
Ecurie Piston Sport Auto
ÉCOLE
CENTRALE LYON
CAR #81
ELECTRICAL

University	Ecole Centrale de Lyon
System	Electrical
Assembly	Rear firewall instruments and wires
P/N Base	EL A0100
Suffix	AA
Details	

Back to BOM

Car #	81
FileLink1	
FileLink2	
FileLink3	

Asm Cost	$ 1 302,35
Qty	1
Extended C	$ 1 302,35

ItemOrder	Part	Part Cost	Quantity	Sub Total
10	Fuse box bracket	$ 0,88	2	$ 1,77
20	Ground bracket	$ 0,55	2	$ 1,09
30	Break light bracket	$ 0,82	2	$ 1,64
40	Master switch panel	$ 15,37	1	$ 15,37
50	Master switch panel bracket	$ 0,83	2	$ 1,65
60	Crash sensor bracket	$ 2,09	1	$ 2,09
			Sub Total	**$ 23,61**

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	ECU, DTA, S80 Pro	DTA	$ 850,00		unit							1	$ 850,00
20	Sensor, Air Temperature	IAT sensor	$ 4,00		unit							1	$ 4,00
30	Sensor, Angular position	TPS	$ 4,00		unit							1	$ 4,00
40	Sensor, Hall effect	Rear wheels speed sensors	$ 4,00		unit							2	$ 8,00
50	Sensor, Hall effect	Camshaft position sensor	$ 4,00		unit							1	$ 4,00
60	Sensor, Hall effect	Crankshaft position sensor	$ 4,00		unit							1	$ 4,00
70	Sensor, Manifold Absolute Pressure (MAP)		$ 4,00		unit							1	$ 4,00
80	Sensor, Temperature	ECT	$ 8,00		unit							1	$ 8,00
90	Sensor, Two state position	Neutral switch	$ 4,00		unit							1	$ 4,00
100	Sensor, Two state position	Crash sensor	$ 4,00		unit							1	$ 4,00
110	Sensor, Fluid pressure	Oil pressure sensor	$ 4,00		unit							1	$ 4,00
120	Sensor, Wide band air fuel ratio		$ 35,00		unit							1	$ 35,00
130	Connector, Aerospace quality	gearmotor box control	$ 1,00		pin							8	$ 8,00
140	Connector, Aerospace quality	Firewall interface - 22 pins	$ 1,00		pin							22	$ 22,00
150	Connector, Computer Type	DB-9 connector for ECU control	$ 1,00		pin							9	$ 9,00
160	Connector, OEM Quality	TPS - 3 wires	$ 0,50		pin							3	$ 1,50
170	Connector, OEM Quality	Oil pressure sensor - 2 wires	$ 0,50		pin							2	$ 1,00
180	Connector, OEM Quality	Neutral switch - 1 wire	$ 0,50		pin							1	$ 0,50
190	Connector, OEM Quality	ECT - 2 wires	$ 0,50		pin							2	$ 1,00
200	Connector, OEM Quality	Lambda sensor - 2x3 wires	$ 0,50		pin							6	$ 3,00
210	Connector, OEM Quality	Camshaft position sensor - 2 wires	$ 0,50		pin							2	$ 1,00
220	Connector, OEM Quality	Crankshaft position sensor - 2 wires	$ 0,50		pin							2	$ 1,00
230	Connector, OEM Quality	ECU - 38 wires	$ 0,50		pin							38	$ 19,00
240	Connector, OEM Quality	Fan - 2 wires	$ 0,50		pin							2	$ 1,00
250	Connector, OEM Quality	Ignition coils - 2x4 wires	$ 0,50		pin							8	$ 4,00
260	Connector, OEM Quality	Fuel injection - 2x4 wires	$ 0,50		pin							8	$ 4,00
270	Connector, OEM Quality	Crash sensor - 2 wires	$ 0,50		pin							2	$ 1,00
280	Connector, OEM Quality	MAP & IAT - 4 wires	$ 0,50		pin							4	$ 2,00
290	Connector, High Power, >2Amps	Regulator input - 3 wires	$ 2,00		pin							3	$ 6,00
300	Connector, High Power, >2Amps	Regulator output - 2 wires	$ 2,00		pin							2	$ 4,00
310	Connector, High Power, >2Amps	Starter motor - 1 wire	$ 2,00		pin							1	$ 2,00
320	Connector, High Power, >2Amps	Gearmotor box supply - 2 wires	$ 2,00		pin							2	$ 4,00
330	Connector, Single wire	Fuel pump	$ 0,05		wire							2	$ 0,10
340	Connector, Single wire	Break light	$ 0,05		wire							6	$ 0,30

350	Connector, Single wire	Connection to frame's ground	$ 0,05		wire							4	$ 0,20
360	Fuse box	4 relays, 8 fuses -> 32 pins	$ 0,25		pin							32	$ 8,00
370	Relay, power	Starter motor, ECU, fuel pump, fan, gearmotor	$ 4,00		unit							5	$ 20,00
380	Fuse, power		$ 1,00		unit							8	$ 8,00
390	Fuse box	250A fuse handler	$ 0,25		unit							2	$ 0,50
400	Fuse, power	250A fuse	$ 1,00		unit							1	$ 1,00
410	Wire, signal		$ 1,00		m							35	$ 35,00
420	Wire sleeving, split		$ 0,50		m							2	$ 0,75
430	Wire, Power		$ 3,00		m							10	$ 30,00
440	Heat Shrink Tubing		$ 0,50		m							4	$ 2,00
450	Switch, Kill	Master switch	$ 3,00		unit							1	$ 3,00
460	Chassis Control Module, Baseline Enclosure	Gearmotor box	$ 25,00		unit							1	$ 25,00
470	Chassis Control Module, +Automatic Shifter	Gearmotor box	$ 5,00		unit							1	$ 5,00
480	Paint	Parts painting	$ 10,00	8,46E-03	m^2								$ 0,08
												Sub Total	**$ 1 166,93**

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Weld	Brackets welding	$ 0,15	cm	15			$ 2,25
20	Aerosol apply	Brackets painting	$ 5,25	m^2	8,38E-03			$ 0,04
30	Aerosol apply	Gearmotor box painting	$ 5,25	m^2	7,92E-05			$ 0,00
40	Assemble, 1kg, Loose	Assemble Master switch panel on brackets	$ 0,06	unit	1			$ 0,06
50	Assemble, 3kg, Loose	Assemble ECU on vehicle	$ 0,19	unit	1			$ 0,19
60	Assemble, 1kg, Loose	Lambda sensor	$ 0,06	unit	1			$ 0,06
70	Assemble, 1kg, Loose	Assemble fuse box on fuse box brackets	$ 0,06	unit	1			$ 0,06
80	Cut wire	Cut sensor to appropriate length	$ 0,08	unit	104			$ 8,32
90	Strip wire	Strip wire ends	$ 0,08	unit	208			$ 16,64
100	Cut (scissors, knife)	Cut heat shrink tubing	$ 0,06	cm	1	repeat 15	15	$ 0,90
110	Shrink tube	Install and route wiring harness	$ 0,15	cm	30			$ 4,50
120	Connector assembly, crimp		$ 0,36	contact	108			$ 38,88
130	Connector Install, Circular, Bayonet		$ 0,11	unit	5			$ 0,55
140	Taping Wire Bundle		$ 0,04	cm	300			$ 12,00
150	Wire Dressing (install and route)		$ 1,00	m	4			$ 4,00
160	Ratchet <= 6.35 mm		$ 0,50	unit	12			$ 6,00
170	Reaction Tool <= 6.35 mm		$ 0,25	unit	12			$ 3,00
180	Attach Wire, Solder wire, bent	Solder cables	$ 0,35	unit	30			$ 10,50
							Sub Total	**$ 107,95**

