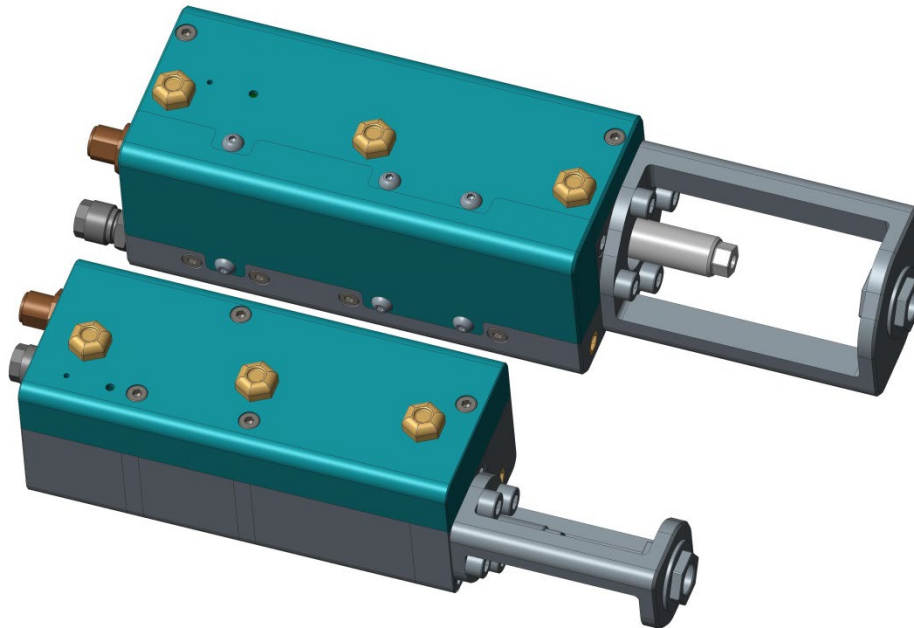


H Pattern Gearbox Actuator



Features

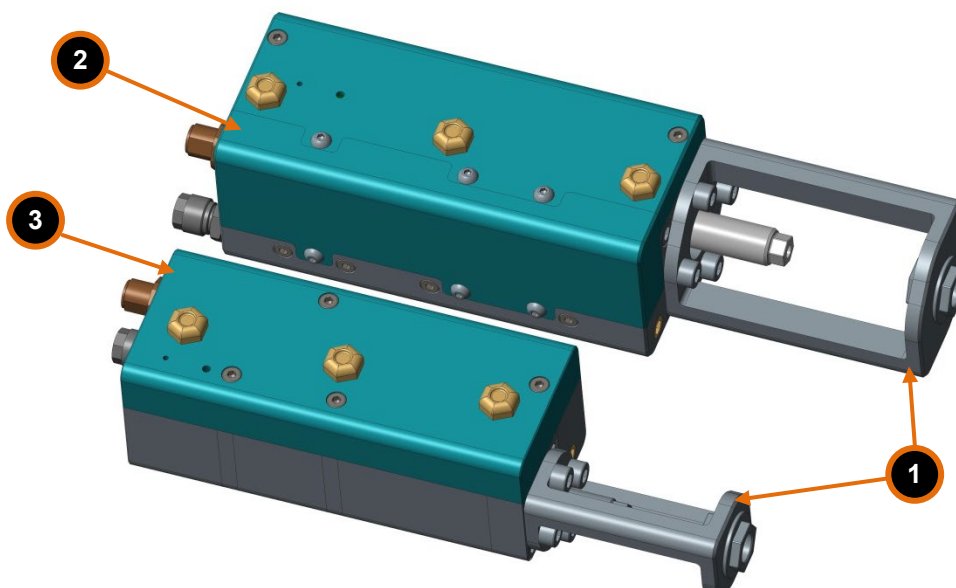
- Pneumatically operated actuators for H pattern gearbox
- Integrated high speed valves
- Integrated position sensor
- 3 position - 40mm diameter (adjustable stroke for each position – max 32/64mm)
- 4 position – 25mm diameter (adjustable stroke for each position – max 13/26/39mm)
- 1000N push and 890N pull force @ 8 bar (40mm)
- Only weights 1100g (25mm)

