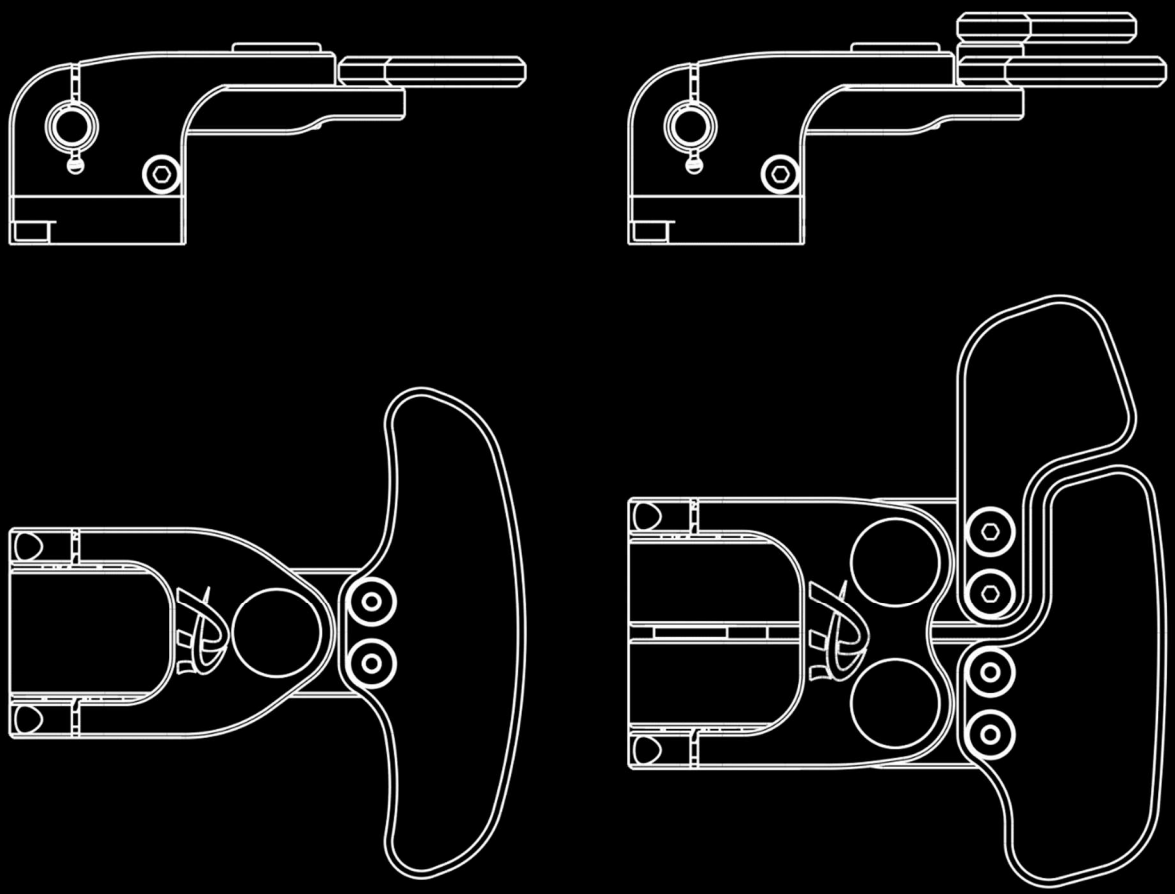
ASCHER RACING

Paddle Shifter Gen6

single & double

product manual – V1.0



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1. Safety Information

Thank you for purchasing the Ascher Racing Paddle Shifters Gen6. Please read the manual carefully before installing and using the product.

The shifters are designed to be used in competitive real racing motorsports applications in extreme environmental conditions. In order to achieve maximum reliability and durability please follow mounting and electronic connection recommendations as described in this manual.

Please note the following general safety aspects:

- **Do not unmount the sensor PCB from the shifter base — WARRANTY VOID!**
- If the shifters are exposed to rain or humidity, use gasket paper between the shifter and its mounting surface to seal the electronics.
- Do not drive any electrical consumers directly through the shifter electronics.
- Do not operate the shifters outside the temperature range -40°C to 85°C.
- If any magnetic metals may touch the shifter during operation, glue-in shifter magnets into their pockets to avoid accidental magnet removal (keep magnets' original N-S orientation).
- Do not disassemble the product beyond what is described in this product manual.
- This product is not intended for children under the age of 15 years.
- Contains small pieces – danger of swallowing!
- Keep hair, clothing and jewelry away from the product when in use.
- Only one person may use the product at any given time. Keep other persons away from the product when in use.
- Make sure the shifters are mounted securely, screws are tightened properly and secured with thread lock before use.

