

Technical file VW FunCup

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Service interval

- Engine

Operations	References	Interval
Engine oil change	Castrol Edge 10W60 (5l)	1 race
Oil filter replacement	MO223	1 race
Engine rebuild		± 150 hours
Belts	Alternator belt : MO224	1 race
Cooling liquid change	Antifreeze G13	1 saison

- Gearbox

Operations	Notes	References	Interval
Gear box oil change	Check filing on the cap	Motul 100% synthetic 75W140 (1,5l without gearbox cooling or 1,8l with gearbox cooling)	1 race
Gearbox overhaul	Open the back of the gearbox and check the gears and the synchromeshes		2 races
Gearbox complete overhaul			80 to 100 hours
Driveshaft overhaul	Check the driveshafts, the grooves and the grease	Valvoline grease	1 race
Ball joint of control shaft change (gearbox)		High strength ball joint : T043	± 80 hours
Check the clearance of the suspension ball joint housing		Suspension ball joint AVD/ARG countersunk : S037 Suspension ball joint AVD/AVG : S037A Suspension ball joint AVG/ARD countersunk : S038 Suspension ball joint AVG/ARD : S038A	

- Paddle Shift

Operations	Notes	References	Interval
Check paddle shift tank level	Check regularly the paddle shift oil quantity and change the oil if it is charged with filings (dark colored oil). Be sure not to pinch the hoses with the actuator. In case of doubt don't hesitate to replace them.		Before every race
Check regularly that the ball joints are safely tightened.			Before every race
Check the link between the gearbox actuating bar and the external selector rocker. Ensure that the hoses are not pinched or too restrained.	Grease regularly the link between the control shaft and the extern selector rocker.		Before every race
Check regularly the electrical connections and that the looms are not rubbing against sharp parts of the chassis.			Before every race
Check the electrical eyelets fixed on the alternator.			Before every race

- Filter replacement

Operations	Notes	References	Interval
Air filter cleaning	Air filter cleaning + check the condition of the filter at the level of the clamps (after every cleaning, take out the ignition coils and blow the coils wells)		1 race
Fuel prefilter change		M316	4 races
Fuel filter change		M126	1 season

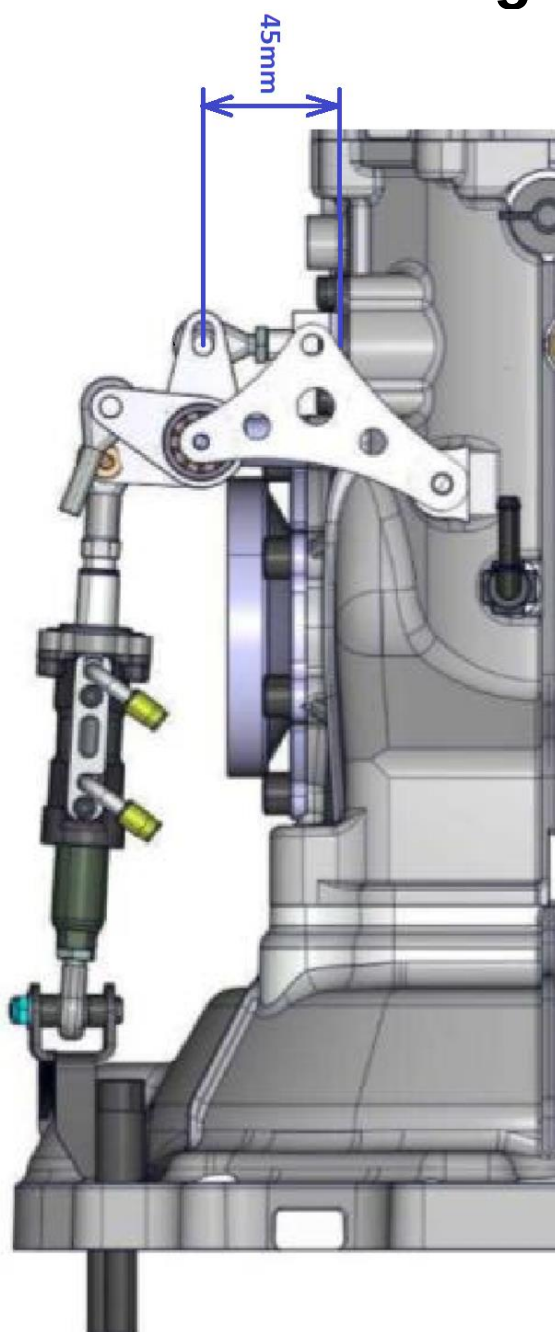
- Miscellaneous

Operations	Notes	References	Interval
Check the condition of the ball joints of the gearbox linkage			Before every race
Check the fixing of the exhaust and the positioning of the springs.			Before every race
Bearings change	Old hub carrier	S066	± 30 hours
	New hub carrier	S066	± 100 hours
Ball joint housing			80 to 100 hours

Tightening torques

Elements	Torque
Wheels	110 Nm (80 ft.lb)
Hub	250 Nm (185 ft.lb)
Driveshaft on the gearbox	70 Nm (50 ft.lb)
Ball joint lower and upper (nut M10 N.S)	80 Nm (60 ft.lb)
Ball joint lower and upper (screw)	70 Nm (50 ft.lb)
Shock absorber on hub carrier	90 Nm (65 ft.lb)
Brake caliper	30 Nm (22 ft.lb)
Gearbox on engine	80 Nm (60 ft.lb)
Gearbox support on gearbox	35 Nm (26 ft.lb)
Flywheel	100 Nm (75 ft.lb)
Clutch mechanism	35 Nm (26 ft.lb)

High strength ball joint clearance on the gearbox (T043)



Measure the clearance between the outer edge of the wedge and the ball joint axis = 45 mm (1.77 in)

Assembly instructions :

Gearbox cooling kit

1. Gearbox cooling kit parts

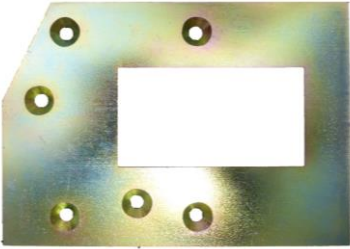
The WRT reference of this kit is : T060.

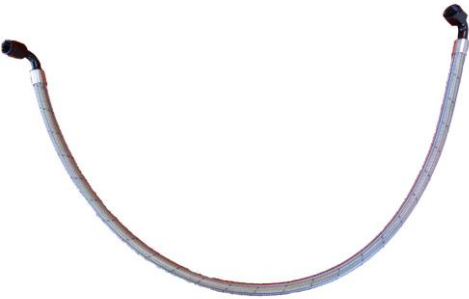
This kit is only intended for an assembly with the Sadev SL82-14 gearbox.

The gearbox cooling kit is made up of the following parts :

- a. Cooling radiator mounting bracket Gearbox cooling : T060A - 2pc
- b. Upper mounting bracket Gearbox cooling : T060B - 1pc
- c. Lower mounting bracket Gearbox cooling : T060C - 1pc
- d. Male / Male - JIC6 / 3/8" fitting : T061 - 2pc
- e. Male / Male - JIC6 / M16x150 fitting : T062 - 1pc
- f. Male / Male - JIC6 / M18x150 fitting : T063 - 1pc
- g. Gearbox cooling filter : T064 - 1pc
- h. Gearbox cooling pump : T065 - 1pc
- i. Gearbox cooling radiator : T066 - 1pc
- j. Hose 1 Gearbox cooling : T067 - 1pc
- k. Hose 2 Gearbox cooling : T068 - 1pc
- l. Hose 3 Gearbox cooling : T069 - 1pc
- m. Gearbox cooling loom : T070 - 1pc
- n. Gearbox cooling temperature switch : T071 - 1pc
- o. Radiator M6 silentblock : M098 - 4pc
- p. Hose clamp : CA023C - 2pc
- q. Screws kit

Excluded : 1.8L of gearbox oil 75w140.

	
a – T060A	b – T060B
	
c – T060C	d – T061
	
e – T062	f – T063
	
g – T064	h – T065

	
i – T066	j – T067
	
k – T068	l – T069
	
m – T070	n – T071
	
o – M098	p – CA023C

2. Gearbox cooling kit assembly

a. Assembly of the silentblocks M098 and brackets T060A on the radiator T066

Assemble the gearbox radiator T066 on its mountings T060A.

Set the shock mounts M098 between the radiator and its mounting bracket (see picture 2).

To attach the radiator on its bracket, you need :

- M6 Flange nuts : 8pc
- M6x14 Washer : 8pc

b. Assembly of the radiator set on the chassis by means of hose clamps

Assemble the radiator set on the chassis by means of the two hose clamps CA023C.

See pictures 1 and 2.



Picture 1



Picture 2

c. Assembly of the pump T065 on its bracket T060B

Pass the two hexagonal head screws M6x25 through the upper bracket T060B (see pic 3). These screws will be used to assemble the brackets T060B and T060C (see point d).

Place the pump T065 on its upper bracket T060B.

Set the silentblocks between the pump and its mounting. To attach the set, you need :

- M6x25 Countersunk screw : 4 pc
- NS M6 Nut : 4pc
- M6x20 Washer : 4pc



Picture 3

Set a male/male fitting (JIC6 / 3/8" : T061) on every hole of the pump. Place some Teflon® on the 3/8" side of the adaptor to ensure the sealing.
CAUTION, be careful not to overtighten the fitting to avoid damaging the plastic threads of the pump.

d. Assembly of the pump set onto the chassis by means of the mounting bracket T060C

Secure the pump set onto the chassis using to the lower mounting bracket T060C (see pictures 1 and 4). To assemble both mounting brackets together, tighten the M6x25 hexagonal head screws, placed in 2.c, with a M6x14 washer and a NS M6 nut.



Picture 4

e. Set up of filter T064

Insert T064 filter inside the M16x150 fitting (T062). (see pictures 5 and 6)

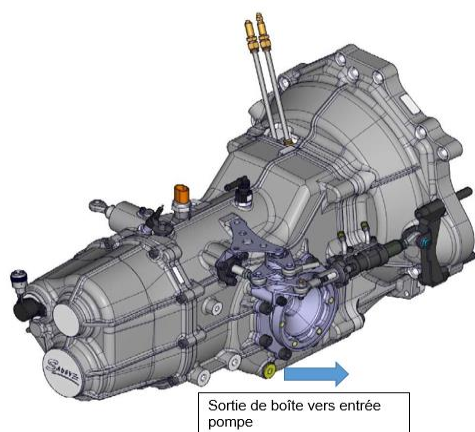


Picture 5



Picture 6

Tighten the M16x150 adaptor and its filter instead of the plug (see picture 7). This plug is located in the lower part of the gearbox on the right side. Put some Loctite 542 on the M16x150 side of the fitting.



Picture 7



Picture 8

f. Connection of the hose T069

Connect T069 hose from the outlet of the gearbox (see pictures 7 and 8) to the inlet of the pump. CAUTION, ensure to follow the inlet (« entrée ») and outlet (« sortie ») indications on the pump. In picture 3, the inlet of the pump is on the left side.

g. Connection of the hose T067 from the pump to the cooling radiator

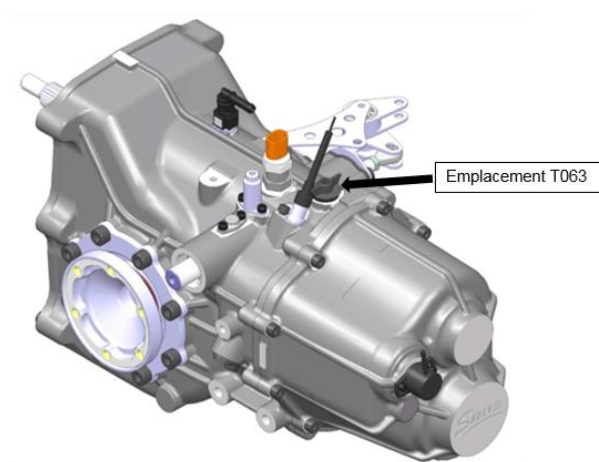
Connect T067 hose from the outlet of the pump to the inlet of the radiator (lower fitting).

h. Oil

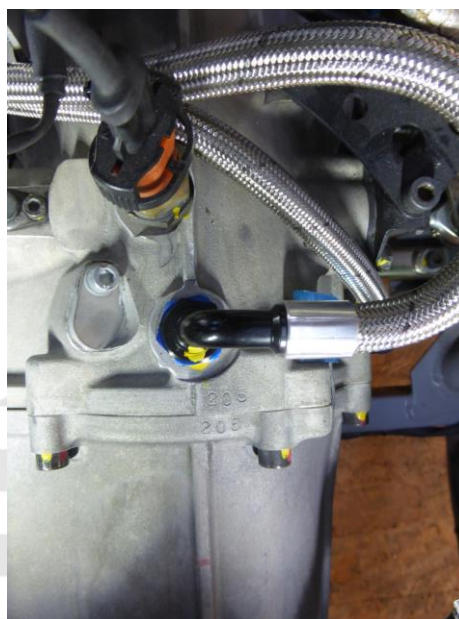
Fill the gearbox with 1.8 liter of 75w140 gearbox oil by the hole provided for the connector T063 (see picture 9).

i. Connection of the hose T063 from the radiator to the gearbox

Tighten the male/male fitting (JIC6 / M18x150 : T063) on the upper rear side of the gearbox (see pictures 9 and 10). Put some Loctite 542 on the M18x150 side of the fitting.



Picture 9



Picture 10

Connect T068 hose from the outlet of the radiator (upper adaptor) to the T063 fitting situated on the top of the gearbox (see pictures 9 and 10).

j. Temperature switch T071 installation

Tighten the temperature switch T071 in the appropriate space on the gearbox (see picture 11). This location is situated on the back of the left-hand driveshaft. This is a M8 female thread. See pictures 11 and 12.



Picture 11



Picture 12

k. Electric connection of the oil pump

Connect the oil pump T065 to the T070 lead identified with « oil pump ».

l. Electric connection of the temperature switch

Connect the terminals of the temperature switch T071 to the T070 lead identified with "SW/Oil Pump".
See picture 12.

m. Electric connection on the dashboard

Connect the T070 loom to 12V supply.
Caution, the eyelet has to be connected to the ground.
The protection fuse to be provided is a 15A.

3. Maintenance

In addition to the regular servicing of the Sadev SL82-14 gearbox, check and clean the filter T064 at every oil change.