ItemOrder	Fastener	Use	UnitCost	Size1	Unit1	Size2	Unit2	Quantity	Sub Total
10	Bolt,Grade 8.8 (SAE)	Regulator redressor	$ 0,04	3	mm	15	mm	3	$ 0,12
20	Washer, Grade 8.8 (SAE 5)	Regulator redressor	$ 0,01	3	mm			3	$ 0,03
30	Nut, Grade 8.8 (SAE 5)	Regulator redressor	$ 0,01	3	mm			3	$ 0,03
40	Bolt,Grade 8.8 (SAE)	Fuse box	$ 0,04	4	mm	15	mm	2	$ 0,08
50	Washer, Grade 8.8 (SAE 5)	Fuse box	$ 0,02	4	mm			2	$ 0,04
60	Nut, Grade 8.8 (SAE 5)	Fuse box	$ 0,01	4	mm			2	$ 0,02
70	Bolt,Grade 8.8 (SAE)	Master switch brackets	$ 0,04	4	mm	15	mm	2	$ 0,08
80	Washer, Grade 8.8 (SAE 5)	Master switch brackets	$ 0,02	4	mm			2	$ 0,04
90	Nut, Grade 8.8 (SAE 5)	Master switch brackets	$ 0,01	4	mm			2	$ 0,02
100	Bolt,Grade 8.8 (SAE)	Master switch	$ 0,04	4	mm	15	mm	2	$ 0,08
110	Washer, Grade 8.8 (SAE 5)	Master switch	$ 0,02	4	mm			2	$ 0,04
120	Nut, Grade 8.8 (SAE 5)	Master switch	$ 0,01	4	mm			2	$ 0,02
130	Bolt,Grade 8.8 (SAE)	M3 on ground brackets	$ 0,04	4	mm	15	mm	3	$ 0,12
140	Washer, Grade 8.8 (SAE 5)	M3 on ground brackets	$ 0,02	4	mm			3	$ 0,06

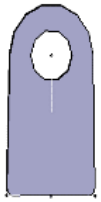
150	Nut, Grade 8.8 (SAE 5)	M3 on ground brackets	$ 0,01	4	mm			3	$ 0,03
160	Bolt,Grade 8.8 (SAE)	Crash sensor	$ 0,04	3	mm	15	mm	2	$ 0,08
170	Washer, Grade 8.8 (SAE 5)	Crash sensor	$ 0,02	3	mm			2	$ 0,04
180	Nut, Grade 8.8 (SAE 5)	Crash sensor	$ 0,01	3	mm			2	$ 0,02
190	Hook and Loop, Hook Side (Velcro)	For ECU and motogear box	$ 0,00	60	cm^2			1	$ 0,18
200	Hook and Loop, Loop Side (Velcro)	For ECU and motogear box	$ 0,00	60	cm^2			1	$ 0,12
210	Tie wrap	For harness routing	$ 0,04	1	unit			15	$ 0,60
								Sub Total	**$ 1,85**

ItemOrder	Tooling	Use	UnitCost	Unit	Quantity	PVF	FractionIn	Sub Total
10	Welds - Welding Fixture	Brackets welding	$ 500,00	point	12	3000	1	$ 2,00
							Sub Total	**$ 2,00**

University	Ecole Centrale de Lyon
System	Electrical
Assembly	Rear firewall instruments and wires
Part	Fuse box bracket
P/N Base	EL 01001
Suffix	AA
Details	

FileLink1	Drawing
FileLink2	
FileLink3	

Back to BOM



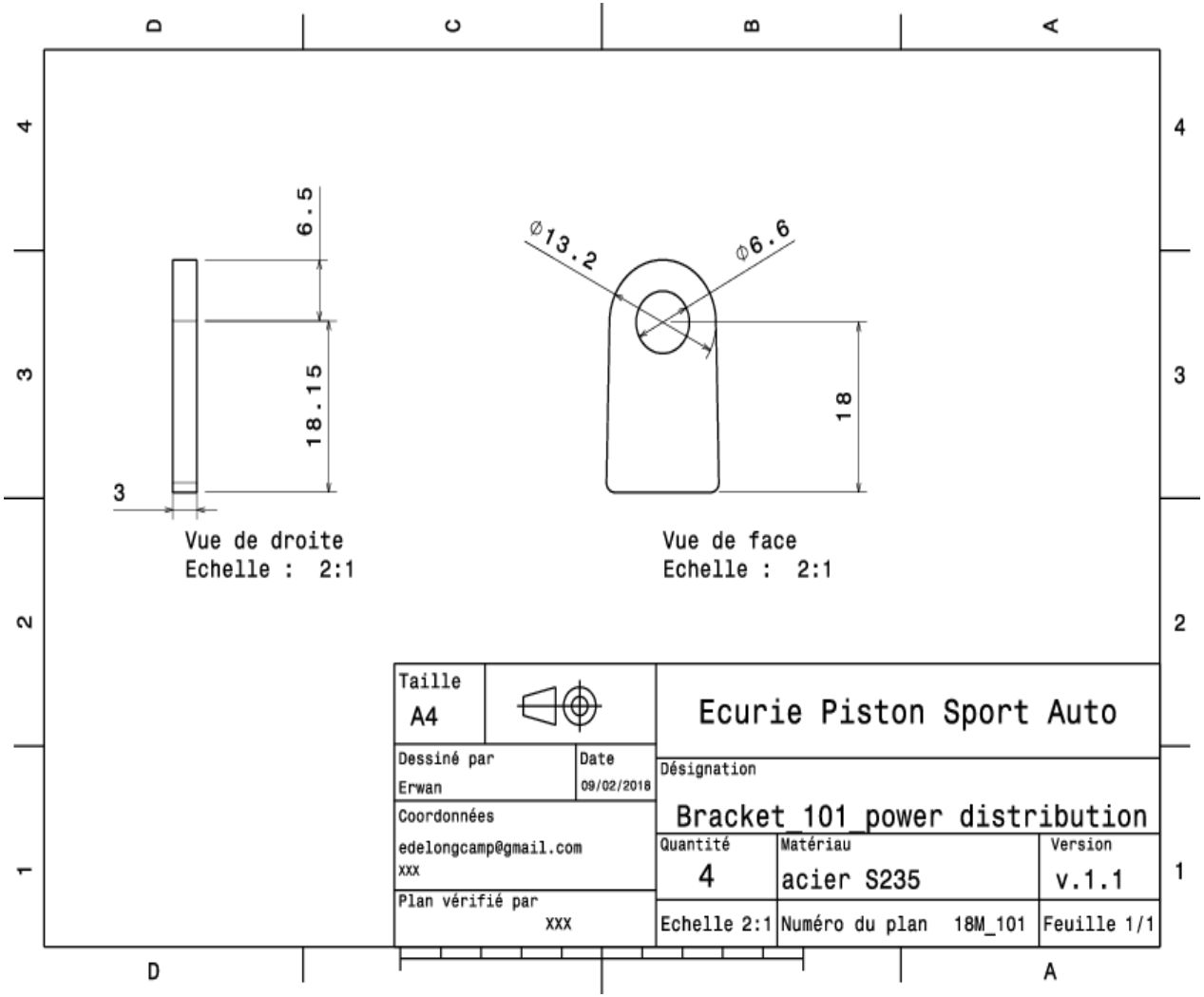
Car #	81
FileLink1	
FileLink2	
FileLink3	

Part Cost	$ 0,88
Qty	2
Extended Cost	$ 1,77

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Steel, mild	Stock material for part	$ 2,25	0,007	kg			Rectangular	3,12E-04	0,003	7850	1	$ 0,02
												Sub Total	**$ 0,02**

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Machining Setup, Install and remove	Setup for laser cutting	$ 1,30	unit	1	2 parts cut from a single machine setup	0,5	$ 0,65
20	Laser Cut	Cutout shape	$ 0,01	cm	7	Material - Steel	3	$ 0,22
							Sub Total	**$ 0,87**