2. Declaration of Conformity

It's in conformity with the essential requirements and other relevant requirements of the Radio Equipment Directive (RED) (2014/53/EU).

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- this device must accept any interference received, including interference that may cause undesirable operation.

Any changes or modifications not expressly approved by KW automotive GmbH could void the user's authority to operate the equipment.

3. Box Contents

The box contains the following components and accessories:

3.1. Single Shifter

- 2 pcs Paddle Shifters (single version)
- 2 pcs connection cables: single version, 3-pin (SKU 76020030)
- paddles, depending on the product variation:
    - SKU 76080041: without paddles
    - SKU 76080042: 2 pcs Formula style paddles
    - SKU 76080043: 2 pcs GT style paddles
- 4 pcs screws to mount paddles to the shifter (DIN 7991 M3 x 8)
- 2 pcs paddle spacer – height 6mm (SKU 75120926)
- 4 pcs screws to mount paddles to the shifter using the spacer (DIN 7991 M3 x 14)

3.2. Double Shifter

- 2 pcs Paddle Shifters (double version)
- 2 pcs connection cables: double version, 4-pin (SKU 76020031)
- paddles, depending on the product variation:
    - SKU 76080044: without paddles
    - SKU 76080045: 4 pcs Formula style paddles (primary & secondary / left & right)
    - SKU 76080046: 4 pcs GT style paddles (primary & secondary / left & right)
- 8 pcs screws to mount paddles to the shifter (DIN 7991 M3 x 8)
- 4 pcs paddle spacer – height 6mm (SKU 75120926)
- 8 pcs screws to mount paddles to the shifter using the spacer (DIN 7991 M3 x 14)

4. Product Features

The Ascher Racing Paddle Shifter Gen6 are designed to offer the following features:

- magnetic snap action for precise and reliable operation
- small dimensions for ergonomic integration and lightweight design
- smooth and play free operation due to pretensioned ball bearing construction
- silenced and precise operation due to rubber bump stops
- maximum precision and reliability in harsh conditions
- contactless hall-switch operation for unlimited electrical lifetime
- no sensor calibration required (measurement of magnet N-S orientation instead of strength)
- no sensor drift during time or temperature changes — permanently fixed shifting point
- no additional signal filters required (hardware or software) due to perfect output signal
- inbuilt sensor hysteresis for precise, stable and flicker-free shifting point
- highly optimized for ultra-low power consumption to be used in battery powered devices
- no sleep modes or reduced cycle times required
- sealed electronics for waterproof operation

4.1. Electrical and Mechanical Rating

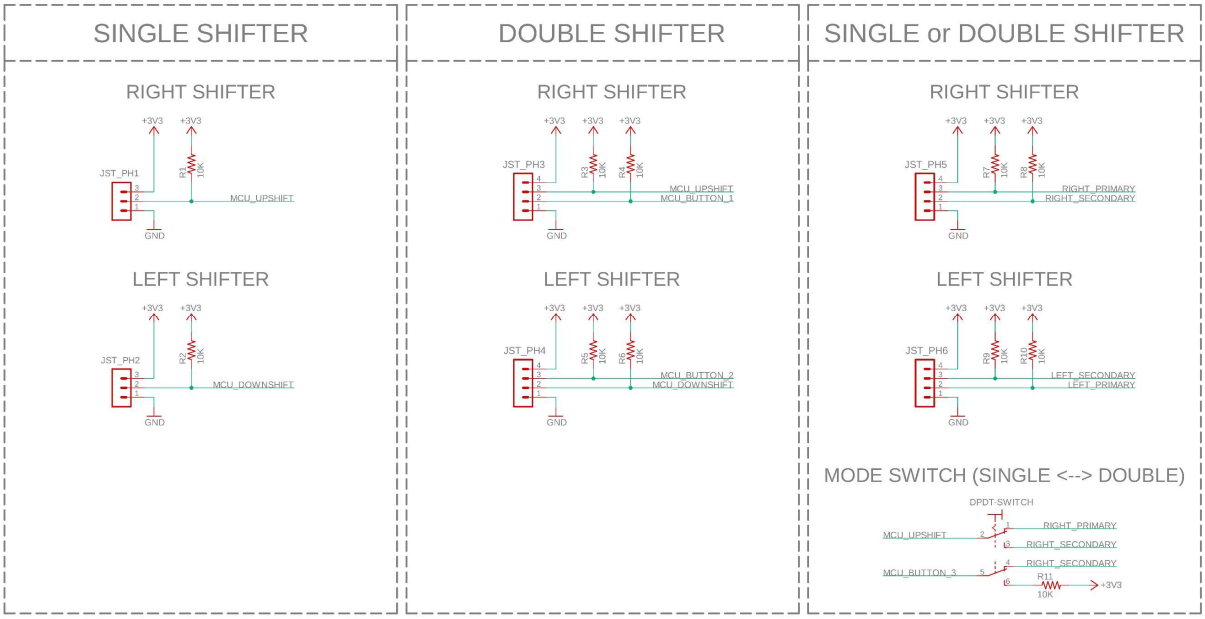
Item	Symbol	Value	Unit
power supply voltage	V_{DD}	2.7 – 5.5	V
current consumption	I_{DD}	40.0	µA
output voltage (shifter not activated)	$V_{OUT-OFF}$	V_{DD}	V
output voltage (shifter triggered)	V_{OUT-ON}	0.0	V
operating temperature	T_{OPR}	-40 — +85	°C
electrical lifetime	n_{ELEC}	unlimited	-
mechanical lifetime*	n_{MECH}	≫ 20.000.000	-
ingress protection code, IEC 60529	-	IP67**	-
mass of two single shifters w/o paddle	m_{SINGLE}	114.7	g
mass of two double shifters w/o paddles	m_{DOUBLE}	167.2	g