Assembly instructions :

POWERBOARD

1. Powerboard kit parts

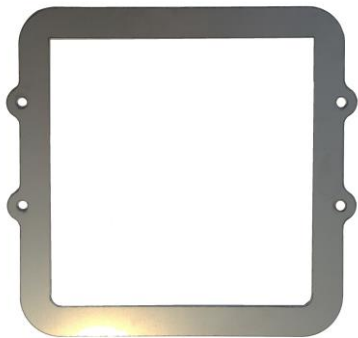
The WRT reference WRT of this kit is : E130

The powerboard kit is made up of the following parts :

- a. Cockpit loom : E120 – 1 pc
- b. Front loom : E121 – 1 pc
- c. Aux front loom : E122 – 1 pc
- d. Rear loom : E123 – 1 pc
- e. Aux rear loom : E124 – 1 pc
- f. Powerboard : E125 – 1 pc
- g. Powerboard mounting bracket : E126 – 2 pc
- h. Powerboard frame : E127 – 1 pc
- i. Engine Start pushbutton : E128 – 1 pc
- j. Ignition switch (Switch E129A + Switch cover E129B) : E129 – 1 pc
- k. Circuit-breaker switch (kit) : E131 – 1
- l. Loom extension for windshield wipers : E132 – 1 pc
- m. Hexagonal head screw : M5X16 (FKE 010.9) – 4
- n. M5 Nut : 8 pc
- o. M6 Nut : 1 pc
- p. M8 Nut : 1 pc
- q. M10 Nut : 1 pc
- r. Extension kit for chassis loom E102 and starter E108 : E134 – 1 pc

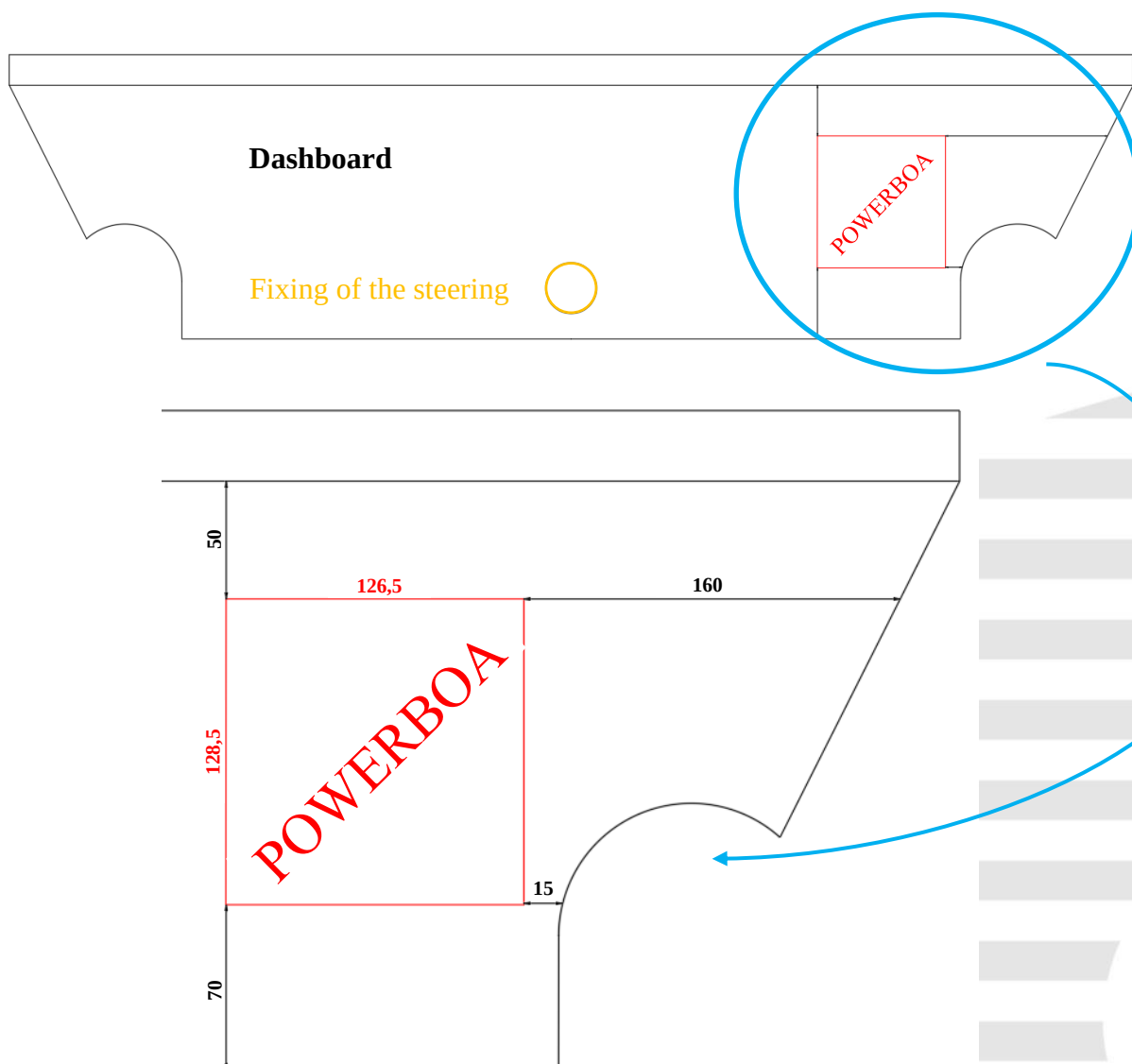
included : 2 4mm eyelet, 1 fast-on connector and 10cm of insulating jacket

	
a – E120	b – E121
	
c – E122	d – E123
	
e – E124	f – E125

	
g – E126	h – E127
	
i – E128	j – E129
	
k – E131	l – E132

2. Connection of the powerboard loom

a. Location of the powerboard E125 on the dashboard



Picture 1

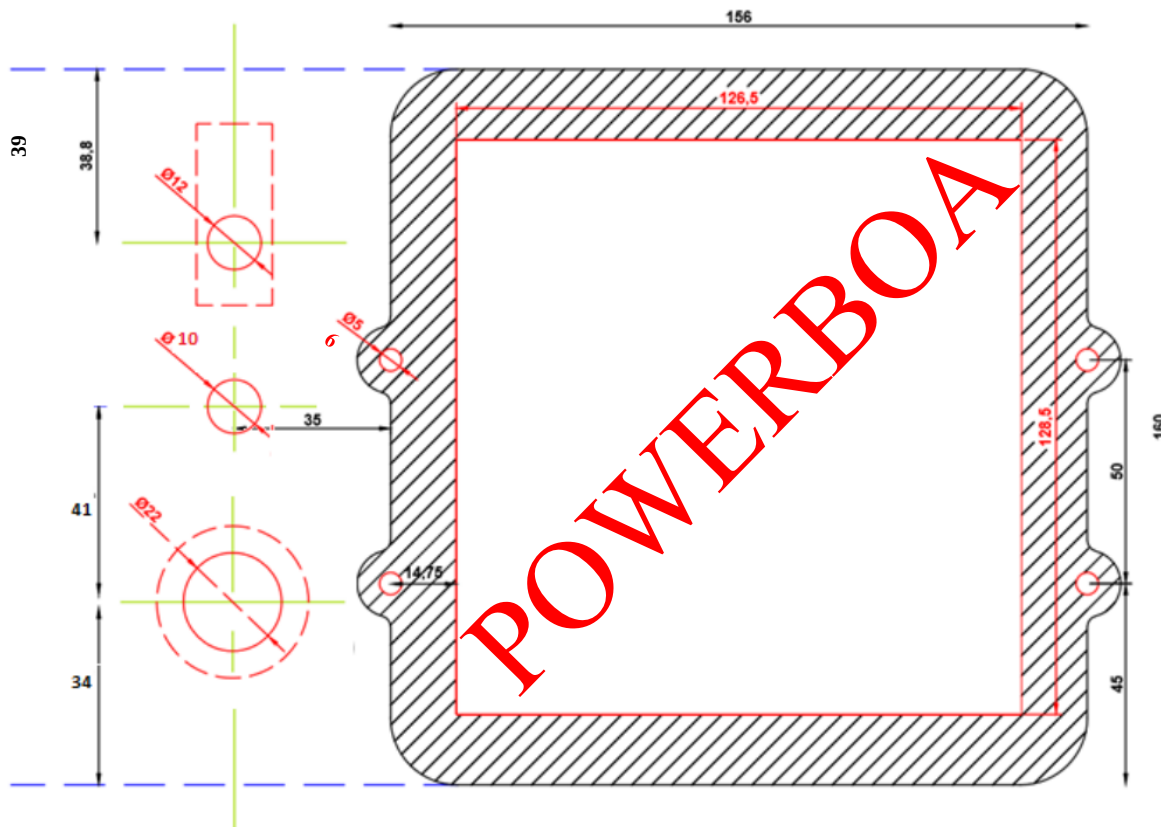
You need :

- A pneumatic saber saw

The powerboard has to be installed on the right side of the steering wheel (see picture 1).

To fit the powerboard in the dashboard, you have to cut a rectangular opening with saber saw (in red in picture 1). The size of this hole is 126,5 X 128,5 mm (see picture 1 and 2).

b. Setup of the powerboard frame E127, of the engine start switch E128 and of the ignition switch on the dashboard



Picture 2

You need :

- A drilling machine
- A Ø 6 drill bit
- A Ø 12 drill bit
- A Ø 22 drill bit
- Engine Start Switch E128
- Ignition Switch E129
- Powerboard Frame E127

To set the powerboard frame, use a drilling machine and the appropriate drill bit to drill 4 holes (see picture 2 – in red on the powerboard frame) necessary for its fitment onto the dashboard.

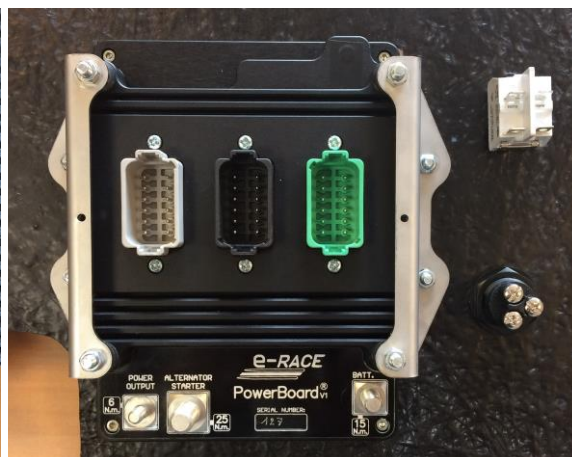
To mount the engine start switch E128 and the ignition switch E129 onto the dashboard, use a drilling machine with two drill bits to drill the holes (in red on the picture 2).

Fit the engine start switch E128 and the ignition switch E129 onto the dashboard.

C. Setup the powerboard E125, powerboard mounting bracket E126 and the powerboard frame E127



Picture 3



Picture 4

You need :

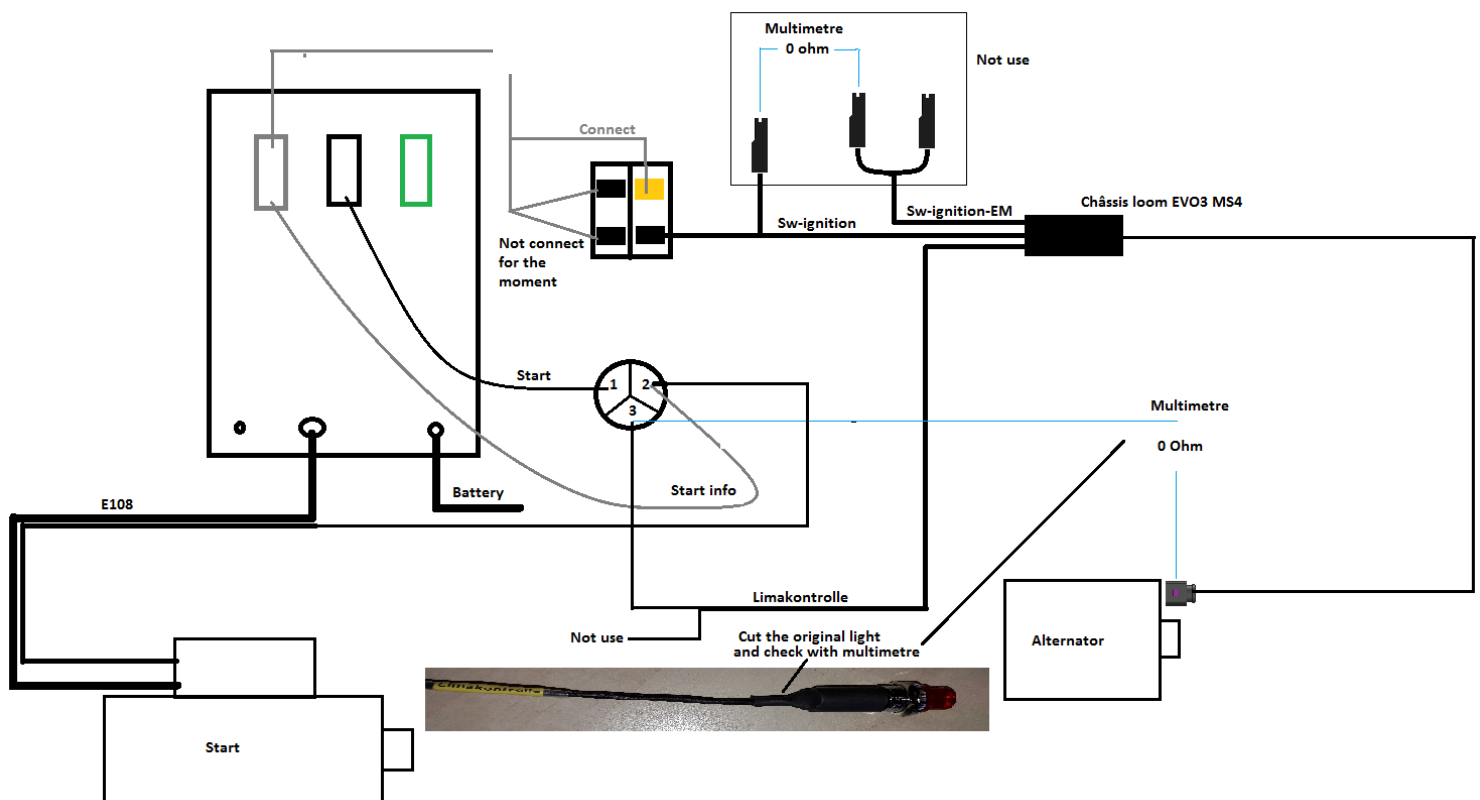
- Powerboard E125
- Powerboard mounting bracket E126
- Powerboard frame E127
- 4 M5X16 hexagonal head screws (FKE 010.9)
- 8 M5 nuts

To begin with, you have to assemble both powerboard mounting brackets E126 onto the powerboard E125 using 4 M5 nuts. Then, fix the powerboard frame E127 onto the powerboard E125, by the upper side of the dashboard by means of 4 hexagonal head screws and the 4 M5 nuts remaining.

d. Handling of the chassis (E102) and the starter looms (E108) (already on the vehicle) to connect the powerboard (E125)

You need :

- Chassis loom E102
- Starter motor loom E108
- Chassis and starter loom modification kit for for the powerboard



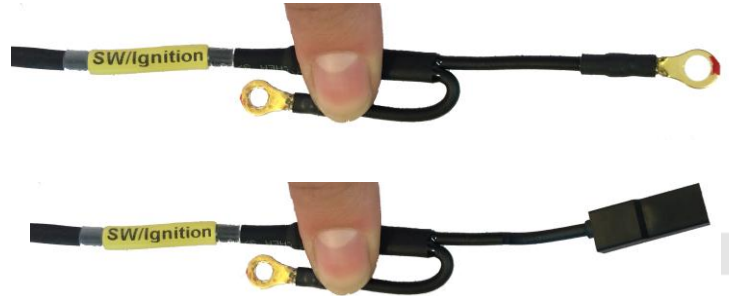
Picture 5

On the chassis loom E102, you can find a lead labelled “Limakontrolle” and you can cut off the original light. Then, you have to check the electric continuity with a multimeter between both leads of the Limakontrolle and the D+ connector (also part of the chassis loom E102). One of the two Limakontrolle leads is connected to the D+ connector, you will hear the beep of the multimeter. You have to crimp a 4mm eyelet to this lead and connect it to the terminal 3 of the engine start switch E128. The other lead has to be curved backwards and isolate from the loom with insulating sleeve (see picture 6).

Still on the chassis loom E102 : test with a multimeter the continuity between both leads labelled “Sw-Ignition” (the switch has to be removed) and both leads labelled “Sw-Ignition-EM”. The lead where there is no continuity (you will hear no beep) has to be connected to the back of the ignition switch E129. To connect this lead, you have to remove the original eyelet and use the fast-on connector (see picture 7). For the three leads left, you have to curve them backwards and isolate them from the loom with insulating sleeve.



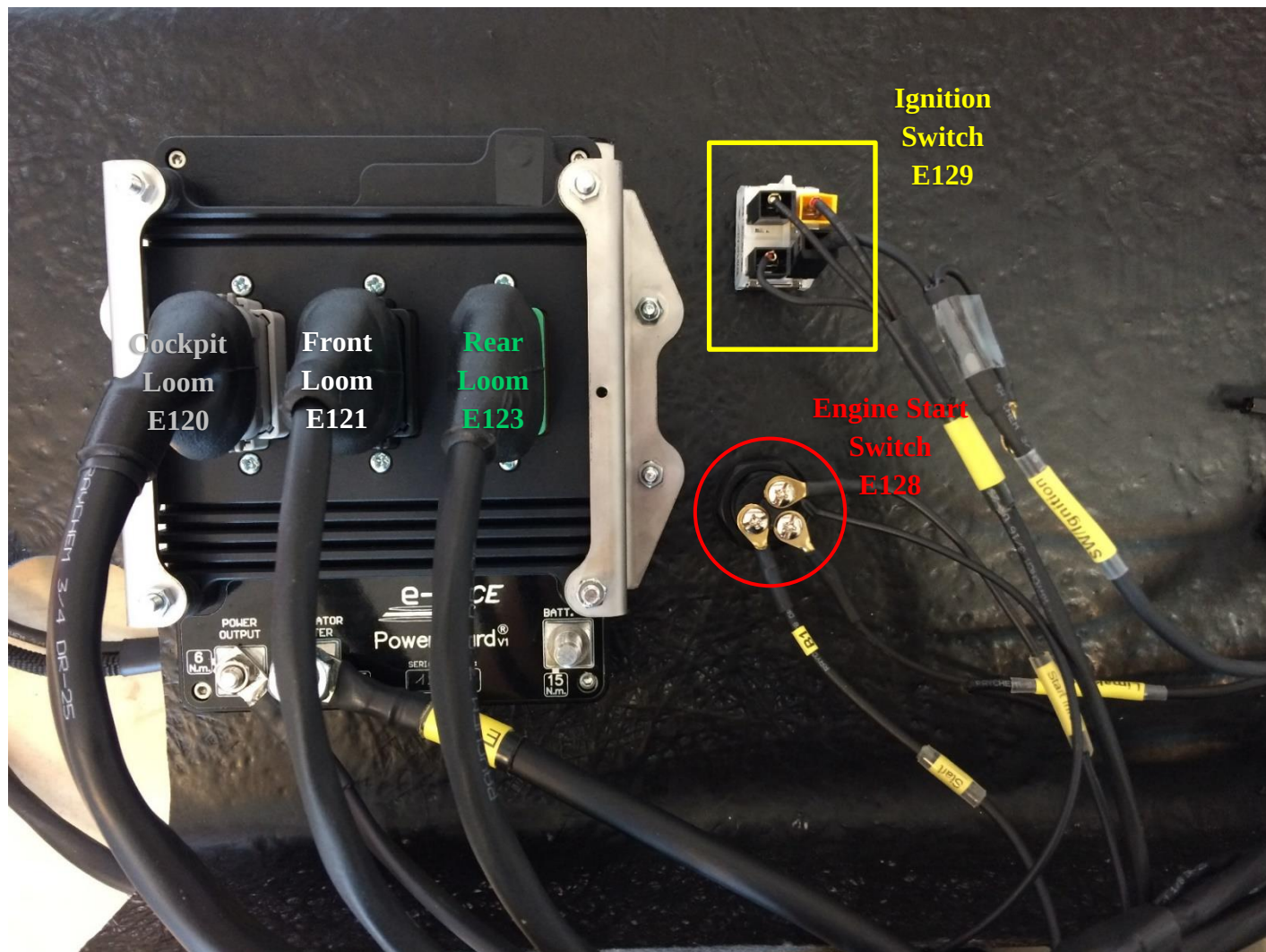
Picture 6 – Before/after Limakontrolle intervention



Picture 7 – Before/After SW-Ignition intervention

On the starter loom E108, you have to fit a 4mm eyelet on the lead used for the starter triggering. This lead has to be connected to the terminal 2 of the engine start switch. This lead has no reference, it has the smallest diameter and is situated beside the lead labelled E108.