Drawing part : EL 01001

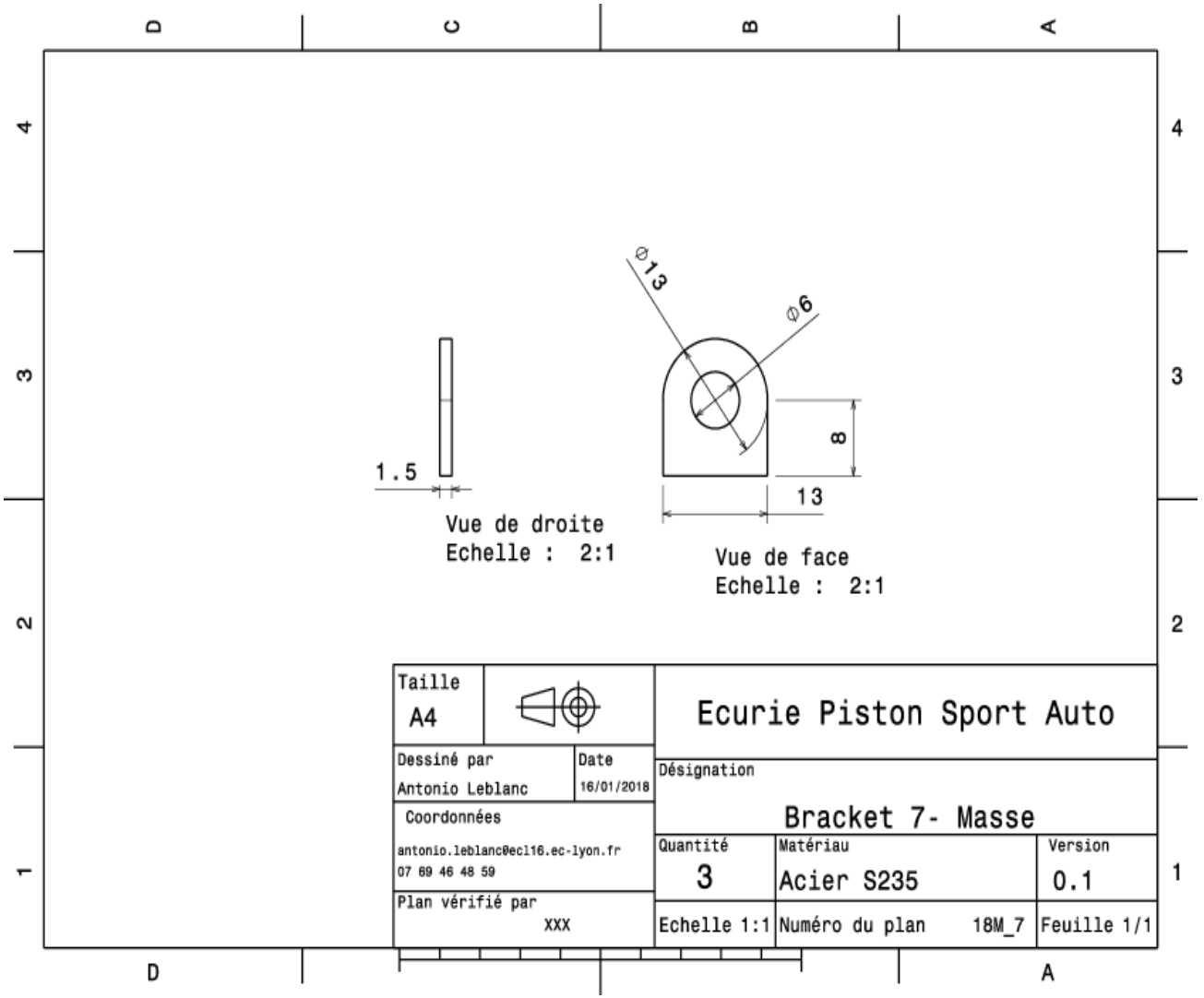


University	Ecole Centrale de Lyon			Back to BOM		**Car #**	81	**Part Cost**	$ 0,55
System	Electrical	**FileLink1**	Drawing					**Qty**	2
Assembly	Rear firewall instruments and wires	**FileLink2**				**FileLink1**			
Part	Ground bracket	**FileLink3**				**FileLink2**		**Extended Cost**	$ 1,09
P/N Base	EL 01002					**FileLink3**			
Suffix	AA								
Details									

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Steel, mild	Stock material for part	$ 2,25	0,002	kg			Rectangular	1,95E-04	0,002	7850	1	$ 0,01
												Sub Total	**$ 0,01**

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Machining Setup, Install and remove	Setup for laser cutting	$ 1,30	unit	1	3 parts cut from a single machine setup	0,33	$ 0,43
20	Laser Cut	Cutout shape	$ 0,01	cm	4	Material - Steel	3	$ 0,11
							Sub Total	**$ 0,54**

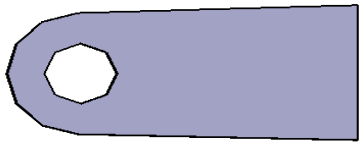
Drawing part : EL 01002



University	Ecole Centrale de Lyon
System	Electrical
Assembly	Rear firewall instruments and wires
Part	Break light bracket
P/N Base	EL 01003
Suffix	AA
Details	

FileLink1	Drawing
FileLink2	
FileLink3	

Back to BOM



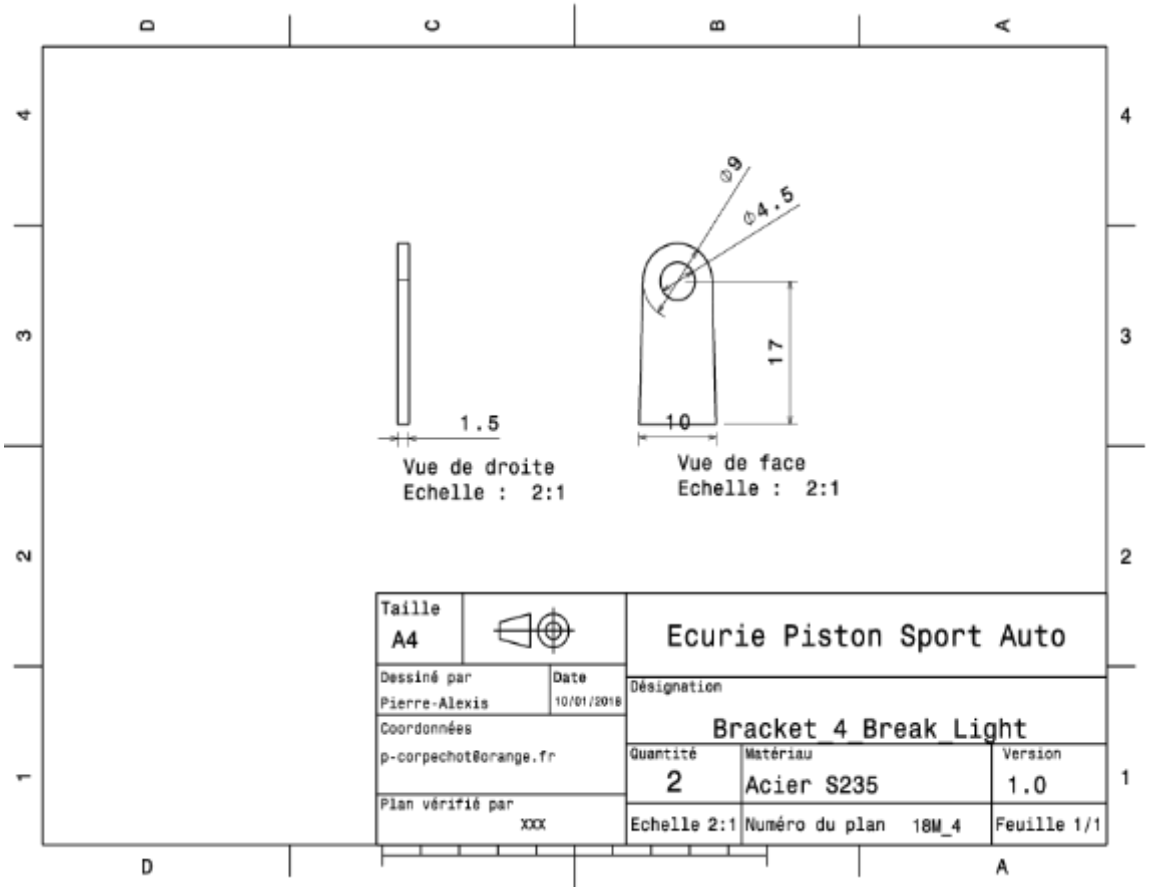
Car #	81
FileLink1	
FileLink2	
FileLink3	

Part Cost	$ 0,82
Qty	2
Extended Cost	$ 1,64

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Steel, mild	Stock material for part	$ 2,25	0,00	kg			Rectangular	2,15E-04	0,002	7850	1	$ 0,01
												Sub Total	**$ 0,01**

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Machining Setup, Install and remove	Setup for laser cutting	$ 1,30	unit	1	2 parts cut from a single machine setup	0,5	$ 0,65
20	Laser Cut	Cutout shape	$ 0,01	cm	6	Material - Steel	3	$ 0,17
							Sub Total	**$ 0,82**

Drawing part : EL 01003



University	Ecole Centrale de Lyon
System	Electrical
Assembly	Rear firewall instruments and wires
Part	Master switch panel
P/N Base	EL 01004
Suffix	AA
Details	Modification of the material

FileLink1	
FileLink2	
FileLink3	

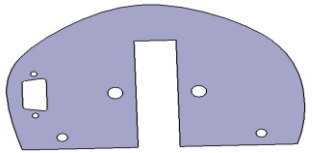
Back to BOM

Car #	81
FileLink1	
FileLink2	
FileLink3	

Part Cost	$ 15,37
Qty	1
Extended Cost	$ 15,37

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Glass Fiber, 1 Ply (kg)		$ 100,00	0,005	kg							1	$ 0,50
20	Carbon Fiber, 1 Ply (kg)		$ 200,00	0,007	kg							2	$ 1,40
												Sub Total	**$ 1,90**

