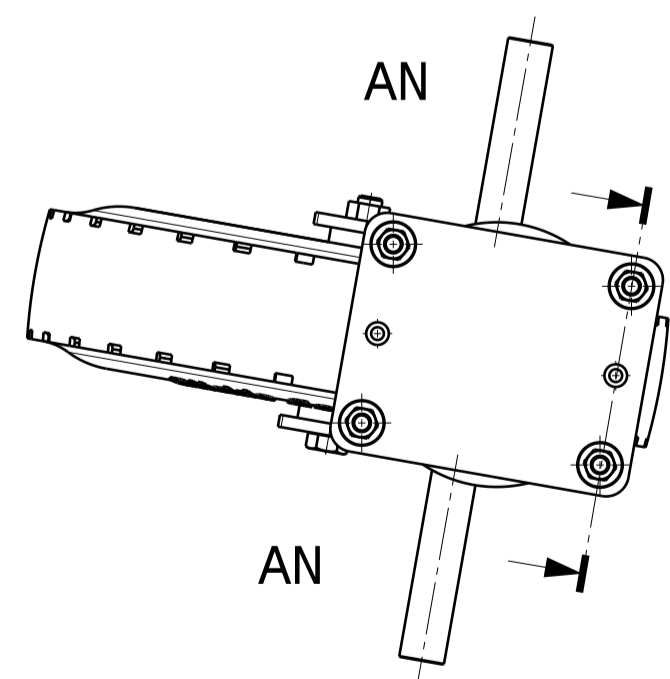
10600
FRONT LANDING GEAR

Bill of Material: 10600

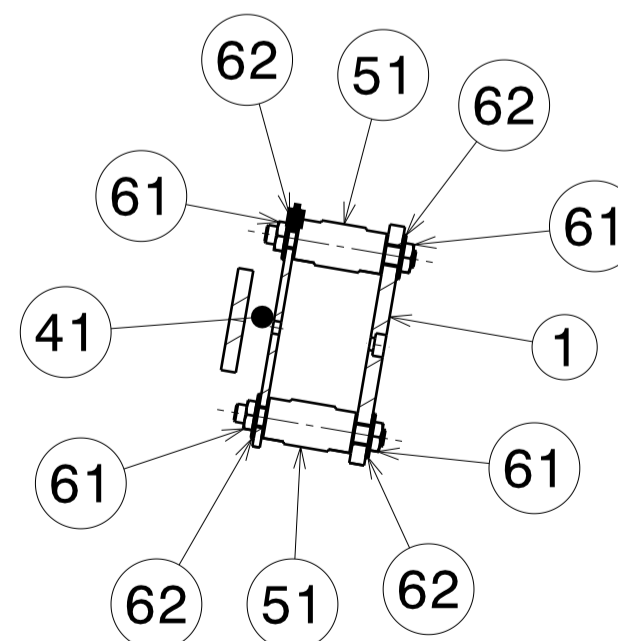
Item	Part Number	Nomenclature	Quantity
1	10600_001	plate	1
51	PSFAU30-60-F20-B15-P12-T20-S15-Q12-WSCO-XO	Shafts-Male Thread, Both Ends Type	4
52	SSFRN30-130-F20-B17-P8-KC8-A8	Rotary Shafts-Male Thread	2
53	ANN12_1	Nut	8
54	WASB30-12-2	Washers-Precision Class	8
61	DIN_934_M8_A2_70	Hexagon Nut DIN_934_M8_A2_70	2
62	DIN_125_8.4_A2_70	Washer DIN_125_8.4_A2_70	2
41	LS-P_420K	Front_wheel_assembly	1