* mechanical lifetime test physically verified: no sign of bearing wear, increased play, change in bump stop behavior, missed or delayed shifts, sensor faults
** if gasket paper is used between the shifter and its mounting surface

4.2. Electrical Connection

The sensor output is an active-low signal (V_{DD} when shifter is not pulled, GND when activated). It's recommended to connect the shifter output as per the following schematics using pull-up resistors.

To support interchangeability between both *single and double* shifters, the *right double shifter* signals (S1 & S2) need to be swapped in order to use the large, primary paddle for upshift. Signals can be swapped with any standard DPDT switch.

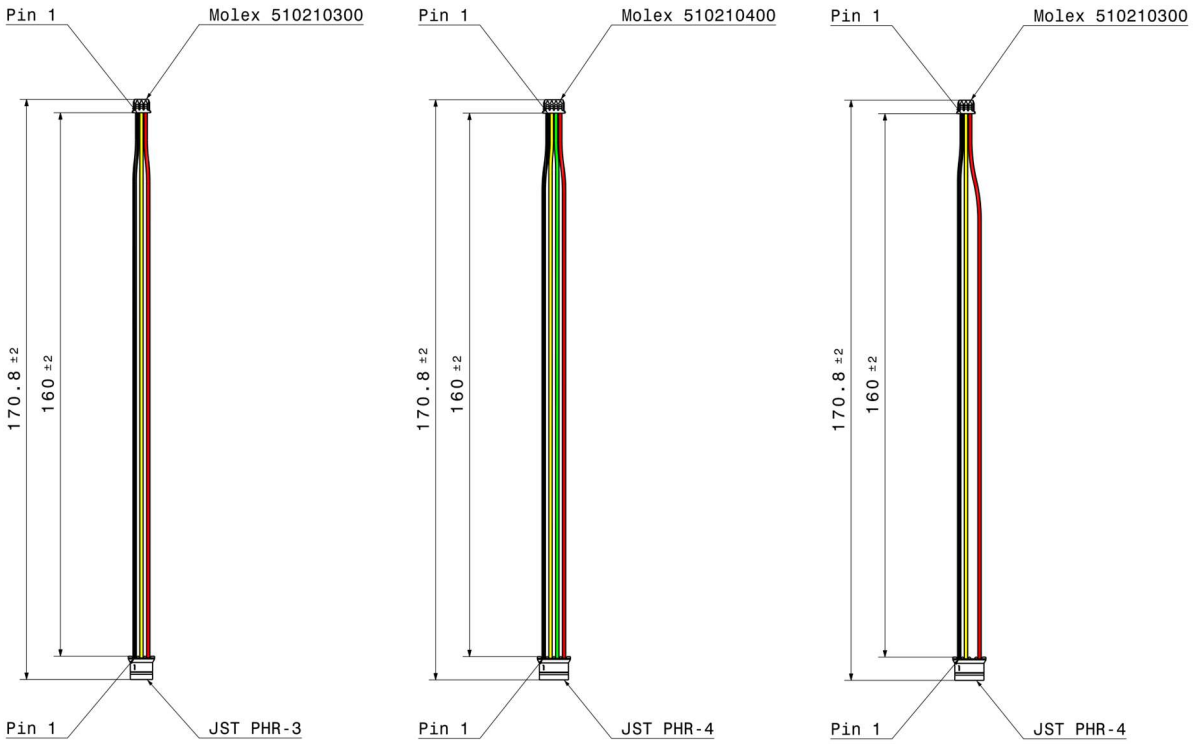


3-pin JST PH CONNECTOR:	4-pin JST PH CONNECTOR:	MODE SWITCH (any DPDT switch):