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Cut (sicssors, knife)	Carbon fiber cutting	$ 0,06	cm	18	Material - Composite + 3	6	$ 6,48
20	Lamination, Manual	Lamination of the ply	$ 35,00	m²	0,013	Material - Composite + 3	6	$ 2,81
30	Resin application, Manual	Resin application on the p	$ 5,00	m²	0,013	Material - Composite + 3	6	$ 0,40
40	Vacuum form		$ 10,00	m²	0,013			$ 0,13
50	Cure, Room Temperature	Curing	$ 10,00	m²	0,013			$ 0,13
60	Machining Setup, Install and remove	Setup for dashboard cutir	$ 1,30	Unit	1		0	$ -
70	Non-metallic cutting > 76.2 mm	Cutting the outer profile	$ 1,40	cm	1			$ 1,40
80	Drilled holes <25,4mm dia.	Drilling holes	$ 0,35	hole	6			$ 2,10
							Sub Total	**$ 13,46**

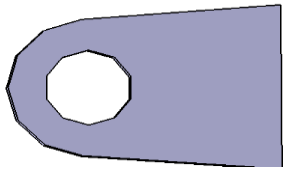


ItemOrder	Tooling	Use	UnitCost	Unit	Quantity	PVF	FracIncld	Sub Total
10	Lamination - Flat Panel Tool	Mold for all plates	$ 1 500,00	m²	0,013	3000	1	$ 0,01
							Sub Total	**$ 0,01**

University	Ecole Centrale de Lyon
System	Electrical
Assembly	Rear firewall instruments and wires
Part	Master switch panel bracket
P/N Base	EL 01005
Suffix	AA
Details	

FileLink1	Drawing
FileLink2	
FileLink3	

Back to BOM



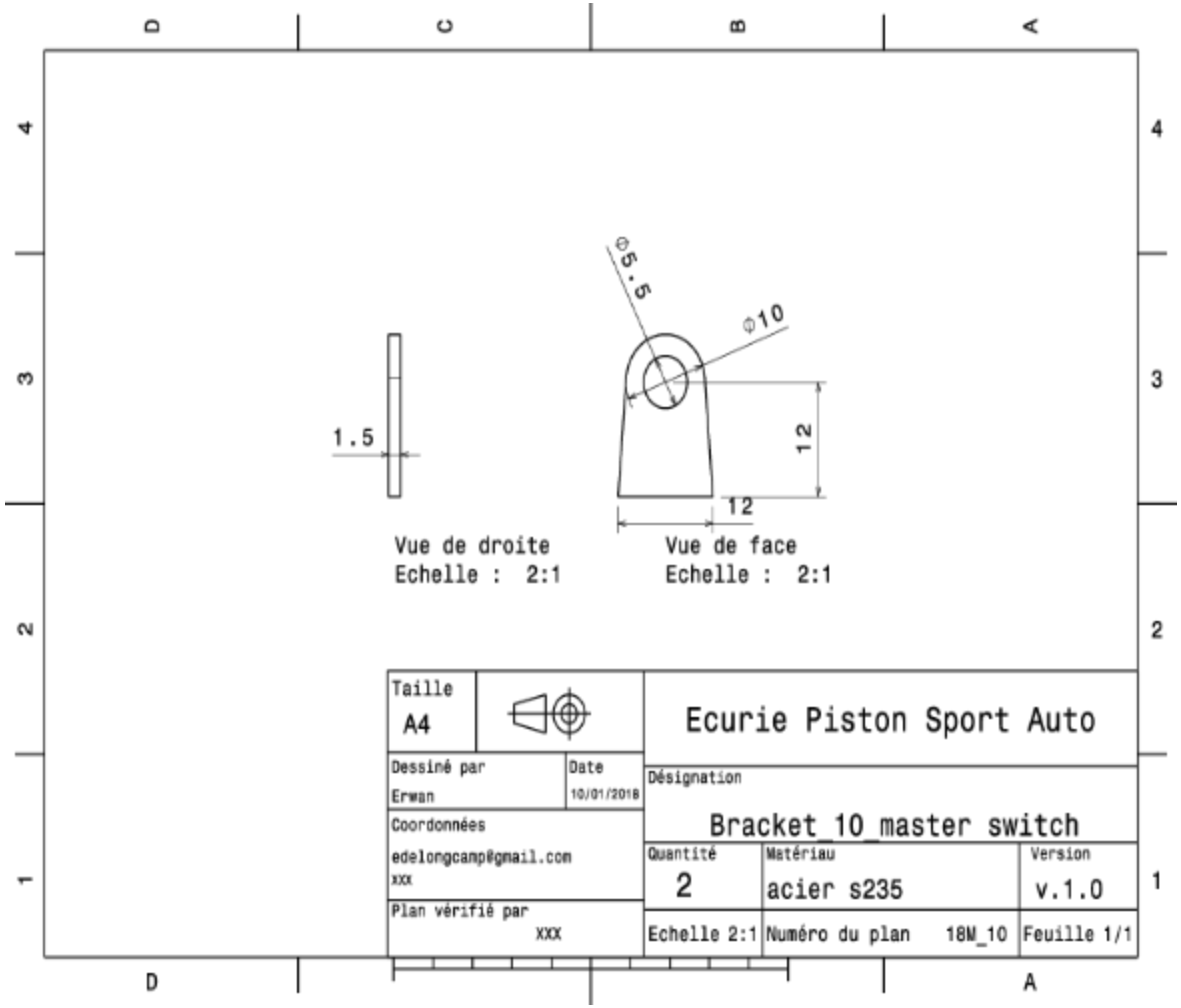
Car #	81
FileLink1	
FileLink2	
FileLink3	

Part Cost	$ 0,83
Qty	2
Extended Cost	$ 1,65

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Steel, mild	Stock material for part	$ 2,25	0,003	kg			Rectangular	2,16E-04	0,002	7850	1	$ 0,01
												Sub Total	**$ 0,01**

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Machining Setup, Install and remove	Setup for laser cutting	$ 1,30	unit	1	2 parts cut from a single machine setup	0,5	$ 0,65
20	Laser Cut	Cutout shape	$ 0,01	cm	6	Material - Steel	3	$ 0,17
							Sub Total	**$ 0,82**

Drawing part : EL 01005



University	Ecole Centrale de Lyon
System	Electrical
Assembly	Rear firewall instruments and wires
Part	Crash sensor bracket
P/N Base	EL 01006
Suffix	AA
Details	

FileLink1	Drawing
FileLink2	
FileLink3	

Back to BOM

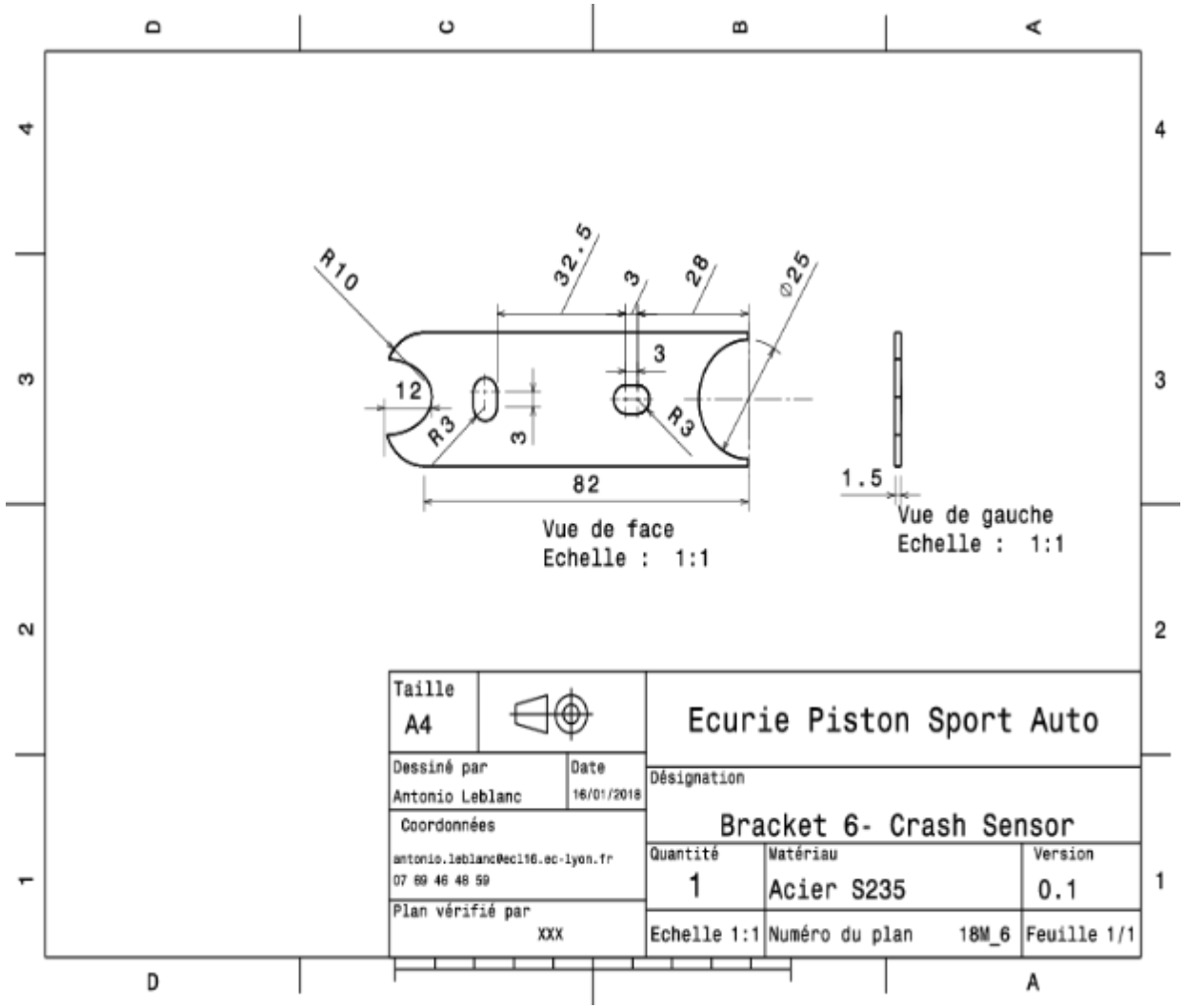
Car #	81
FileLink1	
FileLink2	
FileLink3	