Technical specifications

Dimensions L x W x H	Ø40 ... 261 x 70 x 63 mm	
	Ø25 ... 226 x 62 x 50 mm	
Weight	Ø40 ... 1600 g	
	Ø25 ... 1100 g	
Operating temperature	-20 ... 80°C	
Operating pressure	6 ... 9 Bar	
Voltage	12 V	
Max stroke (adjustable)	Ø40 ... 32/64 mm	
	Ø25 ... 13/26/39 mm	
Operating force [8 Bar]	Ø40 Push	1000 N
	Ø40 Pull	890 N
	Ø25 Push	400 N
	Ø25 Pull	300 N
Pneumatic fitting	Pneumatic tube 8/6 mm	

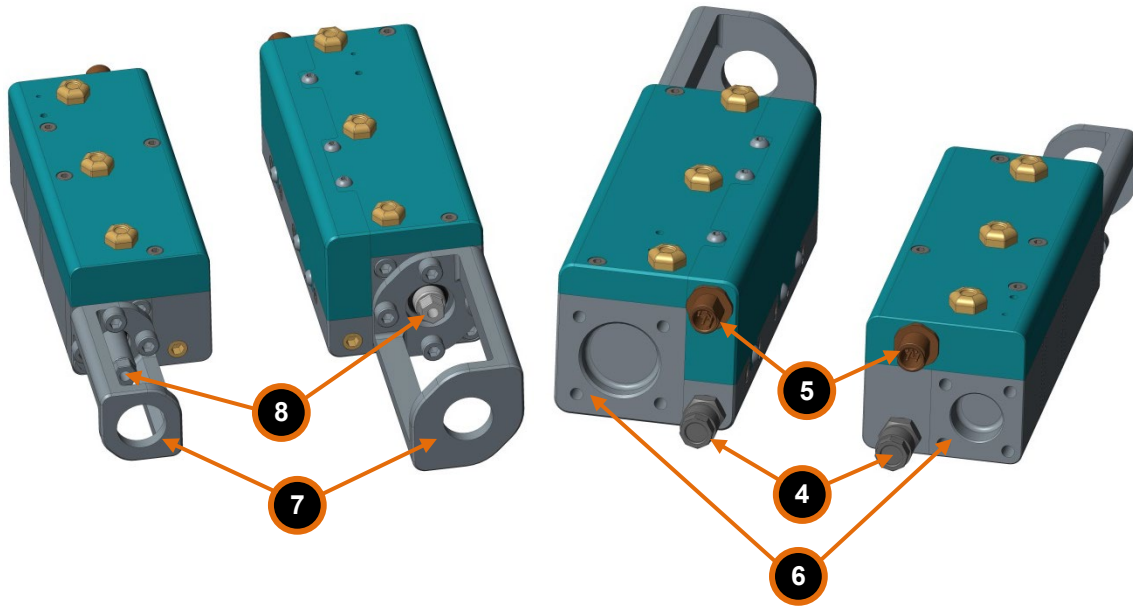
Included in the kit

- ① Shift cable mounting bracket
- ② Ø40 mm gearbox actuator with 3 positions for vertical movements (for in/out of the gear)
- ③ Ø25 mm gearbox actuator with 4 positions for horizontal movements (for selecting gear pair)
Connector