- e. Connection of the looms (E120, E121, E123, E102 et E108) onto the powerboard (E125)



Picture 8

You need :

- Cockpit loom E120
- Front loom E121
- Rear loom E123
- Chassis loom E102
- Starter loom E108
- M6 Nut
- M8 Nut
- M10 Nut

Connection of the main looms : Follow the color code on the electrical diagram.

Connection of the power output : Tighten the M6 nut onto the 6mm eyelet of the lead K – Power Output of the cockpit loom E120.

With a torque wrench, tighten to a torque of **6 Nm**.

Connection of the Alternator-Starter output : Tighten the M10 nut onto the lead labelled E108 of the starter loom E108.

With a torque wrench, tighten to a torque of **25 Nm**.

Connection of the battery supply : Tighten the M8 nut onto the power supply lead coming from the battery.

With a torque wrench, tighten with to torque of **15 Nm**.

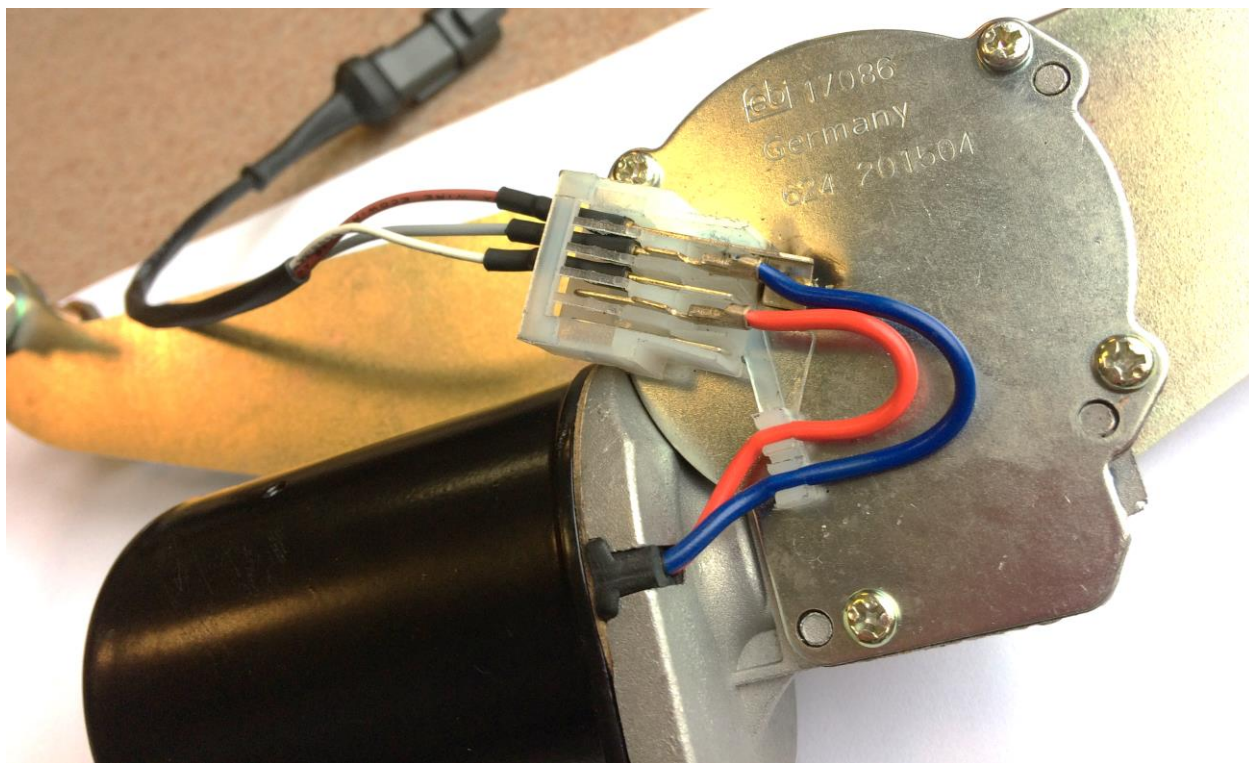
Connection of the ignition switch E129 : Connect the yellow connector (D – Switch Ignition) from the cockpit loom E120 as well as the two black connectors (B and C – Switch Ignition position on/off) (see pictures 6 and 8).

Take the lead of the chassis loom E102 labelled “SW – Ignition” and connect it to the ignition switch E129 (see picture 8).

Connection of the engine start switch E128 : Connect the lead labelled “Start (B1)” from the front loom E121 onto the terminal 1 of the engine start switch. On the terminal 2, connect the starter triggering lead from the starter loom E108 and the lead labelled “Start Info” from the cockpit loom E120. On the terminal 3, connect the “Limakontrolle” lead from the chassis loom E102.

For any further information, the electrical diagrams are at the end of the assembly instructions. (pages 27 to 37)

f. Connection of the loom extension for windshield wipers E132 to the windshield wipers motor



Picture 9

You need :

- Loom extension for windshield wipers E132
- Windshield wipers mechanism

The windshield wipers mechanism has 5 connecting terminals and the loom extension E132 has only 3 connecting terminals.

Connect :

- The brown lead from the loom extension to the ground of the mechanism
- The grey lead to the slow speed power supply (blue lead on the windshield wipers mechanism).
- The white lead to the middle connecting terminal (see picture 8).

For any further information, the electrical diagrams are at the end of the assembly instructions. (pages 27 to 37)

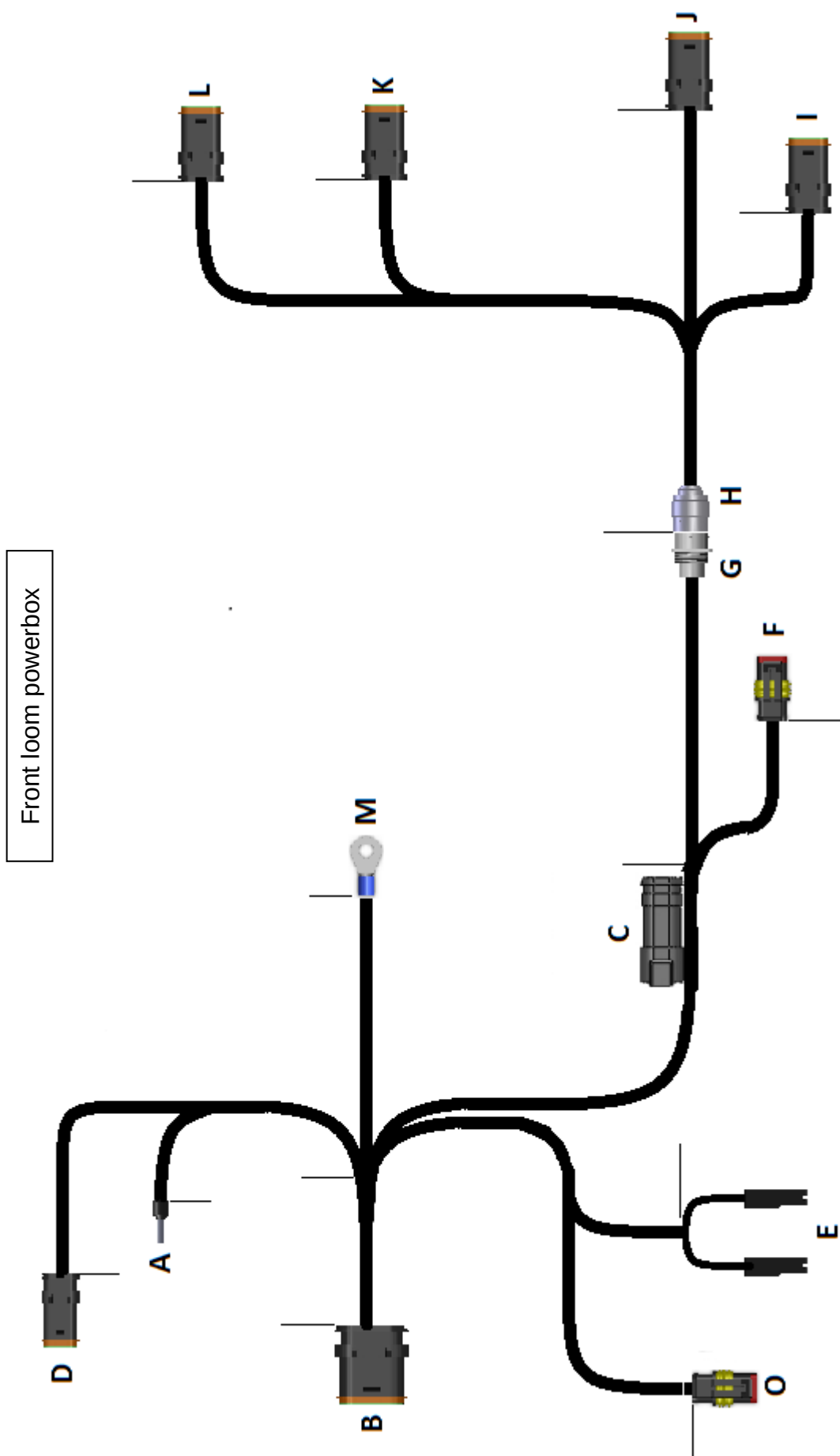
Notes :

It is possible to order as option :

- Extension loom for the radio
Reference : E133 – 1 pc
- Steering wheel connector
Reference : E135 – 1 pc
- Steering wheel pin
Reference : E136 – 1 pc



E133



B	Powerbox (DT06-12SB-CE04)			
B1	Windshield wipers	grey	18AWG	D1
B2	Starter motor	blue	16AWG	A1
B3	Exterior ramp	yellow	16AWG	G1
B4	Transponder	green	20AWG	F1
B5	Switch SC	black	18AWG	E1
B6	PBEG Windshield wipers	white	20AWG	D3
B7	NU			
B8	NU			
B9	Magnifier lights	black	16AWG	G2-O1
B10	Interior ramp	orange	18AWG	G3
B11	NU			
B12	Ventilator	violet	16AWG	G4

A	Starter (isolated pod)			
A1	Starter	black	18AWG	B2

C	Ground (DTHD04-1-12P)			
C1	Ground	brown	12AWG	M

D	Windshield wipers (DT06-3S-CE13)			
D1 (A)	Windshield wipers	grey	18AWG	B1
D2 (B)	Ground	brown	18AWG	M
D3 ©	PBEG Windshield wipers	white	20AWG	B6

E	Switch short-circuit ext (isolated pod)			
E1	Switch SC	black	18AWG	B5
E2	Ground	brown	18AWG	M

F	Transponder (AMP 2-way socket)			
F1	Transponder	green	20AWG	B4
F2	Ground	brown	20AWG	M

G	Front loom connector (UTO 012 8SH6)			
G1 (A)	Exterior ramp	yellow	16AWG	B3
G2 (B)	Magnifier lights	black	16AWG	B9
G3 (C)	Interior ramp	orange	18AWG	B10
G4 (D)	Ventilator	violet	16AWG	B12
G5 (E)	Ground	brown	16AWG	M
G6 (F)	Ground	brown	16AWG	M
G7 (G)	NU			
G8 (H)	NU			

H	Front loom connector (UTO 612 8PH)			
H1 (A)	Exterior ramp	yellow	2x18AWG	J2-J3
H2 (B)	Magnifier lights	black	2x18AWG	K1-L1
H3 (C)	Interior ramp	orange	18AWG	J4
H4 (D)	Ventilator	violet	16AWG	I1
H5 (E)	Ground	brown	16AWG	I2
H6 (F)	Ground	brown	16AWG/2x18AWG	J1-K2-L2
H7 (G)	NU			
H6 (H)	NU			

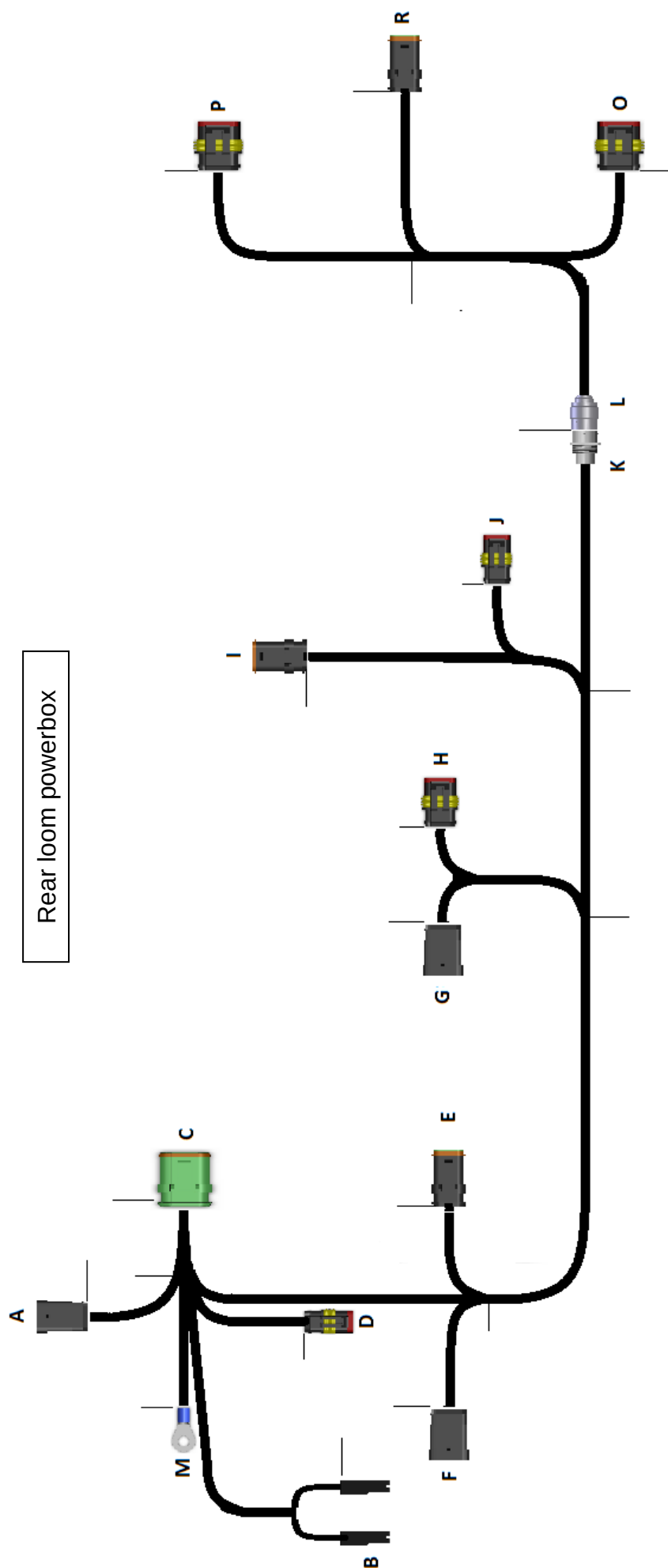
I	Fan (DT06-2S-CE13)			
I1	Fan	violet	16AWG	H4
I2	Ground	brown	16AWG	H5