Section view A0-A0
Scale: 1:5



Auxiliary view AR
Scale: 1:5

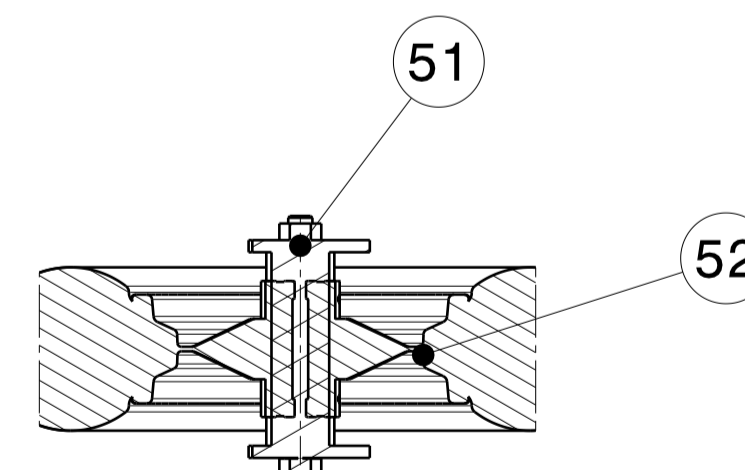
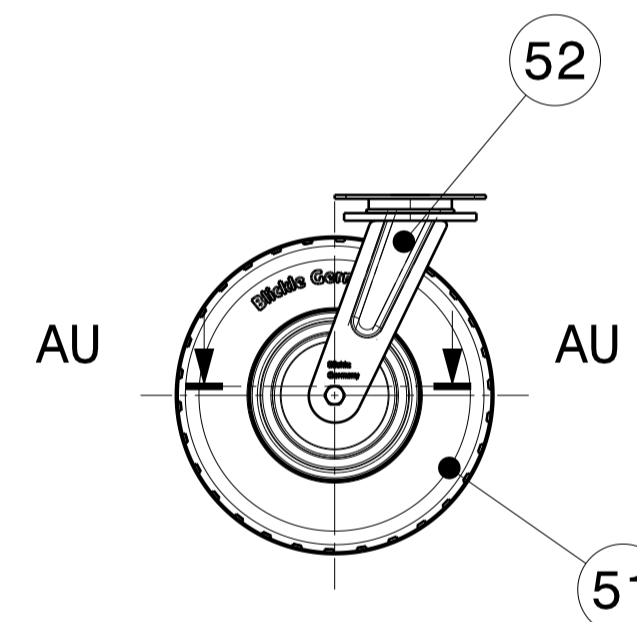


2(X) Section view AN-AN
Scale: 1:5

LS-P-420K
FRONT WHEEL ASSEMBLY

Bill of Material: LS-P_420K

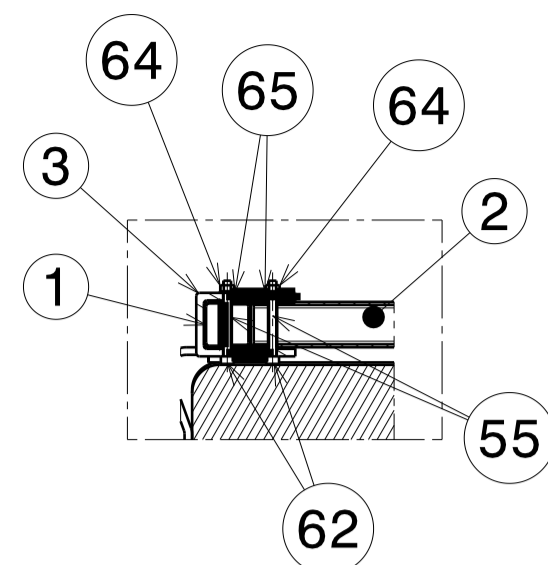
Item	Part Number	Nomenclature	Quantity
51	GH-LS_400-42-128_Standard_1	Grip	1
52	P-Blockprofil_P_420_25-90K	Wheel	1



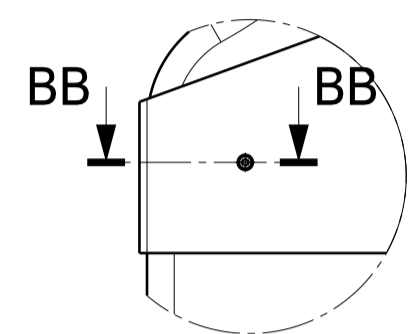
Section view AU-AU
Scale: 1:5

DESTINACION/ NAME	ESPECIFICACION/SPEC.	TOLERANCIA GENERAL GENERAL MANUFACTURING TOLERANCES	ESPECIFICACION/SPEC.
RUGOSIDAD SUPERFICIAL SURFACE TEXTURE	3.2 / ✓ / ✓ / ✓	ISO 1302	FINO/FINE
TRATAMIENTO SUPERFICIAL SURFACE TREATMENT	-	ISO 2768-mL	MEDIO/MEDIUM
TRATAMIENTO TERMICO HEAT TREATMENT	-	TOL. DE FORMA Y POSICION FORM AND POSITION TOLERANCE	BASTO/COARSE
MATERIAL	-	TOL. ANGULARES Y LINEARES ANGULAR AND LINEAR TOLERANCES	ISO 1101
			ISO 406