Part Cost	$ 2,09
Qty	1
Extended Cost	$ 2,09

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Steel, mild	Stock material for part	$ 2,25	0,03	kg			Rectangular	2,54E-03	0,002	7850	1	$ 0,07
												Sub Total	**$ 0,07**

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Machining Setup, Install and remove	Setup for laser cutting	$ 1,30	unit	1			$ 1,30
20	Laser Cut	Cutout shape	$ 0,01	cm	24	Material - Steel	3	$ 0,72
							Sub Total	**$ 2,02**

Drawing part : EL 01006



University	Ecole Centrale de Lyon
System	Electrical
Assembly	Front vehicule electronics
P/N Base	EL A0200
Suffix	AA
Details	Dashboard assembly, dashboard control electronics and front harness

Back to BOM

Car #	81
FileLink1	
FileLink2	
FileLink3	

Asm Cost	$ 456,12
Qty	1
Extended Cost	$ 456,12

ItemOrder	Part	Part Cost	Quantity	Sub Total
10	Dashboard	$ 60,18	1	$ 60,18
20	Dashboard control electronics	$ 234,70	1	$ 234,70
30	Dashboard Tap	$ 1,85	1	$ 1,85
40	Ground bracket	$ 0,55	2	$ 1,09
			Sub Total	**$ 297,83**

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Lamp, LED	RPM counter	$ 0,50	1	unit							10	$ 5,00
20	Display, 7 Segment	Water temperature	$ 1,00	1	unit							3	$ 3,00
30	Display, 7 Segment	Gear	$ 1,00	1	unit							1	$ 1,00
40	Lamp, LED	Oil temperature alert	$ 0,50	1	unit							1	$ 0,50
50	Lamp, LED	Shift light	$ 0,50	1	unit							1	$ 0,50
60	Lamp, LED	Fan light	$ 0,50	1	unit							1	$ 0,50
70	Lamp, LED	Neutral light	$ 0,50	1	unit							1	$ 0,50
80	Lamp, LED	Contact light	$ 0,50	1	unit							1	$ 0,50
90	Switch, Toggle	Data logger switch	$ 1,00	1	unit							1	$ 1,00
100	Switch, Pushbutton	Launch control button	$ 1,00	1	unit							1	$ 1,00
110	Switch, Toggle	Wet/Dry switch	$ 1,00	1	unit							1	$ 1,00
120	Switch, Toggle	Traction control switch	$ 1,00	1	unit							1	$ 1,00
130	Switch, Pushbutton	Homing shifter	$ 1,00	1	unit							1	$ 1,00
140	Switch, Toggle	Fan switch	$ 1,00	1	unit							1	$ 1,00
150	Switch, Toggle	Contact switch	$ 1,00	1	unit							1	$ 1,00
160	Switch, Pushbutton	Start button	$ 1,00	1	unit							1	$ 1,00
170	Switch, Kill	Circuit breaker	$ 3,00	1	unit							1	$ 3,00
180	Connector, Aerospace Quality	Firewall connexion 1	$ 1,00	1	pin							16	$ 16,00
190	Connector, Aerospace Quality	Firewall connexion 2	$ 1,00	1	pin							5	$ 5,00
200	Connector, Single Wire	Ground ring	$ 0,05	1	unit							2	$ 0,10
210	Connector, Single Wire	Break over travel switch spades	$ 0,05	1	unit							2	$ 0,10
220	Wire, Signal		$ 1,00	1	m							46	$ 46,00
230	Wire, Power		$ 3,00	1	m							3	$ 9,00
240	Connector, OEM quality	Shift pads	$ 0,05	1	pin							3	$ 0,15
250	Switch, Kill	Break over travel switch	$ 3,00	1	unit							1	$ 3,00
260	Sensor, Hall effect	Front wheels speed sensors	$ 4,00	1	unit							2	$ 8,00
												Sub Total	**$ 109,85**

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Weld	Weld tabs in frame	$ 0,15	cm	1,8			$ 0,27
20	Cut wire		$ 0,08	unit	53			$ 4,24
30	Strip wire		$ 0,08	unit	106			$ 8,48

40	Connector assembly, crimp	Firewall connexion	$ 0,36	contact	21			$ 7,56
50	Connector Install, Circular, Bayonet		$ 0,11	unit	3			$ 0,33
60	Wire Dressing (install and route)		$ 1,00	m	4			$ 4,00
70	Cut (scissors, knife)	Cut heat shrink tubing	$ 0,06	cm	1	repeat 35	35	$ 2,10
80	Shrink tube		$ 0,15	cm	30			$ 4,50
90	Taping wire bundle		$ 0,04	cm	400			$ 16,00
							Sub Total	**$ 47,48**

ItemOrder	Fastener	Use	UnitCost	Size1	Unit1	Size2	Unit2	Quantity	Sub Total
10	Bolt, Grade 8.8 (SAE 5)	Bolts to fix the dislays and leds	$ 0,03	3	mm			6	$ 0,18
20	Nut, Grade 8.8 (SAE 5)	Nuts to fix the dislays and leds	$ 0,02	3	mm			6	$ 0,12
								Sub Total	**$ 0,30**

ItemOrder	Tooling	Use	UnitCost	Unit	Quantity	PVF	FractionInc	Sub Total
10	Welds - Welding fixture	Material to weld the tabs	$ 500,00	point	4	3000	1	$ 0,67
							Sub Total	**$ 0,67**

University	Ecole Centrale de Lyon
System	Electrical
Assembly	Front vehicule electronics
Part	Dashboard
P/N Base	EL 02001
Suffix	AA
Details	Dashboard support

FileLink1	
FileLink2	
FileLink3	

Back to BOM

Car #	81
FileLink1	
FileLink2	
FileLink3	

Part Cost	$ 60,18
Qty	1
Extended C	$ 60,18

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Glass Fiber, 1 Ply (kg)		$ 100,00	0,03	kg						2200	1	$ 3,00
20	Carbon Fiber, 1 Ply (kg)		$ 200,00	0,025	kg						1580	2	$ 10,00
												Sub Total	**$ 13,00**

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Cut (sicssors, knife)	Carbon fiber cutting	$ 0,06	cm	57	Material - Composite + 3 plies	6	$ 20,52
20	Lamination, Manual	Lamination of the ply	$ 35,00	m²	0,041	Material - Composite + 3 plies	6	$ 8,61
30	Resin application, Manual	Resin application on the ply	$ 5,00	m²	0,041	Material - Composite + 3 plies	6	$ 1,23
40	Vacuum form		$ 10,00	m²	0,041			$ 0,41
50	Cure, Room Temperature	Curing	$ 10,00	m²	0,041			$ 0,41
60	Machining Setup, Install and ren	Setup for dashboard cuting	$ 1,30	Unit	1		0	$ -
70	Non-metallic cutting > 76.2 mm	Cutting the outer profile	$ 1,40	cm	1			$ 1,40
80	Drilled holes <25,4mm dia.	Drilling fasteners hole	$ 0,35	hole	36			$ 12,60
							Sub Total	**$ 45,18**