J	Lights ramp (DT06-4S-CE13)			
J1	Ground	brown	16AWG	H6
J2	Exterior right ramp	yellow	18AWG	H1
J3	Exterior left ramp	yellow	18AWG	H1
J4	Interior ramp	orange	18AWG	H3

K	Right magnifier light (DT06-2S-CE13)			
K1	Right magnifier light	black	18AWG	H2
K2	Ground	brown	18AWG	H6

L	Left magnifier light (DT06-2S-CE13)			
L1	Left magnifier light	black	18AWG	H2
L2	Ground	brown	18AWG	H6

O	Number lights (AMP 2way socket)			
O1	Number lights	black	18AWG	B9
O2	Ground	brown	18AWG	M



C	Powerbox (DT06-12SC-CE04)			
C1	Aux 4	yellow	18AWG	E3
C2	Aux 2 (Paddle shift)	black	14AWG	I1
C3	Position light	blue	20AWG	K1
C4	Left indicators	green	20AWG	K2
C5	Right indicators	black	20AWG	K3
C6	Ground	brown	18AWG	M
C7	Electrically adjustable mirrors	yellow	20AWG	D1
C8	Brake lights	red	20AWG	B1
C9	Anti-crash	white	20AWG	K4
C10	Washer	grey	20AWG	A1
C11	Gearbox cooling pump	violet	18AWG	J1
C12	Aux 3 (Camera)	orange	18AWG	E1

A	Windshield washer (AMP 2-way pin)			
A1	Washer	grey	20AWG	C10
A2	Ground	brown	20AWG	M

B	Stop switch (isolated pod)			
B1	Stop switch	red	20AWG	C8
B2	Stop switch	red	20AWG	K5

D	Electrically adjustable mirrors (AMP 2-way socket)			
D1	Electrically adjustable mirrors	yellow	20AWG	C7
D2	Ground	brown	20AWG	M

E	Aux 3-4 (DT06-4S-CE13)			
E1	Aux 3(camera)	orange	18AWG	C12
E2	Ground	brown	18AWG	M
E3	Aux 4	yellow	18AWG	C1
E4	Ground	brown	18AWG	M

F	Can (AMP 3-way pin)			
F1	Can +	black	20AWG	G1
F2	Can -	brown	20AWG	G2
F3	Shielding		20AWG	G3

G	Can (AMP 3-way socket)			
G1	Can +	black	20AWG	F1/H1
G2	Can -	brown	20AWG	F2/H2
G3	shielding		20AWG	F3/H3

H	Can (AMP 3-way socket)			
H1	Can +	black	20AWG	G1
H2	Can -	brown	20AWG	G2
H3	shielding	grey	20AWG	G3

I	Aux 2 (paddle shift) (DT06-2S-CE13)			
I1	Aux 2 (Paddle shift)	black	14AWG	C2
I2	Ground	brown	14AWG	M

J	Gearbox cooling pump (AMP 2-way socket)			
J1	Gearbox cooling pump	violet	18AWG	C11
J2	Ground	brown	18AWG	M

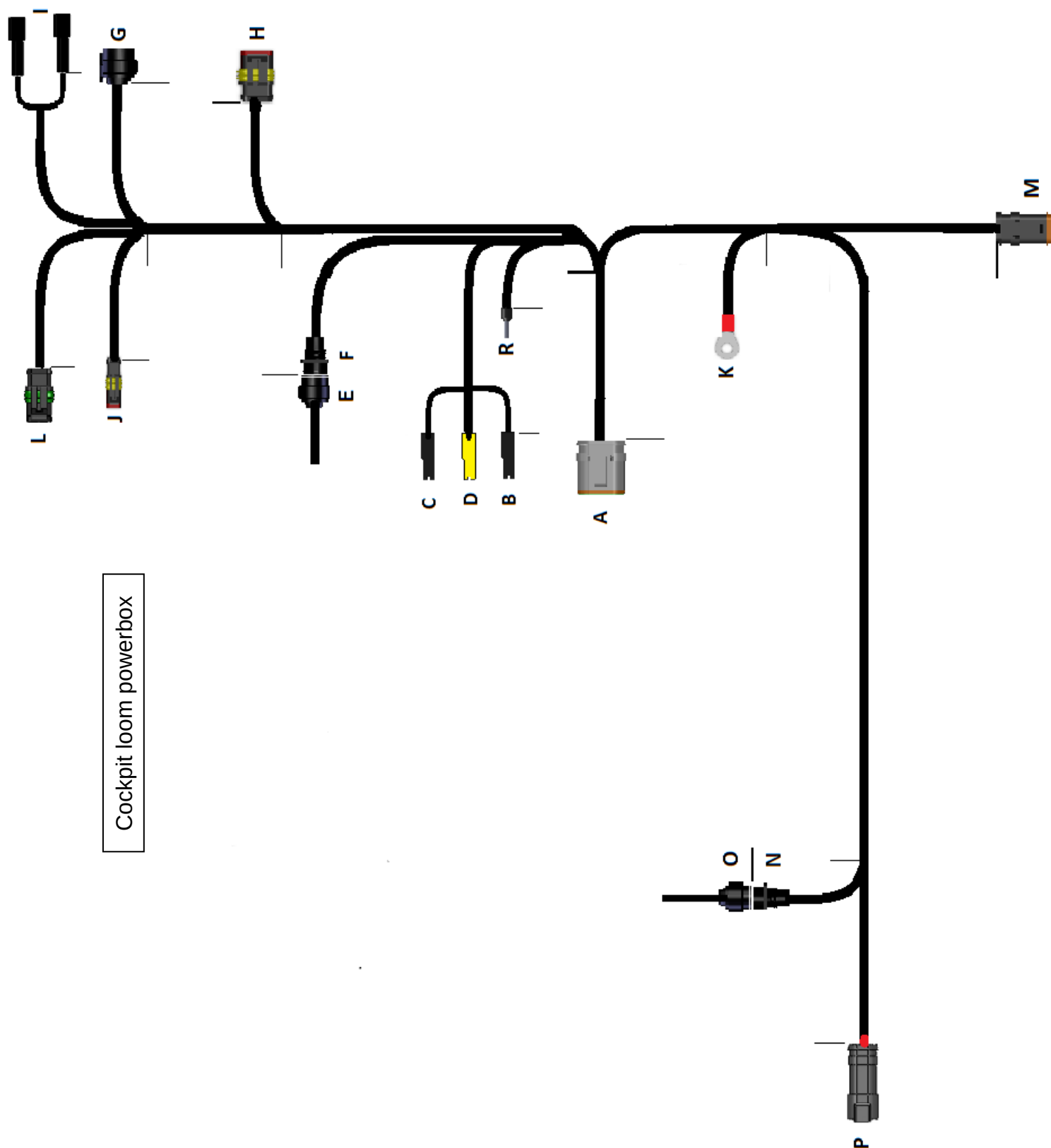
K	Front loom connector (UTOW 710 6SH6)			
K1 (A)	Position lights	blue	20AWG	C3
K2 (B)	Left indicators	green	20AWG	C4
K3 (C)	Right indicators	black	20AWG	C5
K4 (D)	Anti-crash	white	20AWG	C9
K5 (E)	Brake lights	red	20AWG	B2
K6 (F)	Ground	yellow	20AWG	M

L	Rear loom connector (UTOW 610 6PH)			
L1 (A)	Position lights	blue	20AWG	P4/O4
L2 (B)	Left indicators	green	20AWG	O2
L3 (C)	Right indicators	black	20AWG	P2
L4 (D)	Anti-crash	white	20AWG	R1
L5 (F)	Brake lights	red	20AWG	P1-O1
L6 (F)	Ground	yellow	20AWG	P3-O3-R2(B)

O	Left rear lights (AMP 4-way socket)			
O1	Brake lights	red	20AWG	L5
O2	Left indicators	green	20AWG	L2
O3	Ground	brown	20AWG	L6
O4	Position lights	blue	20AWG	L1

P	Right rear lights (AMP 4-way socket)			
P1	Brake lights	red	20AWG	L5
P2	Right indicators	black	20AWG	L3
P3	Ground	brown	20AWG	L6
P4	Position lights	blue	20AWG	L1

R	Anti-crash lights (DT06-3S-CE13)			
R1 (A)	Anti-crash	white	20AWG	L4
R2 (B)	Ground	yellow	20AWG	L6
R3 (C)	NU			



A	Powerbox (DT06-12SA-CE04)			
A1	Aux 1 (cockpit)	violet	18AWG	N5
A2	Ignition switch	red	18AWG	D
A3	NU			
A4	Lights switch	blue	20AWG	F(B)
A5	Windshield wipers switch	green	20AWG	F(C)
A6	Can +	black	22AWG	F(K)
A7	Can -	brown	22AWG	F(J)
A8	Washer switch	grey	20AWG	F(S)
A9	Start info	black	18AWG	R1
A10	Ignition switch position on/off	white	20AWG	B
A11	Steering wheel	yellow	18AWG	F(L)
A12	Radio	orange	18AWG	N1

B	Ignition switch position on/off (isolated pod)			
B1	Ignition switch position on/off	white	20AWG	A10

C	Ignition switch position on/off (isolated pod)			
C1	Ground	brown	20AWG	M

D	Ignition switch (isolated pod)			
D1	switch ignition	red	20AWG	A2

E/F	Steering wheel (UTS6JC1419P)/Dashboard (UTS71419S)			
A	NU			
B	Lights switch	blue	20AWG	A4
C	Washer switch	green	20AWG	A5
D	PTT	black	20AWG	N3
E	PTT	black	20AWG	N4
F	Masse	brown	18AWG	M
G	Speedlimit		20AWG	I1
H	Speedlimit		20AWG	I2
J	Can -	brown	20AWG	A7
K	Can +	black	20AWG	A6
L	Steering wheel	yellow	18AWG	A11
M	Switch neutral		20AWG	G5
N	Switch up		20AWG	G1
P	Switch down		20AWG	G2
R	Switch ground		20AWG	G4
S	Washer switch	grey	20AWG	A8

T	Steering wheel option		20AWG	J1
U	NU			
V	NU			

G	Paddle shift (UTS 6JC10 6P)			
G1(A)	Switch up		20AWG	F(N)
G2(B)	Switch down		20AWG	F(P)
G3(C)	NU			
G4(D)	Switch ground		20AWG	F(R)
G5(E)	Switch neutral		20AWG	F(M)
G6(F)	NU			

H	Can (AMP 3-way socket)			
H1	Can +	black	20AWG	F(K)
H2	Can -	brown	20AWG	F(J)
H3	Shielding		20AWG	

I	Speedlimit (isolated pod)			
I1	Speedlimit		20AWG	F(G)
I2	Speedlimit		20AWG	F(H)

J	Steering wheel option (AMP 1-way socket)			
J1	Option DA HZ	J1	Option DA HZ	J1

K	Power output (Eyelet 8mm)			
K1	ECU MS4 power	red	9AWG	P1

L	Power steering (12033769)			
L1	Power steering	red	12AWG	K
L2	Ground	brown	12AWG	M

M	Ground (DTHD06-8S)			
M1	Ground	black	10AWG	F(F)/N2/N6/C

N/O	Cockpit options (UTS7106S)			
N1(A)	Radio	orange	18AWG	A12
N2(B)	Ground	brown	18AWG	M
N3(C)	PTT	black	20AWG	F(D)
N4(D)	PTT	black	20AWG	F(E)
N5(E)	Aux 1	violet	18AWG	A1
N6(F)	Ground	brown	18AWG	M

P	Power output (DTHD06-1-8S)			
P1	ECU MS4 power	red	10AWG	K1

R	Start info			
R1	Start info	black	18AWG	A9

Assembly instructions :

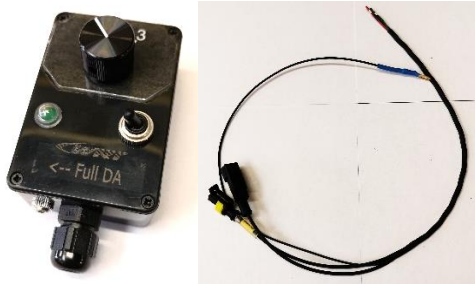
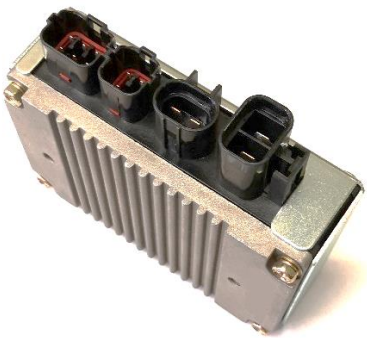
Power steering

1. Power steering kit parts

The WRT reference of this kit is : B020 (single seater) – B021 (two-seater)

The power steering kit is made up of the following parts :

- a. Power steering loom : E249 – 1 pc
- b. Power steering adjustment unit : E250 – 1 pc
- c. Power steering ECU : E251 – 1 pc
- d. Breaker 10 A: E247 – 1 pc
- e. Power steering motor : D022 – 1 pc
- f. Ertalon ring for steering : D024 – 1 pc
- g. Steering sheath 40mm clamp : D008 – 1 pc
- h. Hexagonal head screw : M5X20 (12.9) – 2 pc
- i. Hexagonal head screw : M8x35 (12.9) – 1 pc
- j. M8 Nystop nut – 3 pc
- k. M8 Washer – 3 pc

	
a – E249	b – E250
	
c – E251	d – E247
	
e – D022	f – D024
	
g – D008	

2. Operation of the power steering adjustment unit

The power steering has four assistance levels, adjustable on the unit. The full power steering mode is selected via the left hand position of the 2-position switch. The right hand position enables the rotary switch for the lower assistance levels. There are three such levels. Some basis values are saved in the unit. It is possible to edit this values according to the driver feeling. To edit those values, you can contact WRT.

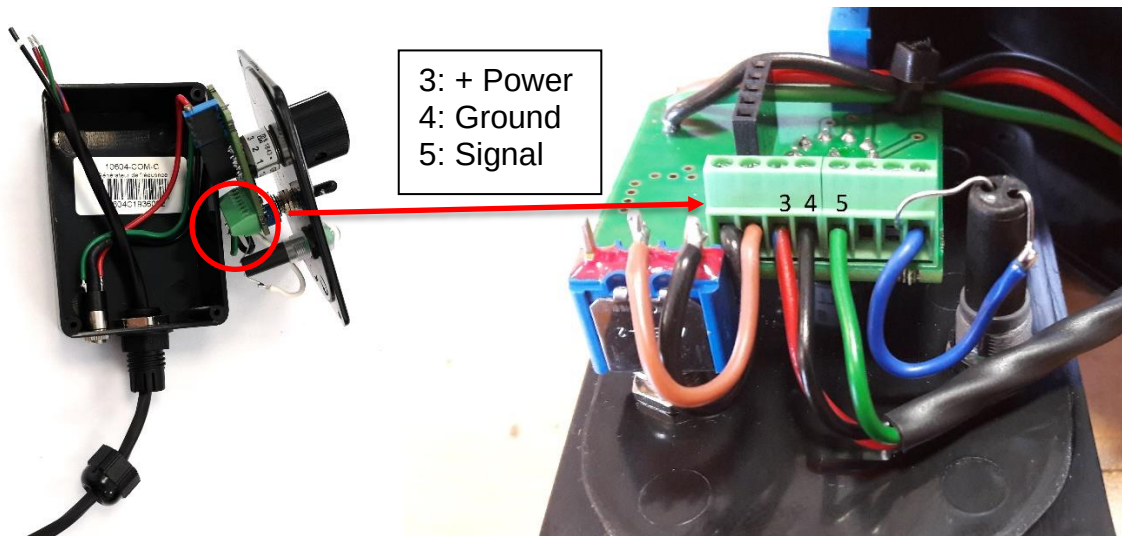


Picture 1

3. Connection of the power steering loom

a. Connection of the power steering adjustment unit

- Loosen the 4 screws of the adjustment unit cover plate for accessing to the terminal block. Remove the cover plate carefully in order not to damage the connectors.
- Pass the lead through the hole at the bottom of the unit.
- Connect the 3 wires of the power steering loom to the terminal block as shown in picture 2. The red wire is voltage supply, the black wire is ground and the green one is the signal.