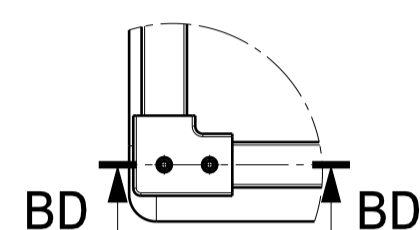
1.0	Initial Issue	28/02/08
EDICION ISSUE	REFERENCIA DE NOTA DE CAMBIO CHANGE NOTE REFERENCE	FECHA DATE
ESCALA SCALE 1:10		DIMENSIONES EN mm DIMENSIONS IN
MLB_TRIKE		
CODIGO/CODE 10000		HOJA DE SHEET 7 OF 8
ELABORADO PREPARED	M. LECINA	



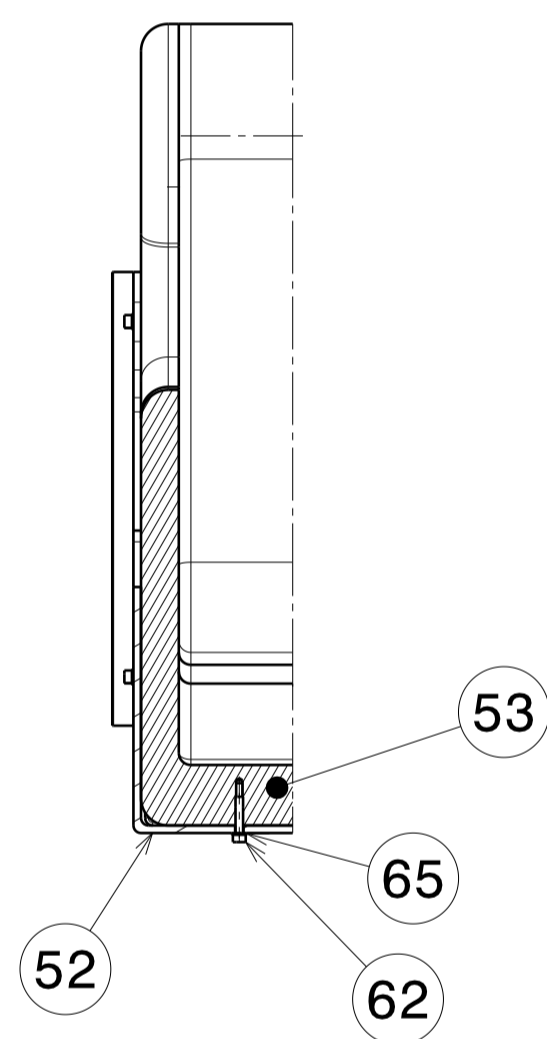
Section view BD-BD
Scale: 1:5



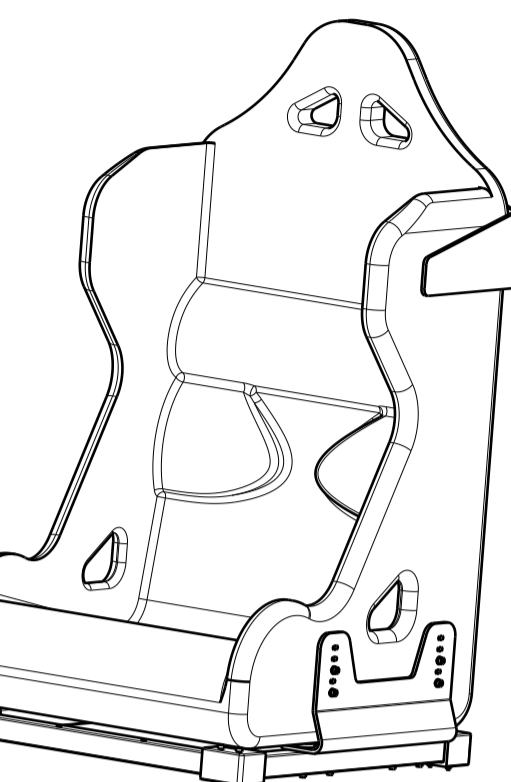
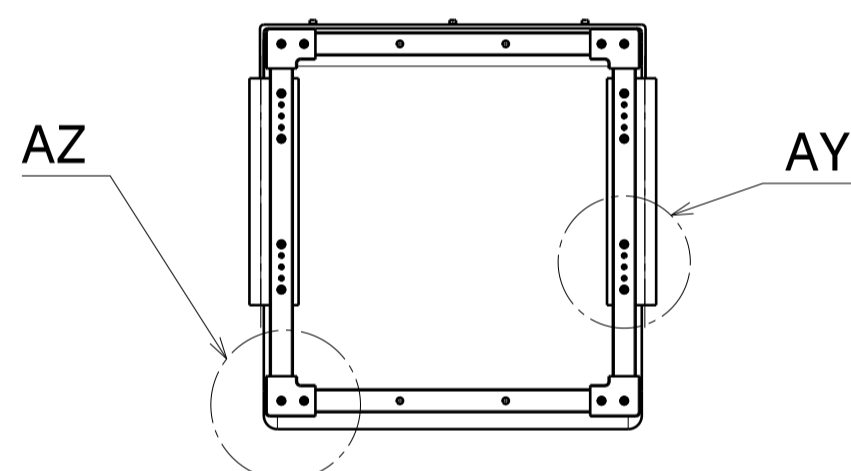
3(X) Detail AX
Scale: 1:5