B3B-PH-K-S (through-hole type / top entry) S3B-PH-K-S (through-hole type / side entry) B3B-PH-SM4-TB (SMT type / top entry) S3B-PH-SM4-TB (SMT type / side entry)	B4B-PH-K-S (through-hole type / top entry) S4B-PH-K-S (through-hole type / side entry) B4B-PH-SM4-TB (SMT type / top entry) S4B-PH-SM4-TB (SMT type / side entry)	- single shifter connected via 4-pin "single-to-double connection cable" - right shifter signal on pin 2 - needs to be connected to MCU_UPSHIFT - PULL-UP on pin 3 to switch off input

4.3. Connection Cables

Both single and double shifters come with their corresponding 3-pin (single) or 4-pin (double) connection cables. In order to connect the single paddle shifter to a 4-pin JST PH connector (to support both single and double shifter modes) the *single-to-double* connection cable (76020032) is required which is available separately.

The cable dimensions are as follows:



76020030
single

76020031
double

76020032
single-to-double

4.4. Pinout

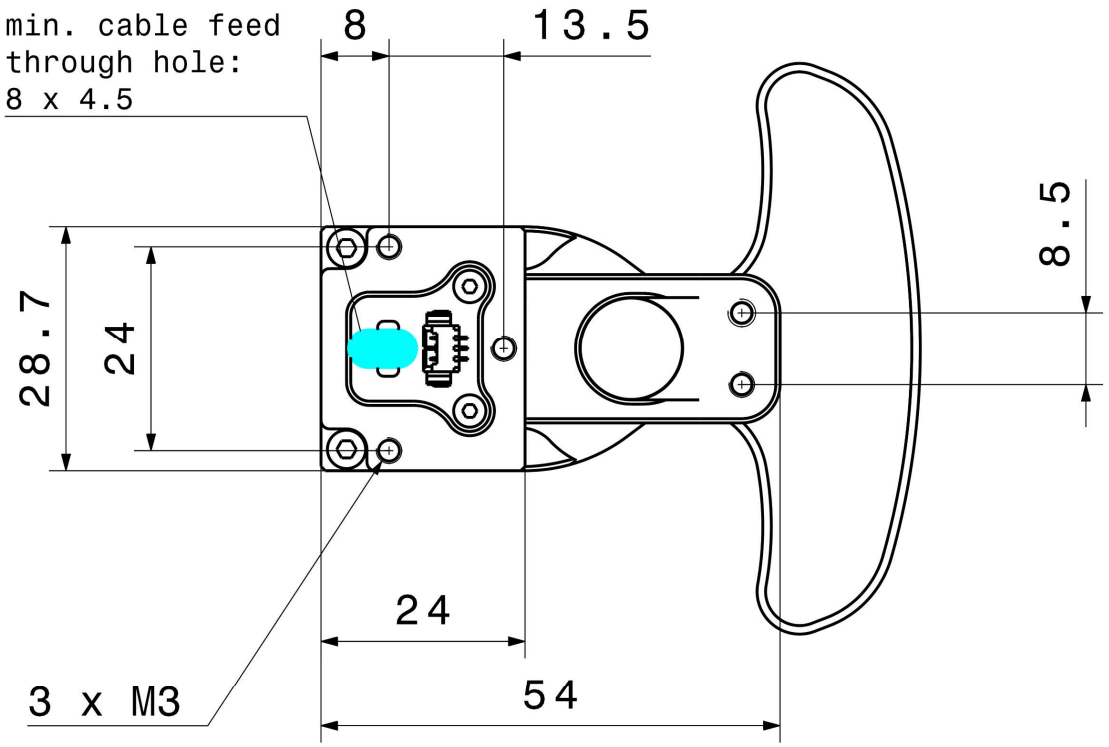
The connection cables are terminated with a JST PHR connector, using the following color-coded pinout.