Picture 2

b. Connection of the 10A breaker

- Connect the breaker between the 2 black pods on the power of the power steering loom.
-



Picture 3

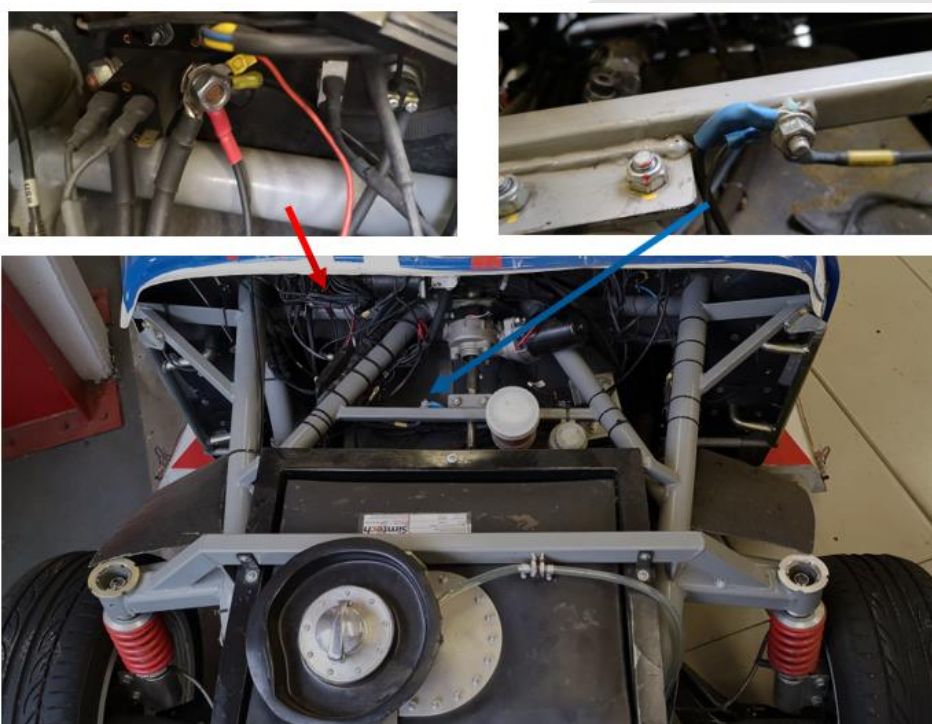
- Place the breaker on the dashboard as shown in picture 4.



Picture 4

c. Connection of the loom on the vehicle

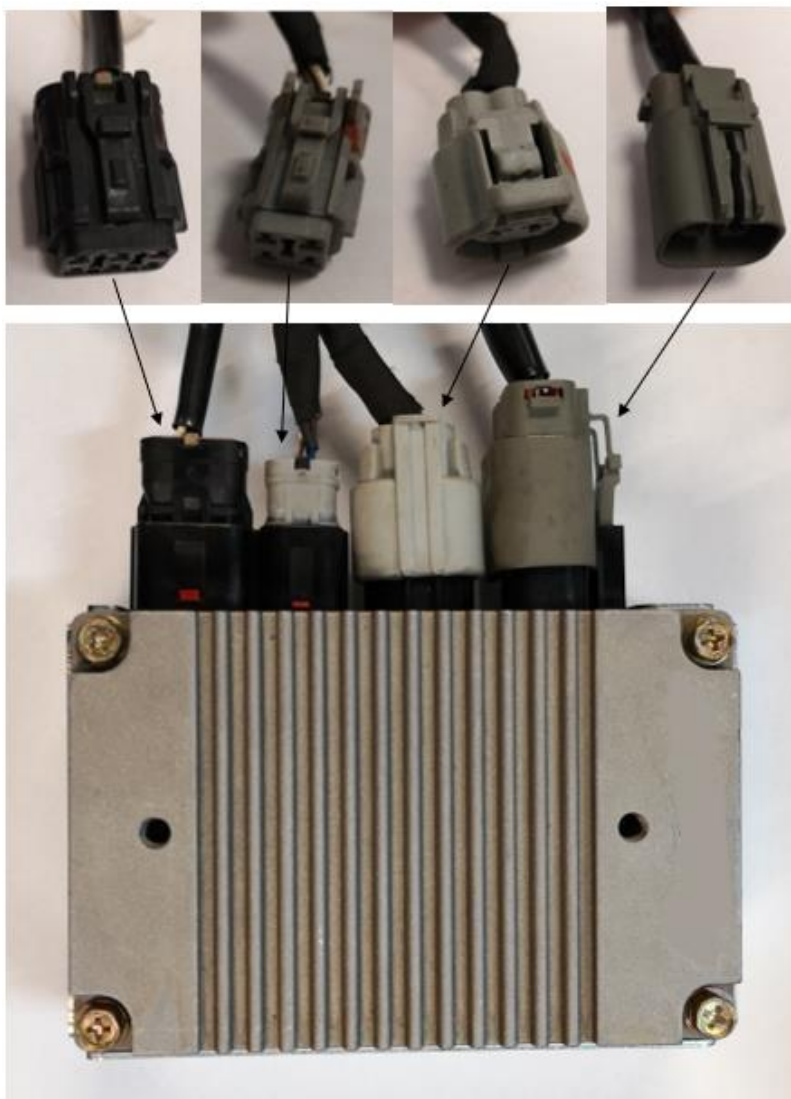
- Connect the red eyelet on the power supply of the dashboard..
- Connect the blue eyelets on the ground of the dashboard.



Picture 5

d. Connection of the ECU

- Connect the 4 connectors on the ECU as shown in the picture below.

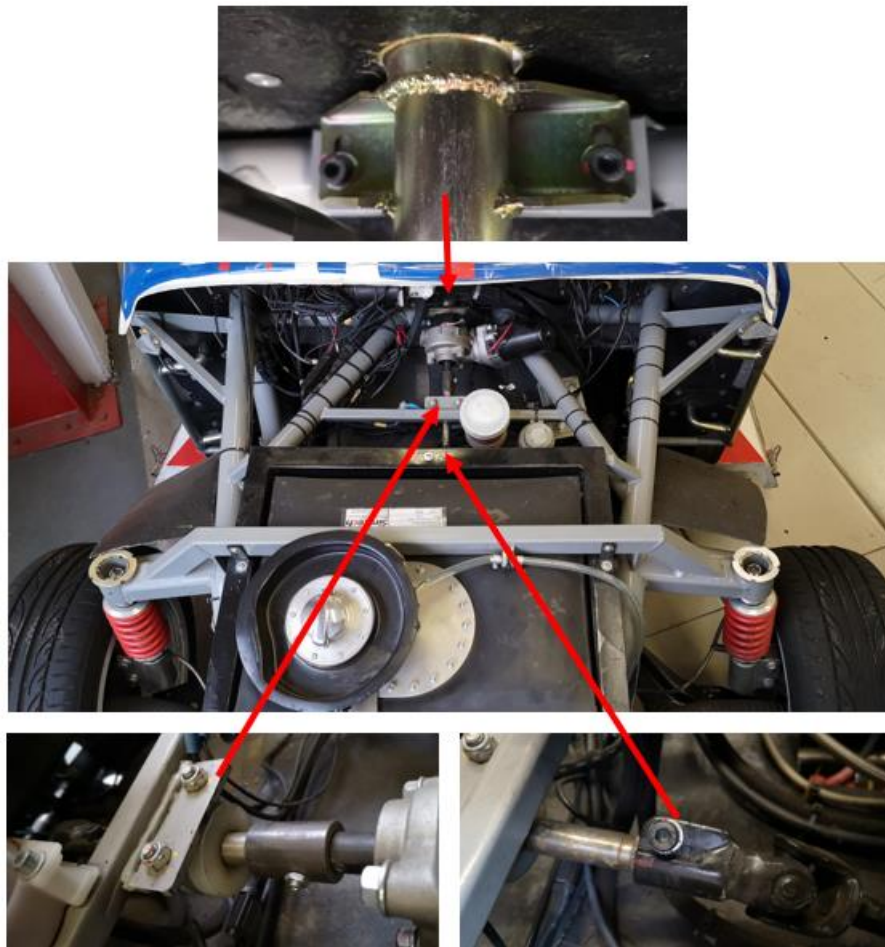


Picture 6

4. Assembly of the power steering on the vehicle

a. Assembly of the power steering motor (D022)

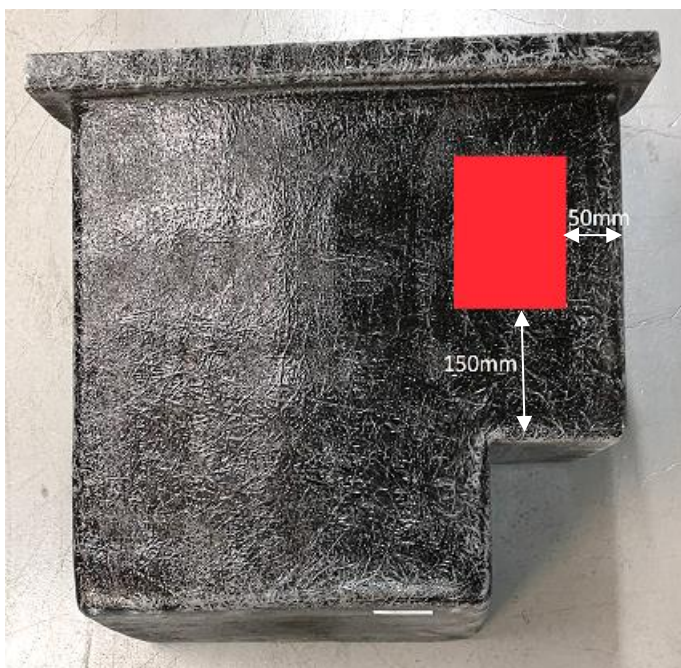
- Mount the steering column on its mounting bracket with the M8x20 two hexagonal head screws.
- Fit the Ertalon ring on the steering column. Maintain the position of the ring with the 40mm clamp and 2 M8 Nylstop nuts (+washers).
- Fix the bottom of the steering column onto the steering joint by means of an M8x30 hexagonal head screw and a M8 Nylstop nut (+washer).



Picture 7

b. Set the ECU and the adjustment unit on the vehicle

- Position the ECU on the driver feet housing with velcro tape 3M as shown in picture 8. Make sure to position the connectors towards the inside of the car. Caution: the ECU has to be clear of the vehicle loom.



Picture 8

- Position the adjustment unit on the dashboard with velcro tape 3M and drill a hole in the dashboard to channel the power steering loom.



Picture 9

ASSEMBLY INSTRUCTIONS : HUB CARRIER (LF/RR and RF/LR)

1. Hub carrier kit parts

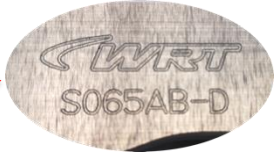
The WRT reference of this kit is :

- Hub Carrier Right Front : S060
- Hub Carrier Left Front : S061
- Hub Carrier Right Rear : S062
- Hub Carrier Left Rear : S063

The hub carrier kit is made up of the following parts :

- a. Hub Carrier LF/RR : S064A OR RF/LR : S064B – 1 pc
- b. Bearing / CV joint spacer 53 S066A : 1 pc
- c. Damper attachment plate : S064C – 1 pc
- d. Ball joint attachment conical socket : S065B – 1 pc
- e. Track rod end washer : S065C – 1pc
- f. Wheel hub with studs : S067 – 1 pc
- g. Track rod attachment plate : S065A – 1 pc
- h. Front caliper bracket S064D OU Rear S064F : 1 pc
- i. Wheel bearing : S066 – 1 pc
- j. Lower ball joint chock : S064U – 1 pc
- k. Threaded socket of lower ball joint : S064V – 1 pc
- l. M12 Nut : S064R – 3 pc
- m. 12X18X0.5 Washer : S064L – 9 pc
- n. ISO7089 M10 Washer : S064T – 3 pc
- o. DIN912 MF M12x150x35 Screw – 1 pc
- p. DIN912 MF M12X150X30 Screw: S064O – 2 pc
- q. DIN912 MF M12X150X45 Screw: S064M – 3 pc
- r. DIN912 M12X60 Screw: S064P – 2 pc
- s. DIN912 12.9 M10x55 machining 3x38mm Screw: S064J – 2 pc
- t. DIN912 12.9 M10x75 Screw – 1 pc
- u. DIN912 12.9 M4x12 Screw – 1 pc
- v. 10.9 M5x12 Screw – 2 pc

Excluded : Copper paste
Loctite 243 threadlocker

 	 
a – S064A	a – S064B
	
b – S066A (Ø int. 53)	c – S064C
	
d – S064B	e – S065C
	
f – S067	g – S065A

	
h – S064D	h – S064F
	
i – S066	r – S064J

Note :

Before the assembly : There is two different diameters : 53 or 50 mm. For the choice of the spacer ring, check that the retaining diameter is the same as the diameter of the spacer ring.



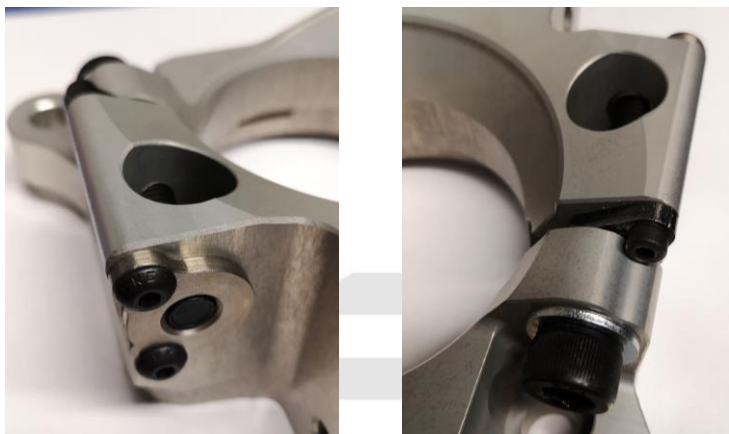
2. Hub carrier assembly

a. Lower ball joint chock and thread socket of lower ball joint assembly

You need :

- 1 ISO7089 M10 Washer
- 1 DIN912 12.9 M10x75 Screw
- 1 DIN912 12.9 M4x12 Screw
- 2 10.9 M5x12 Screws
- Hub Carrier LF/RR S064A OU RF/LR S064B
- Lower ball joint chock S064V
- Threaded socket of lower ball joint S064U

Gently tighten the M10x75 screw in the sockets. Position the tightening wedge then tighten the M5x12 screws and the M4x12 screw with **Loctite 243** as shown on picture 1.



Picture 1

b. Assemblage porte rotule de direction S065A/douille fixation rotule de direction S065B et rondelle rotule de direction S065C

You need :

- A hydraulic press
- Ball joint attachment conical socket S065B
- Damper attachment plate S065C
- Track rod attachment plate S065A

Mount with a hydraulic press the ball joint attachment socket S065B in the track rod attachment plate S065A. The damper attachment plate has to be placed during the assembly of the ball joint.

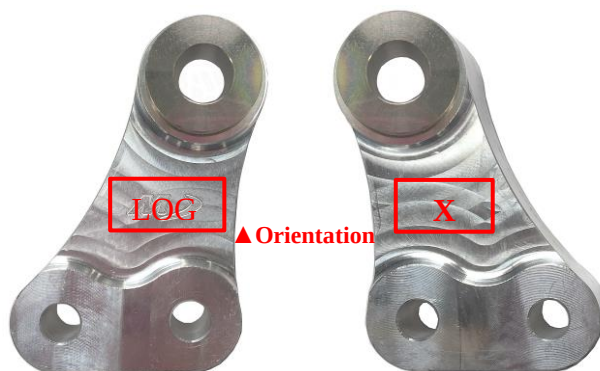
CAUTION : the ball joint attachment socket has to be press fitted at the top of the track rod attachment plate S065A.

- For an assembly of a hub carrier LF/RR : see picture 1
- For an assembly of a hub carrier RF/LR : see picture 2

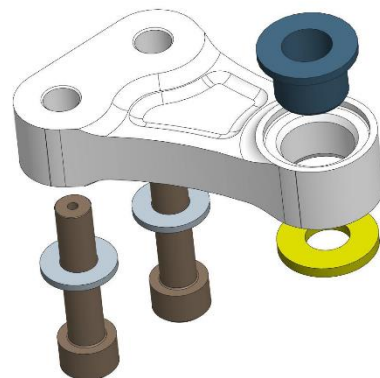
The insertion pressure of the ball joint attachment socket on its support is 150 bar maximum.