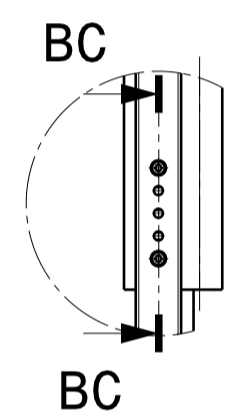
4(X) Detail AZ
Scale: 1:5



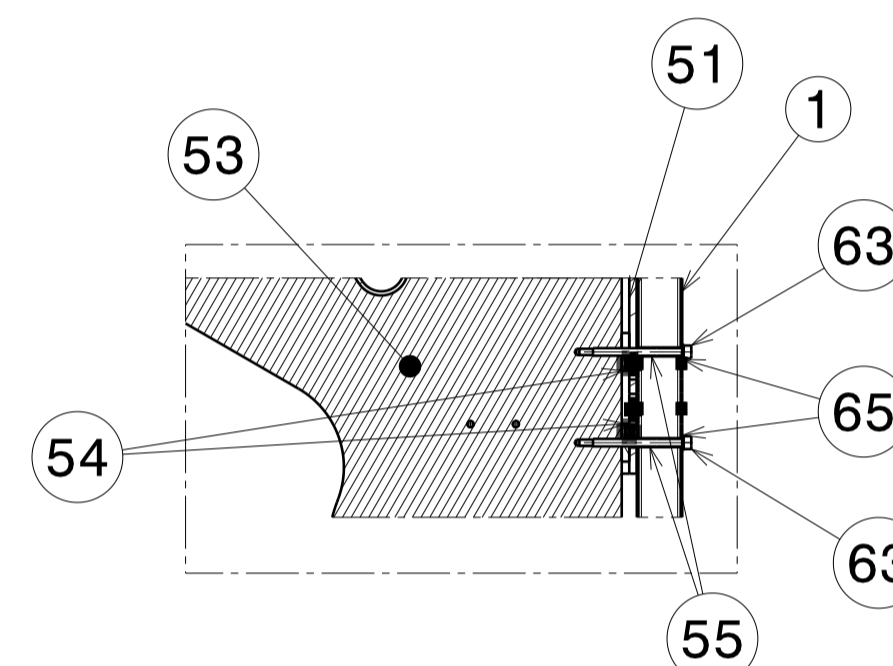
Section view BB-BB
Scale: 1:5



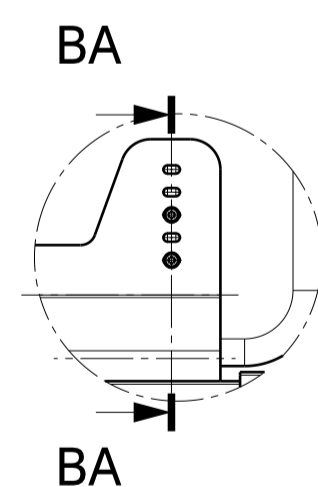
10700
SEAT ASSEMBLY



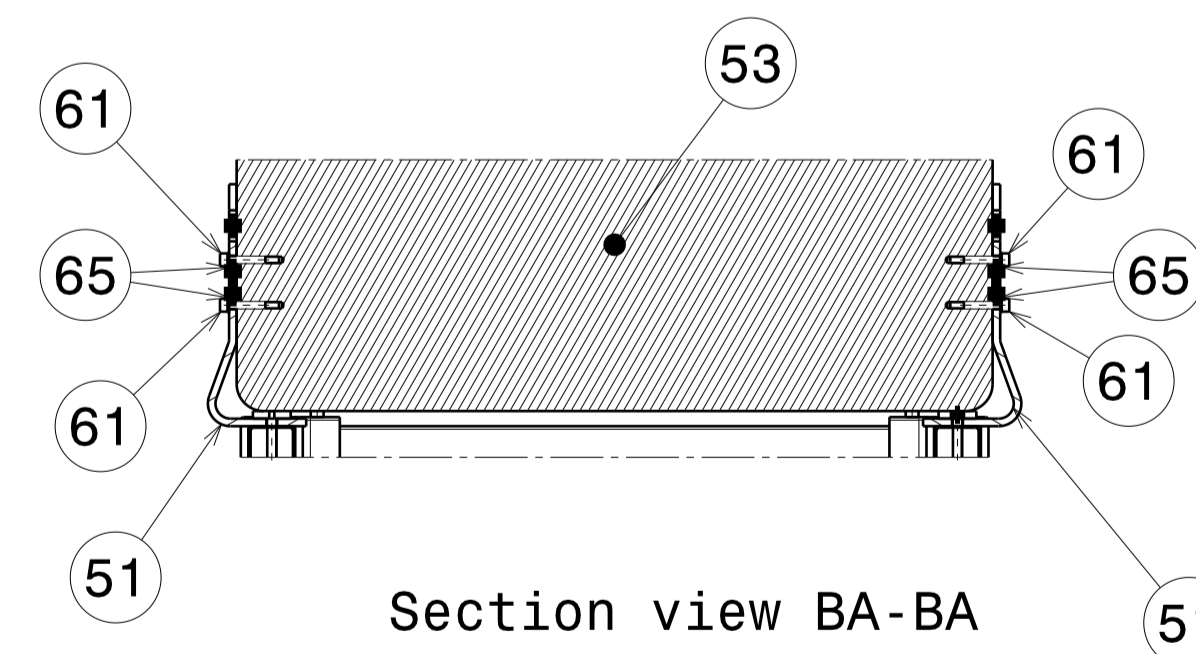
4(X) Detail AY
Scale: 1:5



Section view BC-BC
Scale: 1:5


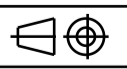


2(X) Detail AV
Scale: 1:5



Section view BA-BA
Scale: 1:5

Bill of Material: 10700			
Item	Part Number	Nomenclature	Quantity
1	10700_001	Seat support	2
2	10700_002	seat side support	2
3	10300_006	Orthogonal_joints_2_directions	4
51	Sparco_Steel_Side_Mounts	Seat side mount	2
52	Sparco_Head_Restraint	Seat head Restraint	1
53	Corbeau FX1	Seat	1
54	WUNS25-5-5	Rubber washer	8
55	PIPS6-0_5-30	Extruded stainless steel tubing	16
61	ISO_4762_M5x25_A2_70	Hexagon socket head cap screw ISO_4762_M5x40_A2_70	11
62	ISO_4762_M5x50_A2_70	Hexagon socket head cap screw ISO_4762_M5x50_A2_70	8