ItemOrder	Tooling	Use	UnitCost	Unit	Quantity	PVF	FracIncld	Sub Total
10	Lamination - Flat Panel Tool	Mold for all plates	$ 1 500,00	m²	4	3000	1	$ 2,00
							Sub Total	**$ 2,00**

University	Ecole Centrale de Lyon
System	Electrical
Assembly	Front vehicule electronics
Part	Dashboard control electronics
P/N Base	EL 02002
Suffix	AA
Details	Embedded electronics and wire connections to dashboard control

Back to BOM

FileLink1	
FileLink2	
FileLink3	

Car #	81
FileLink1	
FileLink2	
FileLink3	

Part Cost	$ 234,70
Qty	1
Extended Cost	$ 234,70

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Wire, Signal	Electronic board communication	$ 1,00	1	m							32	$ 32,00
20	Wire, Power	Electronic board power	$ 3,00	1	m							2	$ 6,00
30	Chassis Control Module, +Dashboard	Student made electronic board	$ 20,00		unit							1	$ 20,00
40	Connector, Aerospace Quality	Signal connection with dashboard	$ 1,00		pin							32	$ 32,00
50	Connector, Aerospace Quality	Power connection with dashboard	$ 1,00		pin							2	$ 2,00
60	Connector, Aerospace Quality	Signal connection with rear vehicle electronics	$ 1,00		pin							8	$ 8,00
70	Connector, Aerospace Quality	Power connection with rear vehicle electronics	$ 1,00		pin							8	$ 8,00
80	Connector, Aerospace Quality	Connection with Break Over Travel switch	$ 1,00		pin							2	$ 2,00
90	Chassis Control Module, Baseline Enclosure	Electronic board box	$ 25,00		unit							1	$ 25,00
												Sub Total	**$ 135,00**

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Cut Wire	Cut wires in correct size	$ 0,08	unit	40			$ 3,20
20	Strip Wire	Strip wire ends	$ 0,08	unit	80			$ 6,40
30	Crimp Wire	Crip wires	$ 0,17	unit	80			$ 13,60
40	Connector Assembly, Crimp	Crimp Molex and Souriau connectors	$ 0,36	unit	80			$ 28,80
50	Lay Wire - Control	Lay control wires	$ 0,02	m	40			$ 0,80
60	Connector Install, Square, Friction	Molex connector install	$ 0,14	unit	40			$ 5,60
70	Wire Dressing (Install and route)	Wires instalation	$ 1,00	m	40			$ 40,00
80	Install Tie Wrap (Zip Tie, Cable Clamp)	Tie wrap instalation	$ 0,09	unit	10			$ 0,90
							Sub Total	**$ 99,30**

ItemOrder	Fastener	Use	UnitCost	Size1	Unit1	Size2	Unit2	Quantity	Sub Total
10	Install Tie Wrap (Zip Tie, Cable Clamp)	Wires	$ 0,04					10	$ 0,40
								Sub Total	**$ 0,40**

University	Ecole Centrale de Lyon
System	Electrical
Assembly	Front vehicule electronics
Part	Dashboard Tap
P/N Base	EL 02003
Suffix	AA
Details	Attachement to frame tap

FileLink1	Drawing
FileLink2	
FileLink3	

Back to BOM

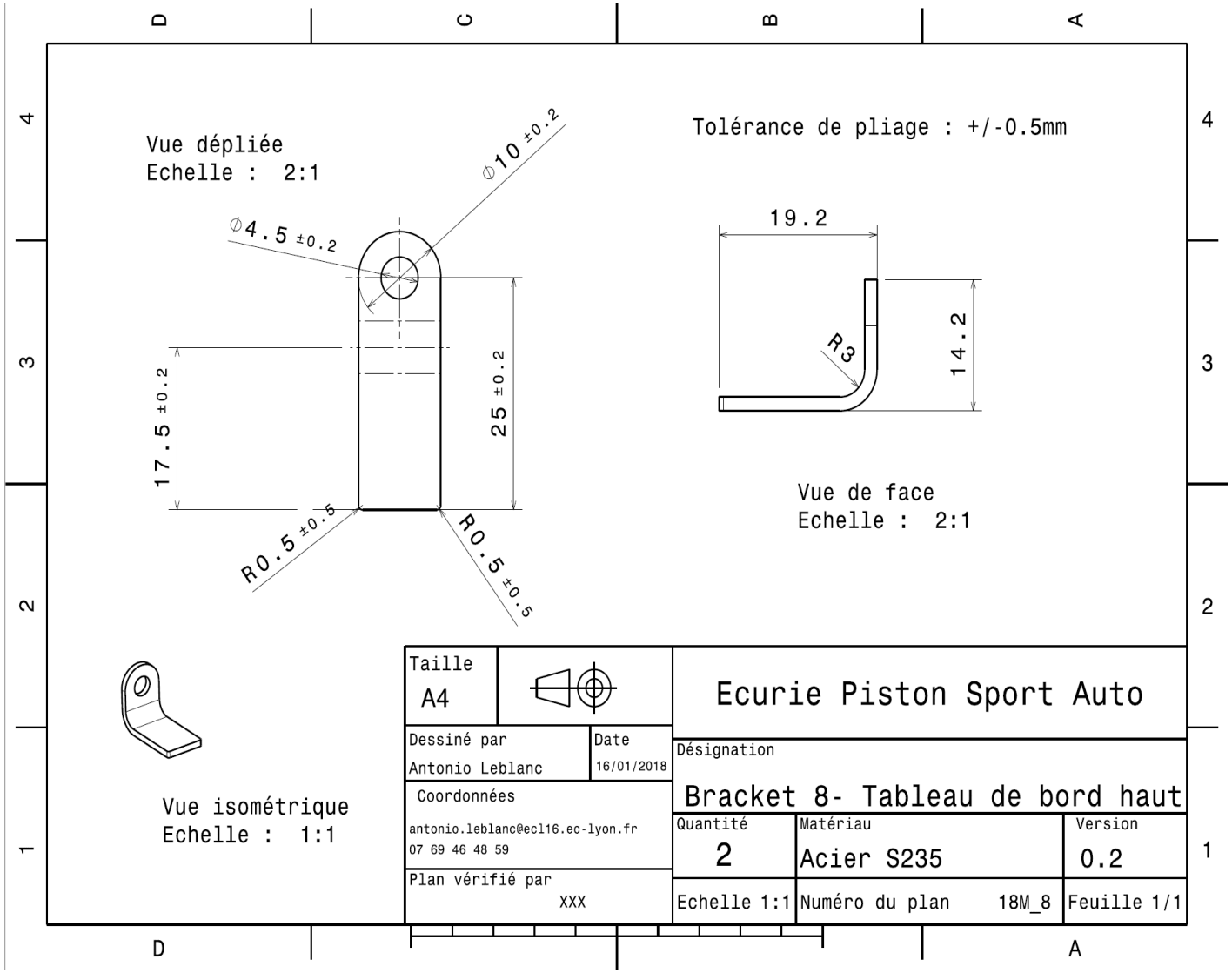
Car #	81
FileLink1	
FileLink2	
FileLink3	

Part Cost	$ 1,85
Qty	1
Extended C	$ 1,85

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Steel, Mild	Material for part	$ 2,25	0,004	kg			rectangle	5,20E-02	0,004	1580	1	$ 0,01
												Sub Total	**$ 0,01**

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Machining Setup, Install and remove	Laser cut setup	$ 1,30	unit	1		1	$ 1,30
20	Laser Cut	Cutout shape	$ 0,01	cm	29,5		1	$ 0,30
30	Sheet metal bends	Part bend	$ 0,25	unit	1,0		1	$ 0,25
							Sub Total	**$ 1,85**

Drawing part : EL 02003



University	Ecole Centrale de Lyon
System	Electrical
Assembly	Front vehicule electronics
Part	Ground bracket
P/N Base	EL 02004
Suffix	AA
Details	