Picture 2 : LF/RR



Picture 3 : RF/LR



For any further information, the hub carrier drawings are at the end of the assembly instructions. (pages 58 to 62)

c. Wheel bearing S066 and wheel hub S067 assembly

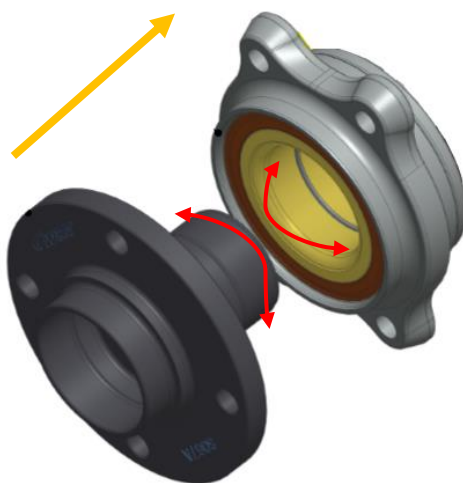


Picture 4

You need :

- Copper paste
- Hydraulic press
- Wheel bearing S066
- Wheel hub S067

Grease (red arrows on picture 5) the inside of the wheel bearing S066 and the outside of the wheel hub (see picture 4). Use some copper paste.



Picture 5

Caution you must respect the mounting direction as shown on picture 4 (yellow arrow).

It is necessary to exert the force of the press on the inner ring of the bearing in order not to damage it. Insert the wheel bearing S066 in the wheel hub S067 with the press (see picture 6 and 7).

Pressure exerted : between 150 and 200 bars



Picture 6



Picture 7

- d. Wheel hub S067 + bearing S066 and hub carrier assembly (LF/RR : S064A OU RF/LR : S064B)



Picture 8

You need :

- Copper paste
- Loctite 243 threadlocker
- 4 12X18X0.5 Washers
- 2 DIN912 MF M12X150X45 Screws
- 2 DIN912 MF M12X150X30 Screws
- Wheel hub S067 + bearing S066 assembled
- Hub carrier LF/RR S064A OU RF/LR S064B
- Torque wrench

Put some copper paste on the inner part of the hub carrier (LF/RR : S064A OU RF/LR : S064B) and insert wheel hub S067.

Apply some **Loctite 243** on the 4 screws before tightening.

Set the parts with the 2 M12X150X45 screws for the upper part and with the 2 M12X150X30 screws without forgetting the 4 12x18x0.5 washers. (see picture 8).

With the torque wrench, tighten the 4 screws to a torque of **90 Nm**.

e. Damper attachment plate S064C and hub carrier assembly



Picture 9

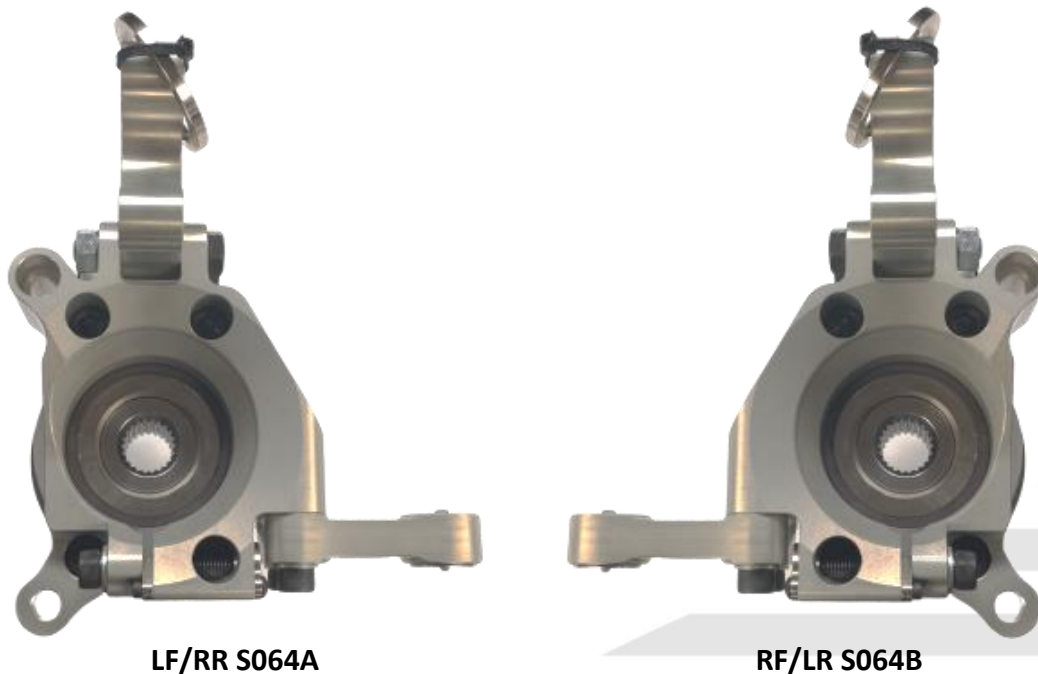
You need :

- 4 12X18X0.5 washers
- 2 DIN931 M12X60 screws
- 2 M12 nuts
- Damper attachment plate S064C
- Hub carrier AVG/ARD S064A OR AVD/ARG S064B
- Torque wrench

Put the damper attachment plate S064C in the hub carrier and insert the 2 M12x60 screws with 12x18x0.5 washers. Set the 2 remaining washers and tighten the 2 M12 nuts. (see picture 9).

With the torque wrench, tighten the screws to a torque of **110 Nm**.

- f. Assembly of the track rod attachment plate S065A1 on the hub carrier (LF/RR : S064A OU RF/LR : S064B)



Picture 10

You need :

- Loctite 243 threadlocker
- 2 ISO7089 M10 washers
- 2 DIN912 M10X55 machining 3x38mm screws S064J
- Track rod attachment plate S065A with the socket assembled
- Hub carrier LF/RR S064A OU RF/LR S064B
- Torque wrench

Apply some **Loctite 243** on both screws **prior to** tightening them.

Put the track rod attachment plate in position on the hub carrier. Screw the 2 M10x55 machined screws with the M10 washers as shown on the picture 10.

With the torque wrench, tighten the screws to a torque of **60 Nm**

g. Assembly of the brake caliper mounting (Front : S064D and Rear : S064F) on the hub carrier (LF/RR : S064A or RF/LR : S064B)



Picture 11 : Front brake caliper mounting

Picture 12 : Rear brake caliper mounting

How to differentiate the front brake caliper bracket from the rear brake caliper bracket?

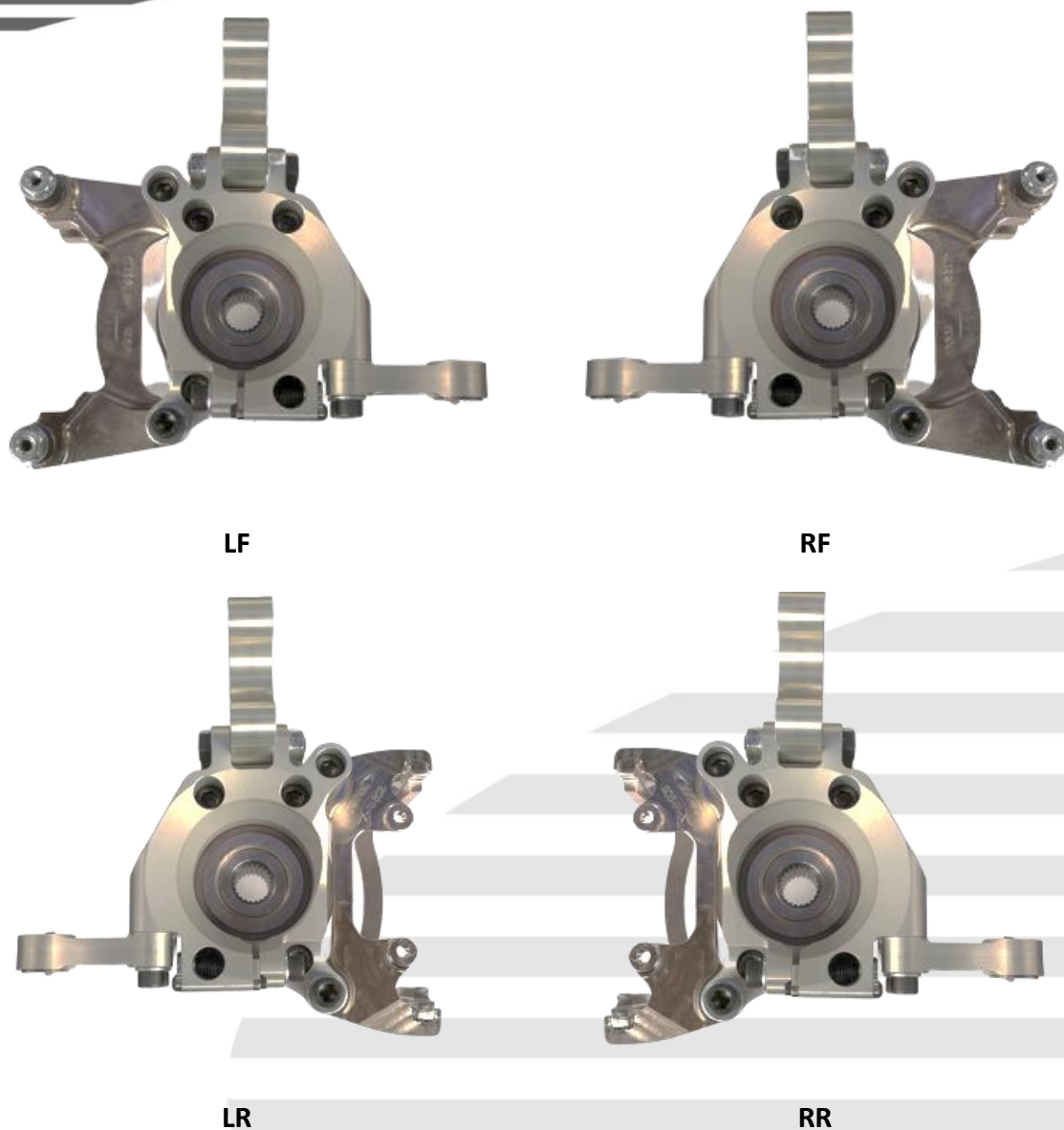
The front caliper bracket has 2 sliders whereas the rear one does not have any slider. In addition, the rear caliper bracket groove is wider than the front brake caliper ones (see picture 10 and 11).

You need :

- Loctite 243 threadlocker
- 1 DIN912 MF M12X150X45 screw
- 1 12X18X0.5 washer
- 1 DIN912 MF M12X150X35 screw
- 1 ISO789 M12 washer
- Front brake caliper bracket S064D or Rear S064F
- Hub carrier LF/RR S064A or RF/LR S064B
- A torque wrench

Apply **Loctite** on the 2 screws before fixing them.

Attach the caliper bracket (Front : S064D OU Rear : S064F) on the hub carrier (S064A ou S064B) with the 2 screws and the corresponding washers. (see picture 13).

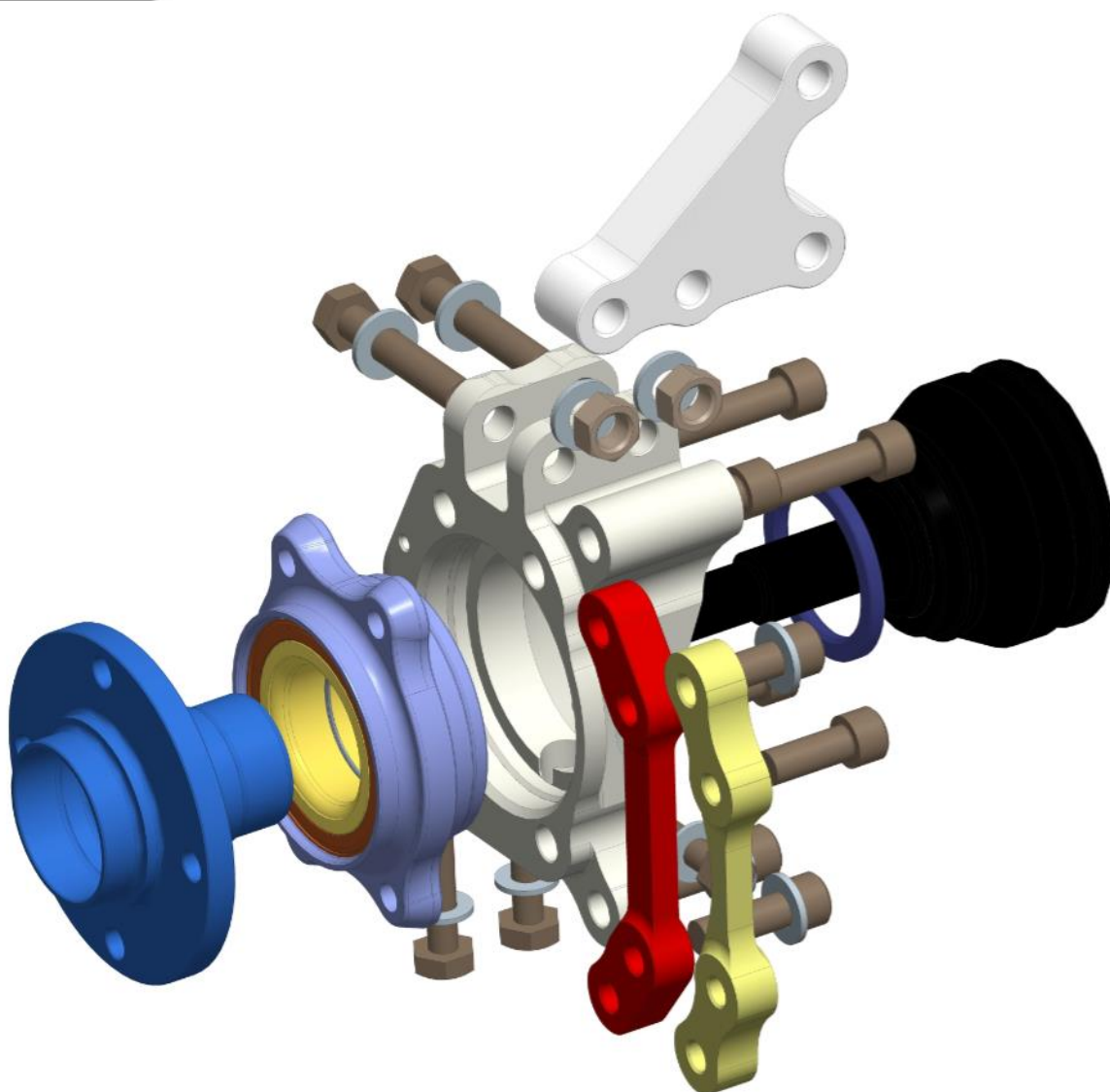


Picture 13

With the torque wrench, tighten the 2 screws to a torque of **110 Nm**

Note :

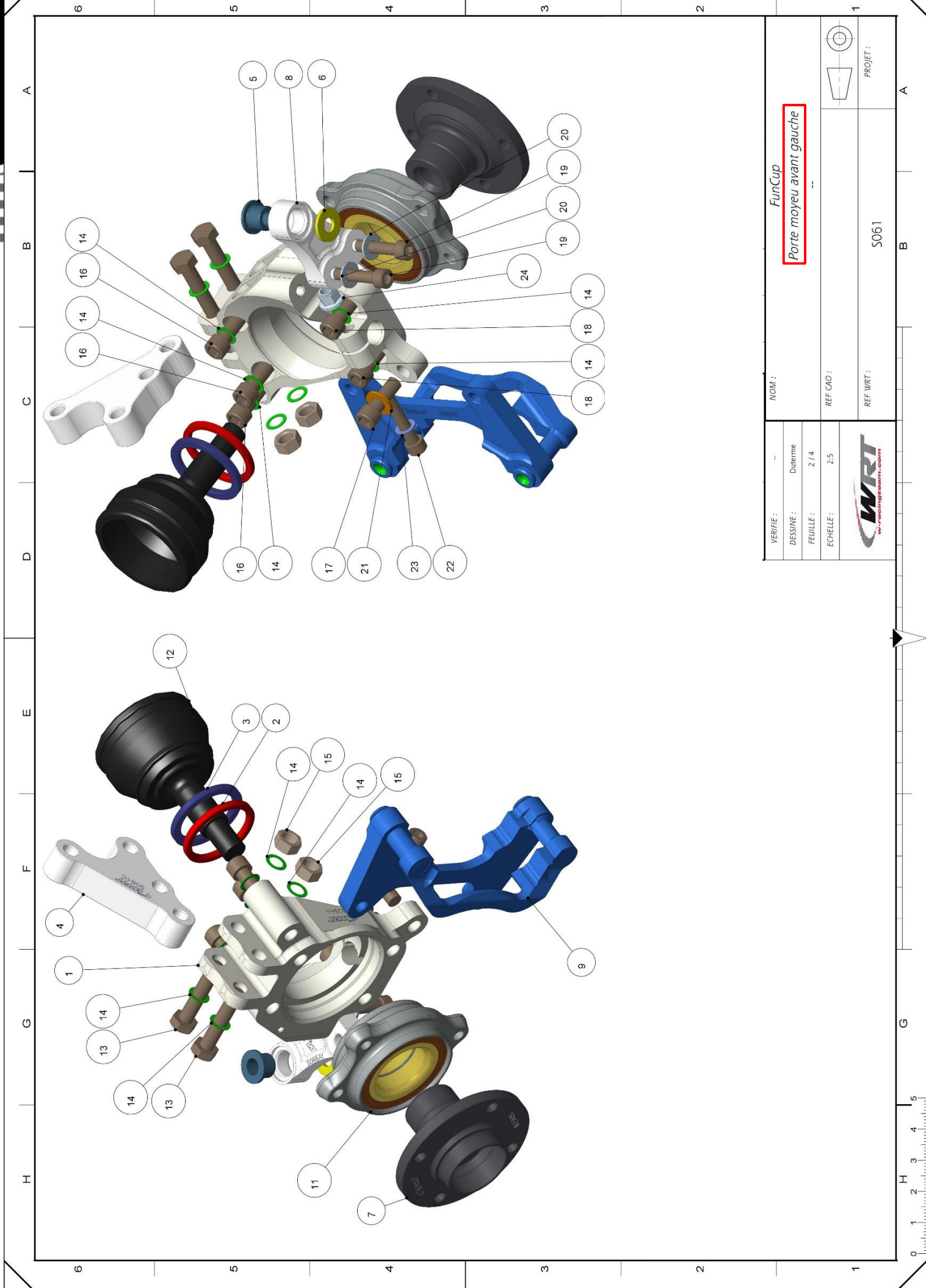
- There is an adaptative interface for the vehicles equipped with the old brake caliper system.