JST PHR	SINGLE	DOUBLE	S-to-D
PIN 1	GND	GND	GND
PIN 2	S1	S1	S1
PIN 3	V_{DD}	S2	-
PIN 4	n/a	V_{DD}	V_{DD}

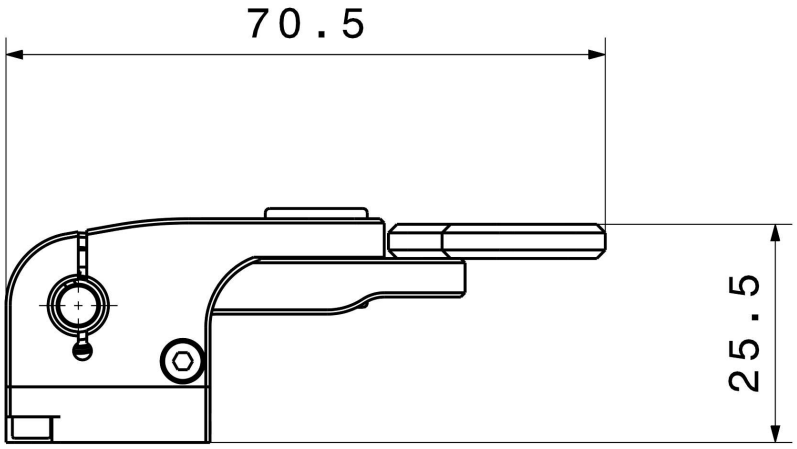
5. Dimensions and mounting hole pattern

Both single and double paddle shifters are mechanically interchangeable due to the very same mounting hole pattern. Electronic interchangeability can be achieved as shown in section 4.2 and 4.3.