FileLink1	Drawing
FileLink2	
FileLink3	

Back to BOM

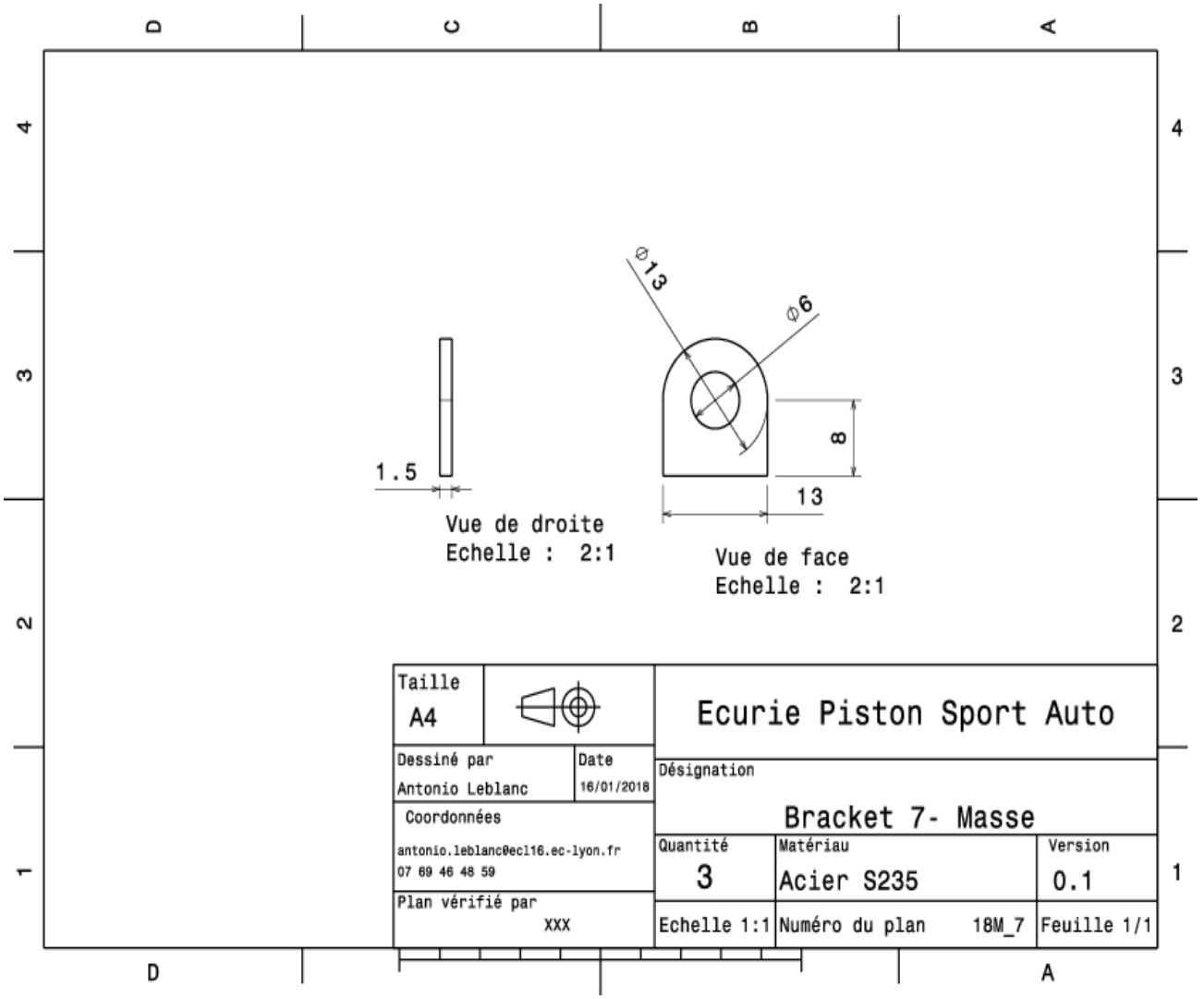
Car #	81
FileLink1	
FileLink2	
FileLink3	

Part Cost	$ 0,55
Qty	2
Extended Cost	$ 1,09

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Steel, mild	Stock material for part	$ 2,25	0,002	kg			Rectangular	1,95E-04	0,002	7850	1	$ 0,01
												Sub Total	**$ 0,01**

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Machining Setup, Install and remove	Setup for laser cutting	$ 1,30	unit	1	3 parts cut from a single machine setup	0,33	$ 0,43
20	Laser Cut	Cutout shape	$ 0,01	cm	4	Material - Steel	3	$ 0,11
							Sub Total	**$ 0,54**

Drawing part : EL 02004



University	Ecole Centrale de Lyon
System	Electrical
Assembly	Battery assembly
P/N Base	EL A0300
Suffix	AA
Details	Li-Ion battery assembly

Back to BOM

Car #	81
FileLink1	
FileLink2	
FileLink3	

Asm Cost	$ 103,73
Qty	1
Extended C	$ 103,73

ItemOrder	Part	Part Cost	Quantity	Sub Total
10	Main battery mount	$ 4,83	1	$ 4,83
20	Side battery mount	$ 3,66	2	$ 7,31
30	Battery bracket	$ 0,61	3	$ 1,84
			Sub Total	**$ 13,98**

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Battery, Advanced chemistry (Li-Ion)	Starter battery LiFePo4	$ 65,00	1,3	kg							1	$ 84,50
20	Paint	Brackets painting	$ 10,00	5,00E-04	m^2							3	$ 0,02
												Sub Total	**$ 84,52**

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Weld	Tabs welding on frame	$ 0,15	cm	0,72			$ 0,11
20	Aerosol apply	Tabs painting	$ 5,25	m^2	5,00E-04			$ 0,00
30	Assemble, 1kg, Loose	Side to main battery mount	$ 0,25	unit	2			$ 0,50
40	Riveting	Side mounts to main mount	$ 0,25	unit	8			$ 2,00
50	Assemble, 1kg, Line-on-line	Insert Battery in bracket	$ 0,13	unit	1			$ 0,13
60	Assemble, 1kg, Loose	Insert battery mount on backet	$ 0,06	unit	1			$ 0,06
70	Ratchet <= 6.35 mm	Insert battery mount on bracket	$ 0,50		2			$ 1,00
80	Reaction tool <= 6.35mm	Insert battery mount on bracket	$ 0,25		2			$ 0,50
							Sub Total	**$ 4,30**

ItemOrder	Fastener	Use	UnitCost	Size1	Unit1	Size2	Unit2	Quantity	Sub Total
10	Bolt,Grade 8.8 (SAE 5)	M6 for battery mount on tab	$ 0,04	6	mm	20	mm	2	$ 0,08
20	Nut, Grade 8.8 (SAE 5)	M6 for battery mount on tab	$ 0,03	6	mm			2	$ 0,06
30	Washer, Grade 8.8 (SAE 5)	M6 for battery mount on tab	$ 0,01	6	mm			4	$ 0,04
40	Tie Wrap		$ 0,04		unit			2	$ 0,08
								Sub Total	**$ 0,26**

ItemOrder	Tooling	Use	UnitCost	Unit	Quantity	PVF	FractionIn	Sub Total
10	Welds - Welding Fixture	Brackets welding on frame	$ 500,00	point	4	3000	1	$ 0,67
							Sub Total	**$ 0,67**

University	Ecole Centrale de Lyon
System	Electrical
Assembly	Battery assembly
Part	Main battery mount
P/N Base	EL 03001
Suffix	AA
Details	To carry the battery