Picture 14

Références : Front brake caliper interface (in red on the picture 14) S064G or rear (in yellow on the picture 14) S064H : 1 pc

3. Hub carriers exploded view (see pages 59,60,61 and 62)



FunCup

Porte moyeu avant gauche

NOM :

VERIFIE :

DESSINE :

FEUILLE :

ECHELLE :

Du terme

2 / 4

2:5

REF CAO :

REF WRT :

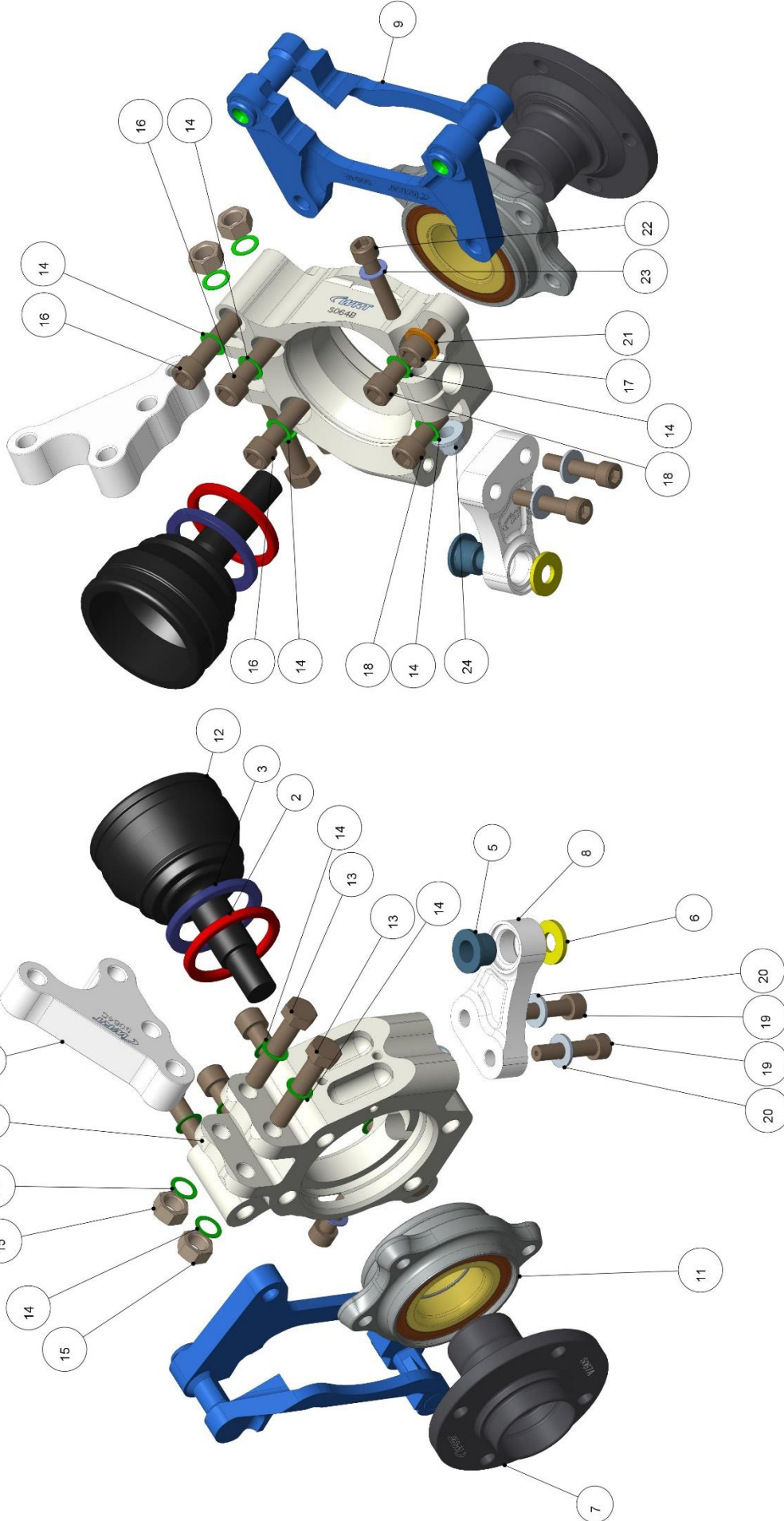
S061

PROJET :

1



A B C D E F G H



FunCup

Porte moyeu avant droit

NOM :

VERIFIE :

DATE :

FEUILLE :

ECHELLE :

REF CAO :

REF WRT :

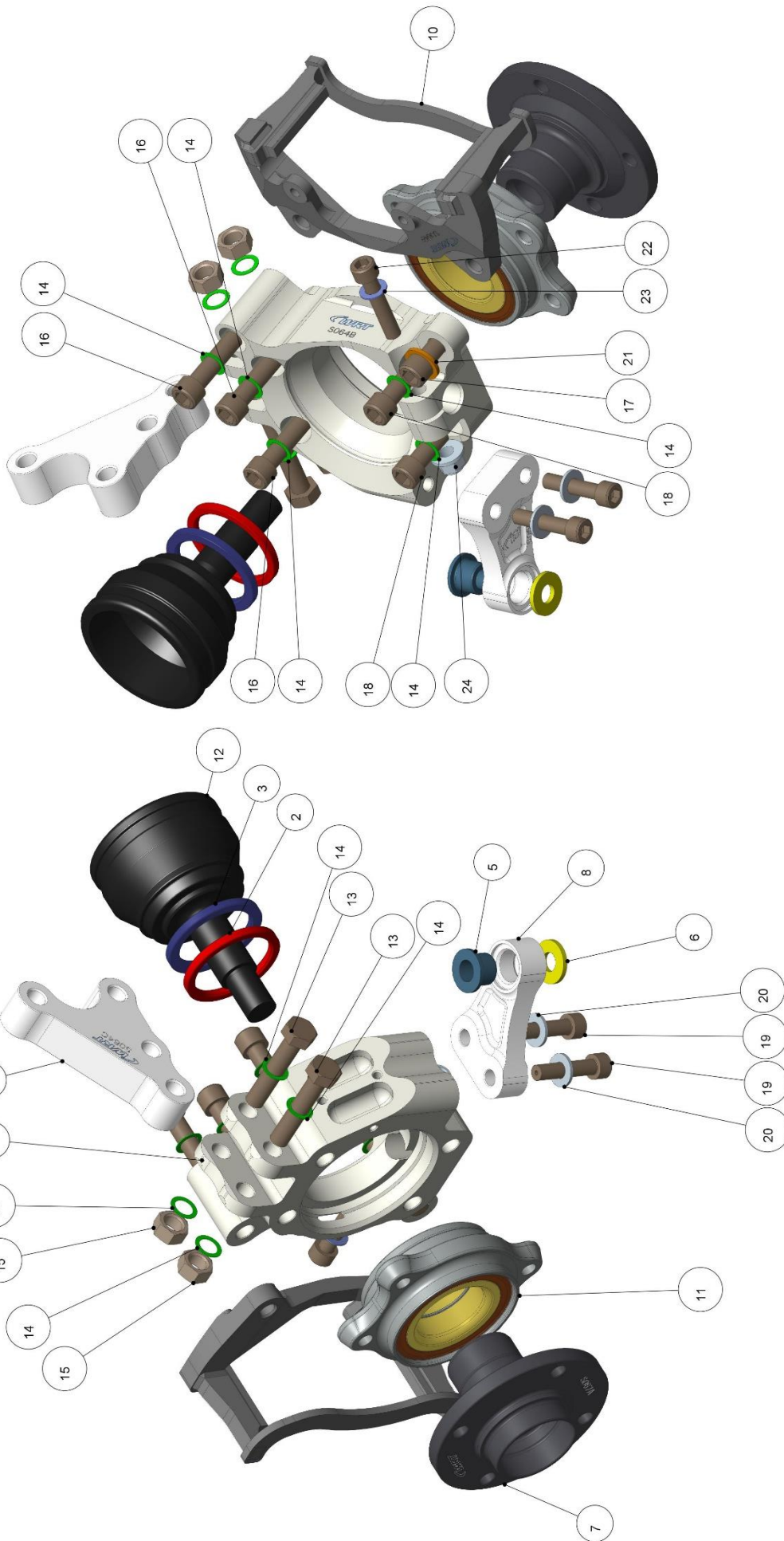


S060

PROJET :

0 1 2 3 4 5

A B C D E F G H



FunCup

Porte moyeu arrière gauche

NOM :

VERIFIE :

DESSINE :

FEUILLE :

ECHELLE :



REF CAO :

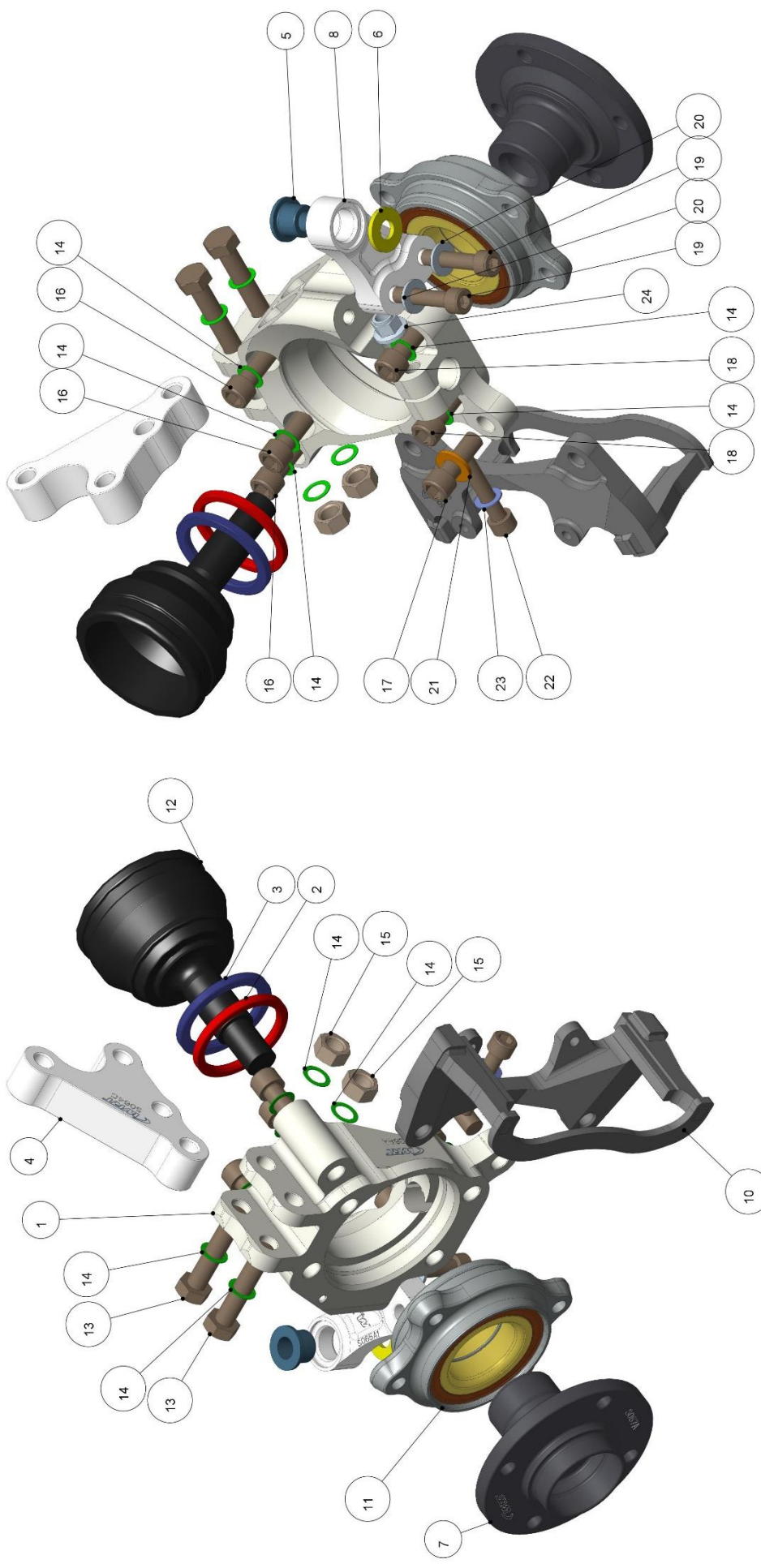
REF WRT :

S063

PROJET :

0 1 2 3 4 5

A B C D E F G H



FunCup

Porte moyeu arrière droit

NOM :

VERIFIE :

DATE :

FEUILLE :

ECHELLE :

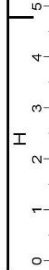


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REF WRT :

S062

PROJET :



1) Technical file :

Paddle Shift

1. Paddle Shift kit parts

The kit is made of the following parts :

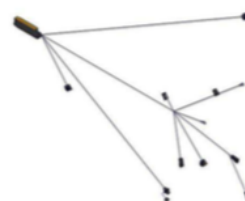
- Hydraulic unit and its mounting bracket



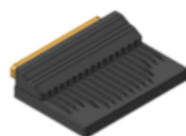
- Gearbox actuator and its mounting bracket



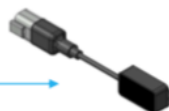
- Loom



- Computer GCU



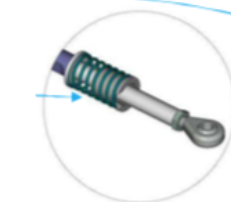
- Motor control unit



- Two paddles to fix behind the steering wheel



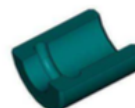
- Spiral loom for steering wheel



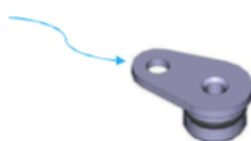
- Compression spring 2x20.5x88.5



- Cylinder stop



- Reverse cable plug



2. Hydraulic unit

Type of oil recommendation: The hydraulic unit is tested and filled with mineral oil : ATF DEXRON IID.
In case of oil change or refilling watch for the use of a compatible oil.

Bleeding : The system comes equipped with an automatic drainage. But due to the length of the pipes, after the oil change, it is preferable to actuate alternately all the organs to perform a perfect air bleeding.

Oil leveling in the tank : The hydraulic unit is composed of a plastic oil tank (at atmospheric pressure) and of a high pressure accumulator. The oil flow between both these elements follows the principle of commutating vases.

The leveling is done by adding the oil in the tank (A). Respect the below procedure :

- Loosen and remove the plug and the pressure compensator (1) (rubber)
- Adjust the oil level (2).
- Replace the pressure compensator mounted on the plug in the tank (3), deforming it beforehand by hand (bean shape).
- Tighten the plug.
- The oil level must be between the two MIN and MAX level lines (4).



System Operation : The hydraulic unit consists of an electro-pump assembly and generates hydraulic power. This is maintained between two pressure levels by a sensor.