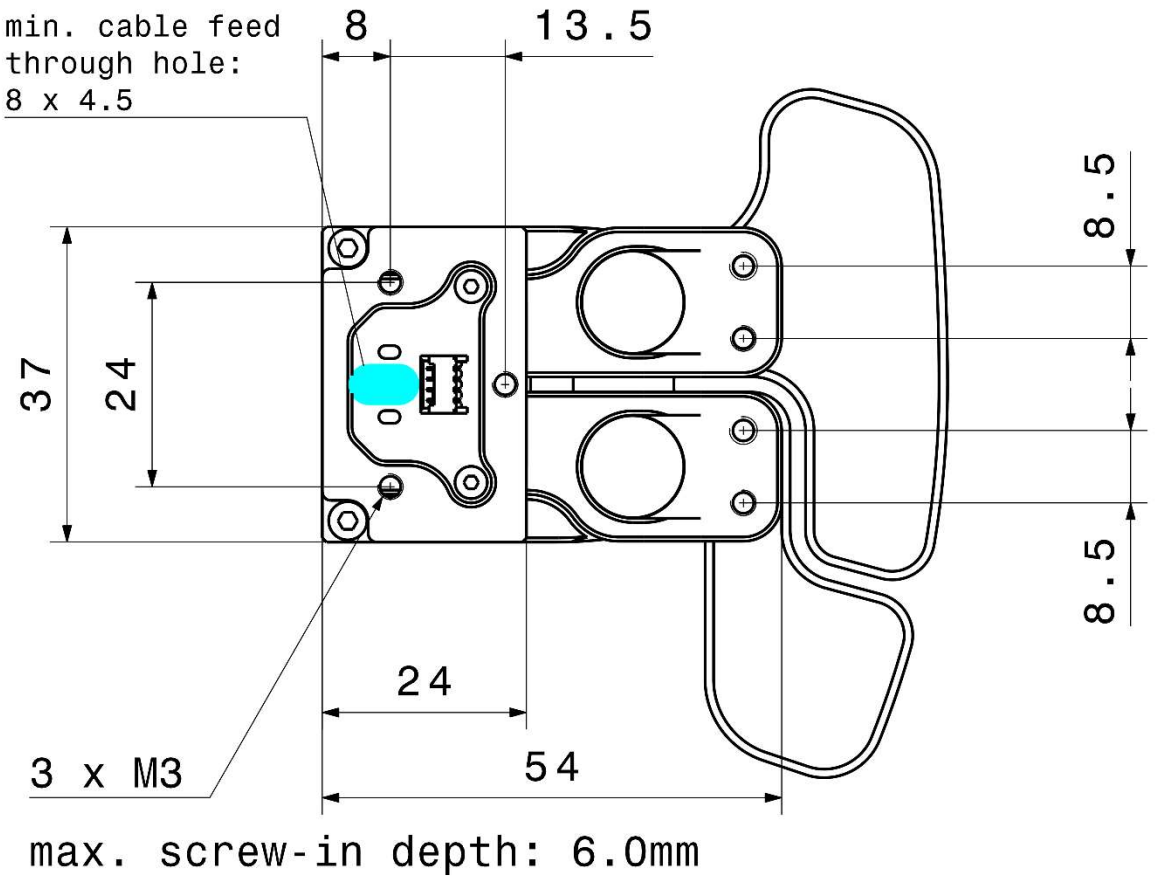
5.1. Single Shifter

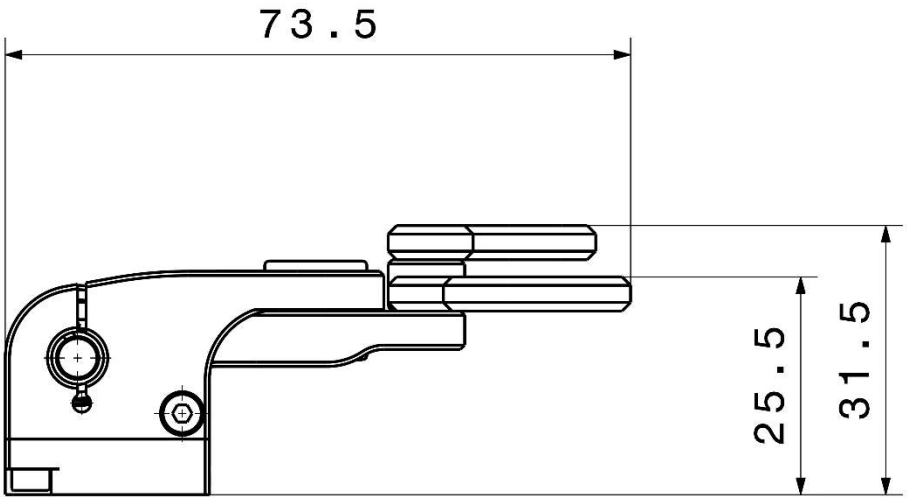


max. screw-in depth: 6.0mm



5.2. Double Shifter





6. Shifter Activation Point

It's highly recommended to not perform any adjustments if not instructed by product support!

The activation point is set by factory to the middle of the paddle throw and does not need any modification, calibration or adjustment over time. The adjustment screw is secured with thread lock. Due to the high sensitivity of the sensor mechanism the shifting point grub screw is set-up precisely to a tolerance of 1/8 turn. Turning the grub screw *inwards* results in an *earlier* activation point.

7. Bump Stop Replacement

Both top and bottom rubber bump stops can be replaced easily in case of any unforeseen damage. In order to freely access them, separate the top shifter assembly from the bottom part. Unscrew both M2.5 screws on the bottom as well as both M2.5 screws on the side using a 2mm hex wrench.

Never unmount the sensor PCB as this will lose the shifter activation point and void the warranty!

Unmounting the shifter from its base will not lose the activation point — it will stay the same after assembly. Furthermore, it's not required to unmount the shaft and lever arm from the top assembly.

Carefully swing the lever arm to separate magnets and freely access the top bump stop. Carefully remove both magnets first by using additional magnets placed on top. In case of glued-in magnets, swing the lever arm and separate magnets.

Remember the magnet N-S orientation and put them back in the same orientation. If the activation point changed slightly after reassembly, magnets might be installed in wrong orientation.

Remove old rubber bump stops, any remaining adhesive and clean the surface to remove any oil or grease. Apply new bump stops by removing only the bottom paper covering the adhesive film. It's absolutely necessary to **keep the protective film on the top side of the rubber** to prevent the paddle from sticking and compromising shifter precision.

For reassembly, apply Loctite 243 to all screws and proceed in the following order:

1) put together top and bottom shifter part
2) apply force so that the top assembly touches the bottom (front part/ bump stop side)
3) insert and tighten both M2.5 screws from the *side* (torque = 0.8Nm)
4) insert and tighten both M2.5 screws from the *bottom* (torque = 0.8Nm)

Contact support for replacement rubber bump stops:

Single Shifter:

- 2 pcs 75130200 (Shifter_Gen6_single_rubber_top)
- 2 pcs 75130201 (Shifter_Gen6_single_rubber_bottom)

Double Shifter:

- 2 pcs 75130202 (Shifter_Gen6_double_rubber_top)
- 2 pcs 75130203 (Shifter_Gen6_double_rubber_bottom)