FileLink1	Drawing
FileLink2	
FileLink3	

Back to BOM

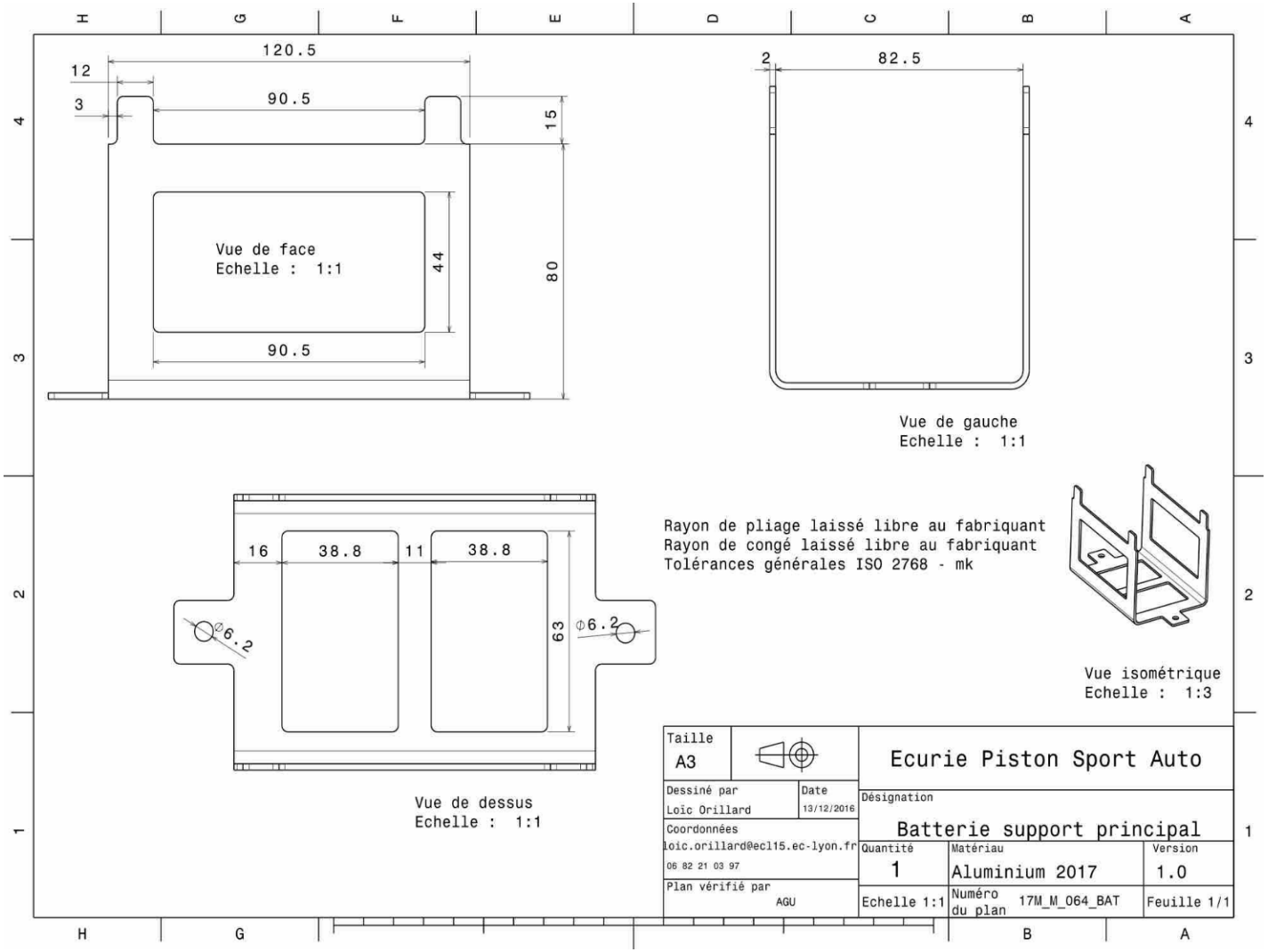
Car #	81
FileLink1	
FileLink2	
FileLink3	

Part Cost	$ 4,83
Qty	1
Extended C	$ 4,83

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Aluminium, Normal		$ 4,20	0,231	kg			Rectangular a	4,27E-02	0,002	2712	1	$ 0,97
												Sub Total	**$ 0,97**

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Machining Setup, Install and remove	Setup for laser cutting	$ 1,30	unit	1		1	$ 1,30
20	Laser Cut	Cutout shape	$ 0,01	cm	186		1	$ 1,86
30	Sheet metal bends		$ 0,35	bend	2		1	$ 0,70
							Sub Total	**$ 3,86**

Drawing part : EL 03001



University	Ecole Centrale de Lyon
System	Electrical
Assembly	Battery assembly
Part	Side battery mount
P/N Base	EL 03002
Suffix	AA
Details	To carry the battery

FileLink1	Drawing
FileLink2	
FileLink3	

Back to BOM

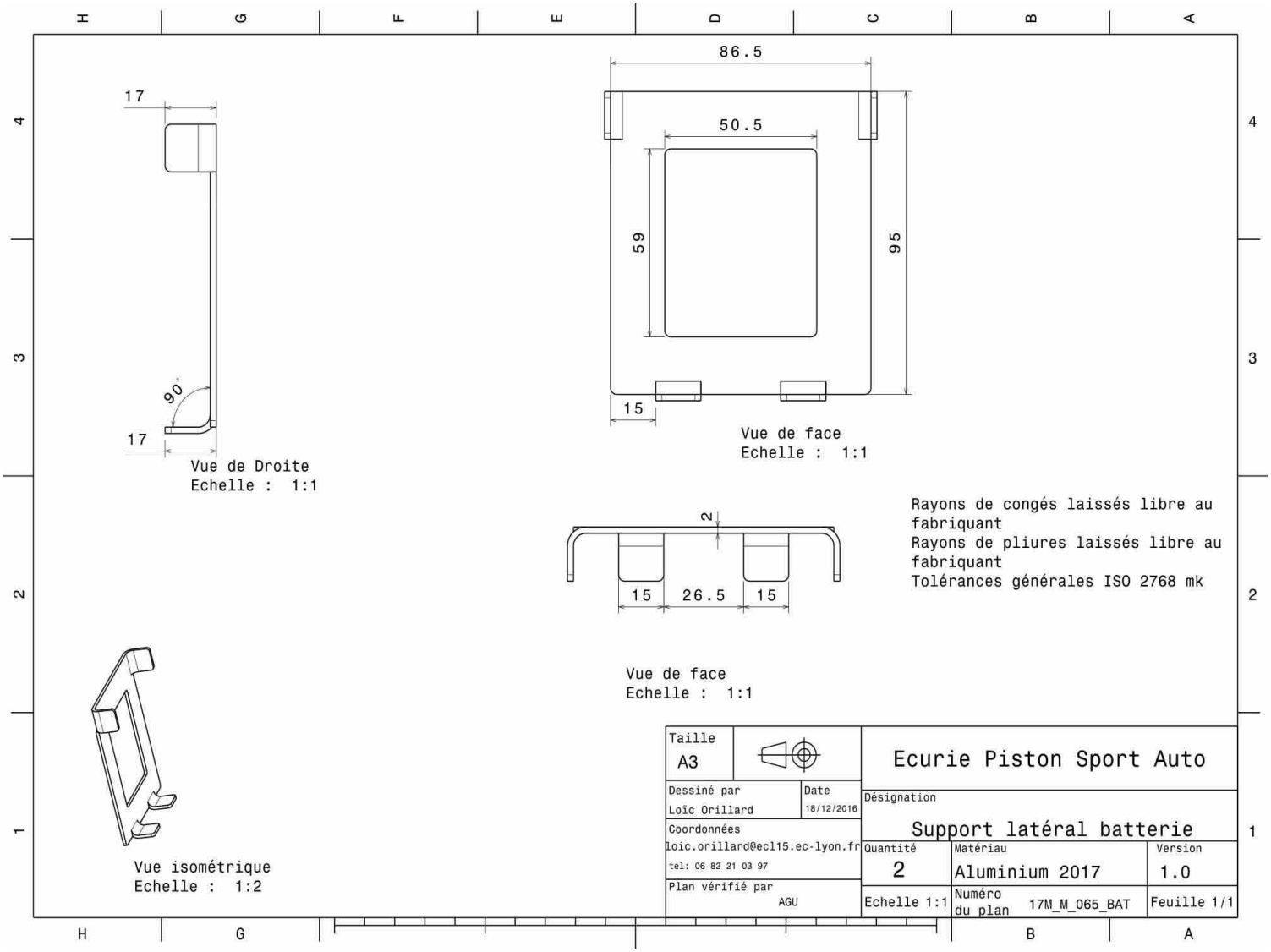
Car #	81
FileLink1	
FileLink2	
FileLink3	

Part Cost	$ 3,66
Qty	2
Extended C	$ 7,31

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Aluminium, Normal		$ 4,20	0,061	kg			Rectangula	1,12E-02	0,002	2712	1	$ 0,26
												Sub Total	**$ 0,26**

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Machining Setup, Install and remove		$ 1,30	unit	1			$ 1,30
20	Laser Cut	Cutout shape	$ 0,01	cm	70			$ 0,70
30	Sheet metal bends		$ 0,35	bend	4			$ 1,40
							Sub Total	**$ 3,40**

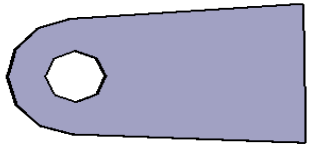
Drawing part : EL 03002



University	Ecole Centrale de Lyon
System	Electrical
Assembly	Battery assembly
Part	Battery bracket
P/N Base	EL 03003
Suffix	AA
Details	Description brève de la pièce

FileLink1	Drawing
FileLink2	
FileLink3	

Back to BOM



Car #	81
FileLink1	
FileLink2	
FileLink3	

Part Cost	$ 0,61
Qty	3
Extended Cos	$ 1,84

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Steel, mild	Stock material for part	$ 2,25	2,83E-03	kg			rectangular	2,40E-04	0,002	7850	1	$ 0,01
												Sub Total	**$ 0,01**

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Machining Setup, Install and remove	Setup for laser cutting	$ 1,30	unit	1	3 parts cut from a single machine setup	0,33	$ 0,43
20	Laser Cut	Cutout shape	$ 0,01	cm	6	Material - Steel	3	$ 0,17
							Sub Total	**$ 0,61**

Drawing part : EL 03003