63	ISO_4762_M5x60_A2_70	Hexagon socket head cap screw ISO_4762_M5x60_A2_70	8
64	DIN_934_M5_A2_70	Hexagon Nut DIN_934_M5_A2_70	8
65	DIN_125_5.3_A2_70	Washer DIN_125_5.3_A2_70	27

1.0	Initial Issue	28/02/08
EDICION ISSUE	REFERENCIA DE NOTA DE CAMBIO CHANGE NOTE REFERENCE	FECHA DATE
 E.U.L.T. Aeronáutica		
 ESCALA SCALE		1:10 DIMENSIONES EN DIMENSIONS IN
TITULO / TITLE MLB_TRIKE		A1
NOMBRE NAME M. LECINA		CODIGO / CODE 10000
ELABORADO PREPARED		HOJA DE SHEET 8 OF 8

ESPECIFICACION / SPEC.	ESPECIFICACION / SPEC.
RUGOSIDAD SUPERFICIAL SURFACE TEXTURE 3.2 / ✓ / ✓ / ✓	TOLERANCIA GENERAL GENERAL MANUFACTURING TOLERANCES FINO/FINE MEDIO/MEDIUM BASTO/COARSE
TRATAMIENTO SUPERFICIAL SURFACE TREATMENT -	ISO 2768-mL
TRATAMIENTO TERMICO HEAT TREATMENT -	TOL. DE FORMA Y POSICION FORM AND POSITION TOLERANCE ISO 1101
MATERIAL MATERIAL -	TOL. ANGULARES Y LINEARES ANGULAR AND LINEAR TOLERANCES ISO 406