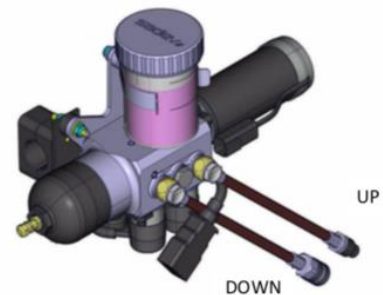
Generally speaking, when the low pressure level is reached following triggering of the actuator, the electric motor driving the pump starts to restore a sufficient pressure level in the system. . The engine running time is then 2 to 3 seconds.

The electric motor must never operate permanently. If this is the case, the possible causes are:

- The oil level in the tank is too low.
- An element clogs the suction hole of the tank.
- The control module of the electric motor has failed (static relay).
- The electric motor has reached a critical temperature that has permanently damaged it.

Location and connection of hydraulic hoses:

- Male hose "UP": connected to the box actuator.
- Female hose "DOWN": connected to the box actuator

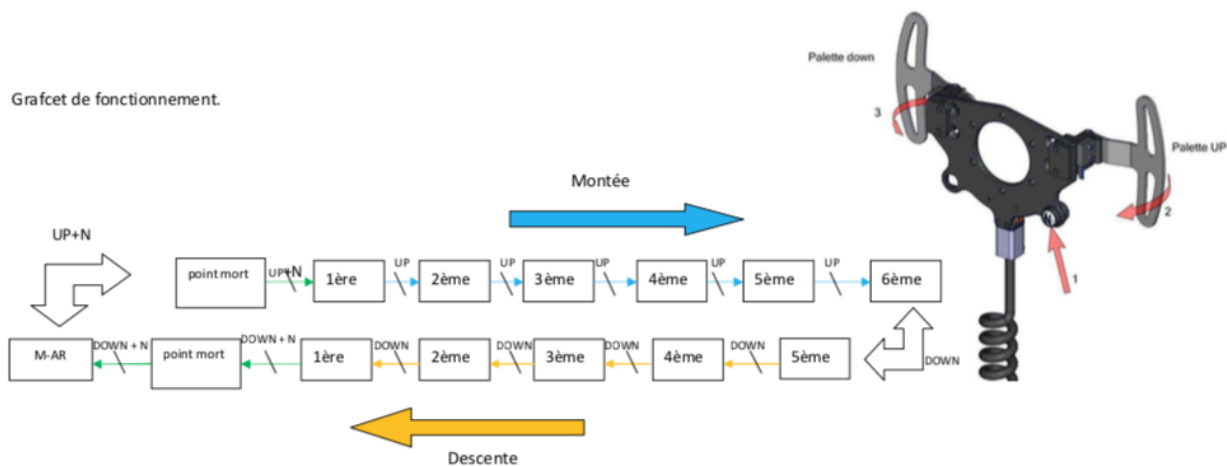


Use of the system : The shifting strategy incorporates several safety features:

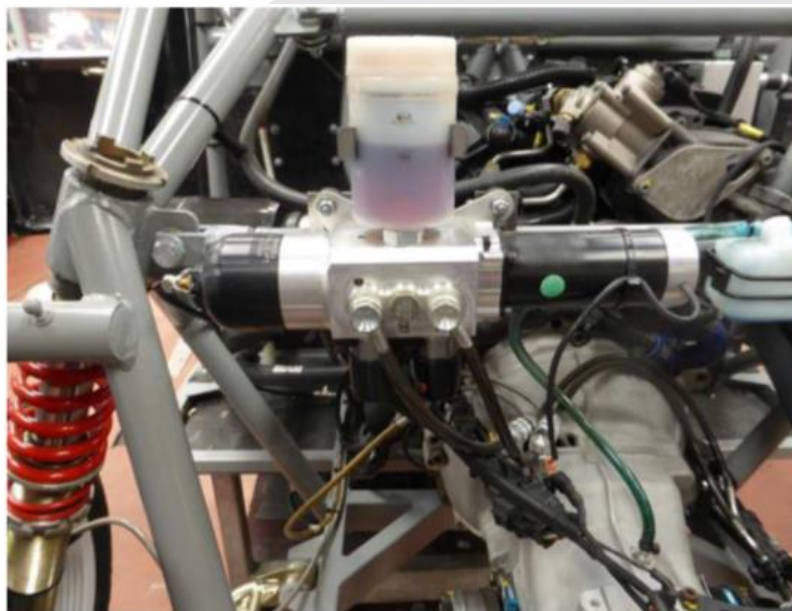
- Overrev engine safety upon downshift (downshift request too early compared to engine speed, request refused).
- Throttle opening safety (if throttle setpoint > 30%, downshift request is refused). To engage 1st gear: it is necessary to press the Neutral button (1) "remain pressed" then to activate the paddle UP (2) in order to deactivate the safety.

To engage the reverse gear or neutral, press the Neutral button (1) "remain pressed" and then press the DOWN (3) button to deactivate the safety.

Graficet de fonctionnement.

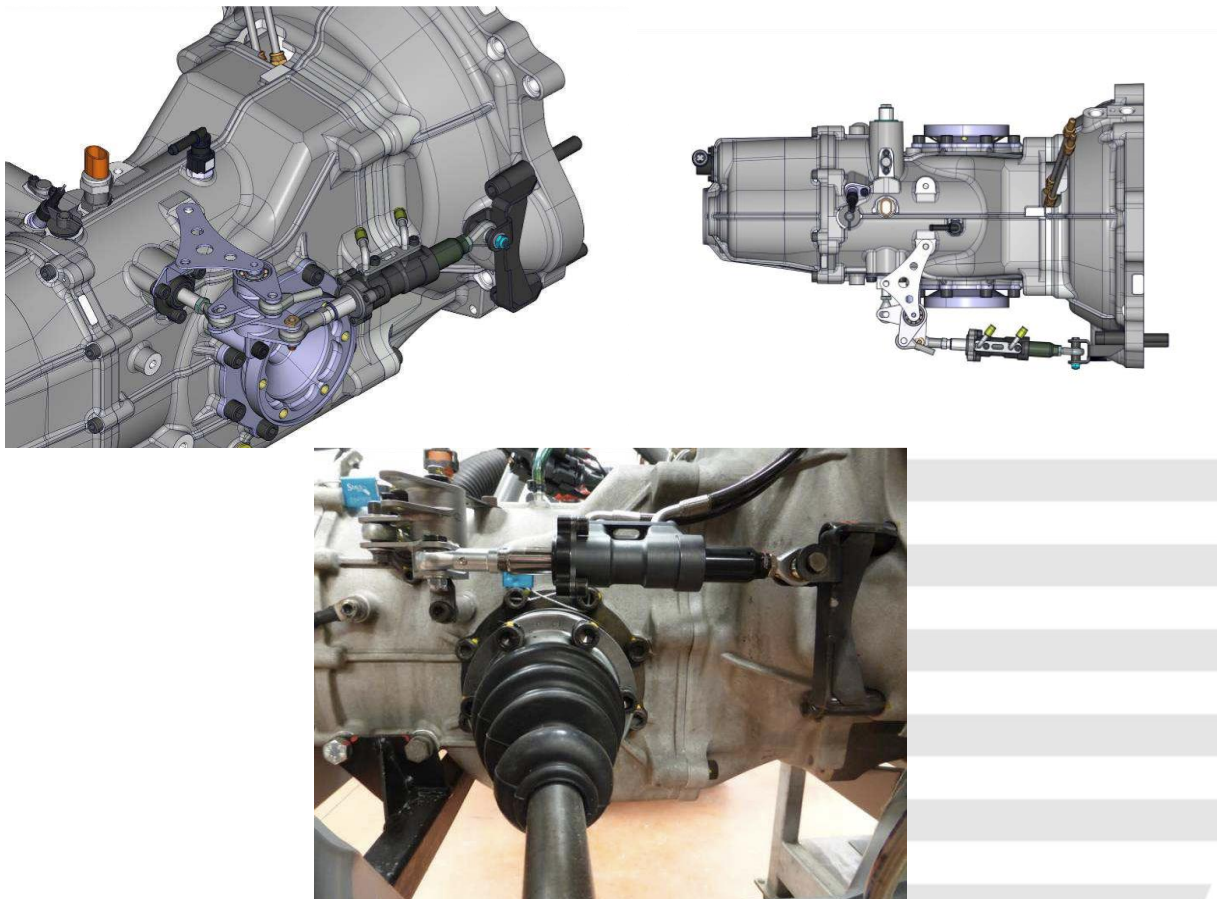


Positioning on the vehicle : The hydraulic unit must be attached to the truss tube above the gearbox using the supplied clamps.



3. Gearbox hydraulic actuator

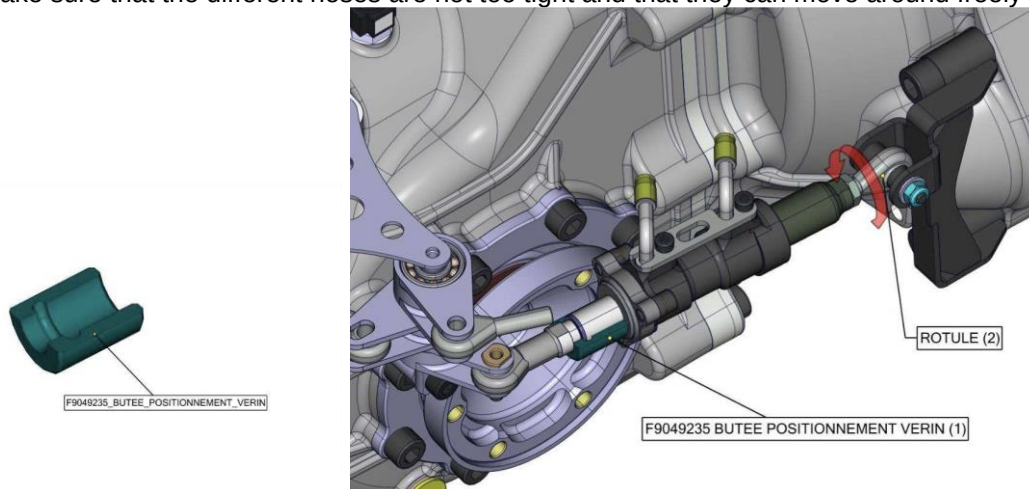
Recommended assembly : Install the gearbox actuator using the mechanically welded clevis as below (see assembly instructions)



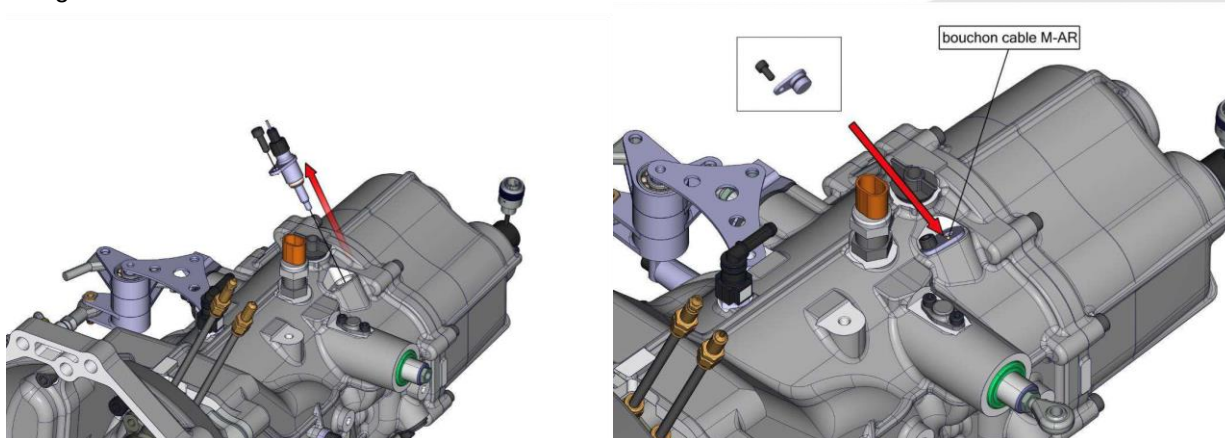
Once the hydraulic actuator is installed on the gearbox, make sure that it is in its middle position using the centering wedge F9049235 (1). If it is not the case, tighten or loosen the ball joint (2) side clutch bell to adjust the position of the cylinder.

Once the actuator is in place, check that the hoses are correctly positioned and protect them if they are in contact with a metallic element.

Also make sure that the different hoses are not too tight and that they can move around freely



Reverse cap : Remove the locking cable from reverse gear, and position the reverse plug with its seal using the ChcM6x16 screw.



4. Electrical wiring and calculator (GCU)

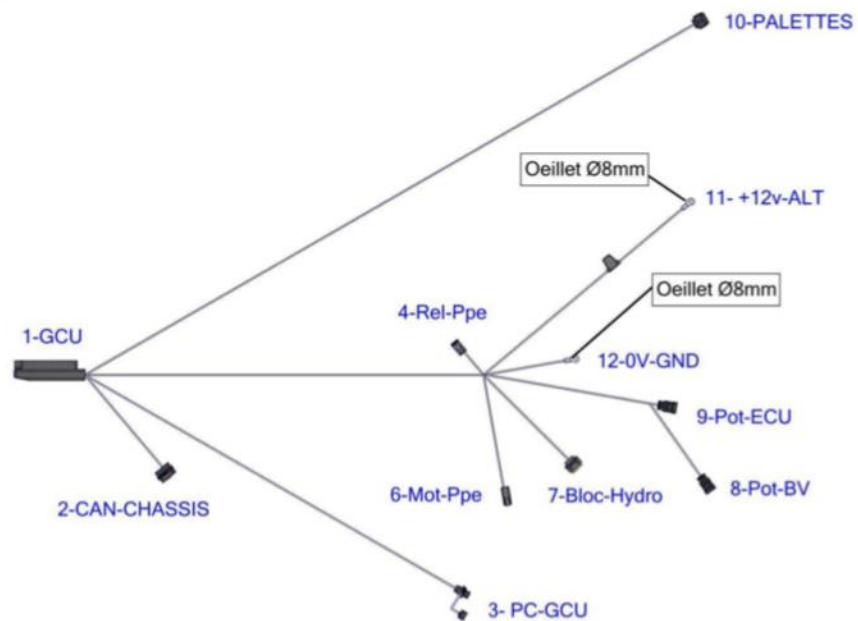
The wiring harness must be connected to the following items: Alternator (+ 12V) and vehicle ground (11 & 12).

- Gearbox potentiometer (8 & 9).
- Gearbox Control Unit (GCU) (1).
- Chassis CAN link (2).
- Hydraulic unit (6 & 7).
- Control module of the electric motor (4).
- Steering wheel (10).

Take care when installing the beam to isolate the elements generating high temperatures. Be sure to use the reinforcement tabs under the grommets (+ 12V and GND).

Transmission potentiometer : Regularly check that the gearbox potentiometer is correctly adjusted. It must deliver a voltage of 1.20 Volt $\pm$ 0.05 V when the gearbox is in neutral.

Electrical harness



Calculator (CGU)



Position du calculateur.
Le fixer avec du velcro.



5. System maintenance

Hydraulic unit : Before each meeting it is important to check the oil level in the tank.

If it decreases significantly, there is an external leak on the actuator or in a fitting. Locate the leak and replace the faulty component.

Regularly monitor the quality of the oil and replace it as soon as it is loaded in particle (oil of dark color). Also, be careful not to pinch the connection hoses with the actuator. In case of doubt do not hesitate to replace them.

Gearbox actuator : Regularly check that the ball joints are correctly tightened.

Also check the connection between the gearbox actuating bar and the external selection rocker, grease regularly. Make sure that the hoses are neither pinched nor too tight.

Electrical harness : Regularly check the condition of the connectors and that the harness does not come into contact with sharp parts of the chassis. Check the condition of the grommets to be attached to the alternator.

6. Fault diagnosis table

Encountered problem	Location of the failure
Up- and downshifts impossible	Gearbox potentiometer out of service or out of adjustment
	Connector of the steering wheel not connected to the vehicle beam or out of service.
	No hydraulic pressure
	Actuator hydraulic hoses disconnected
	Hydraulic unit 10-ways connector not connected
	Power supply problem on the harness, check the condition of the eyelets on the alternator.
Up- and downshifts too slow	Gearbox actuator hoses pinched
	The electric motor of the hydraulic unit rotates constantly.
	No hydraulic pressure available
No hydraulic pressure (motor not running)	2-way power supply connector for the electric motor disconnected (grey connector)
	Electric motor out of service
	Electric motor control module (solid state relay) out of service or not connected
	Hydraulic power supply fuse out of service
	Power supply problem on the harness, check the condition of the eyelets on the alternator.
The motor is always running	Oil level too low
	An element obstructs the suction hole of the tank.
	Electric motor control module (solid state relay) out of service or not connected

	The electric motor has reached an internal temperature that is too high ($\pm 90^{\circ}\text{C}$) and is damaged.
	The battery is too low.
	Hydraulic unit pressure sensor out of service