Connection Diagram

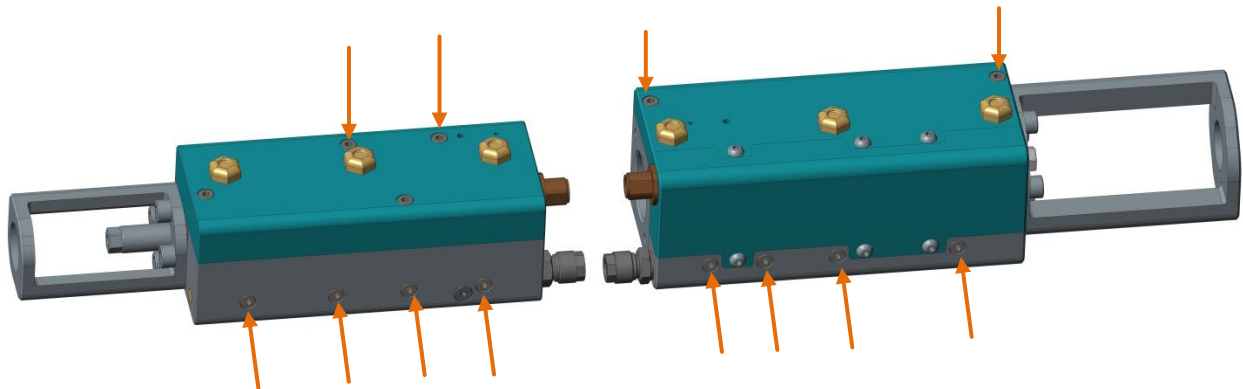
- ④ Air supply (Ø 8 mm pneumatic pipe).
- ⑤ Electrical connector
- ⑥ Mounting holes (for dimensions see technical drawing).
- ⑦ Shift cable mounting bracket
- ⑧ Shift cable



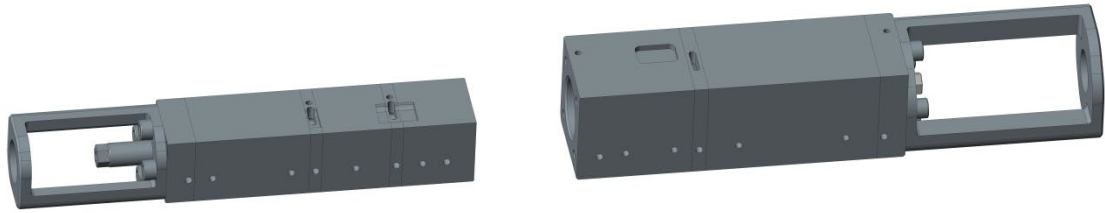
Adjusting the travel

Travel is adjusted by adding or removing washers and it is usually pre-adjusted for your specific car. You can also adjust the travel yourself.

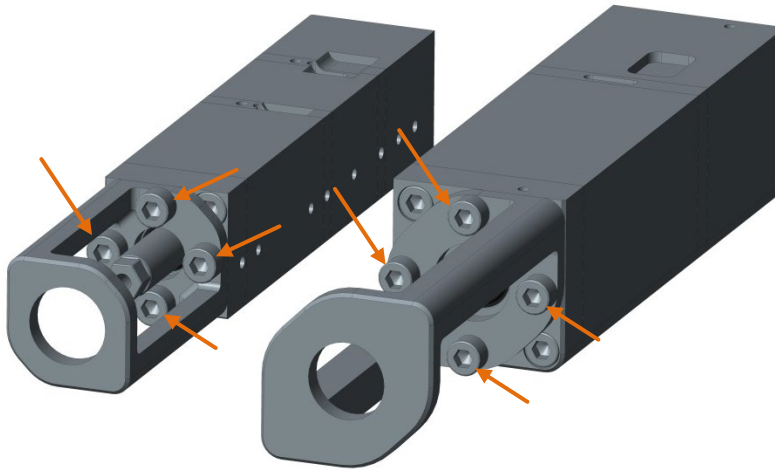
1. Unscrew marked screws. Unplug air and electrical supply before unscrewing. Do not remove other screws because you could damage the actuators.



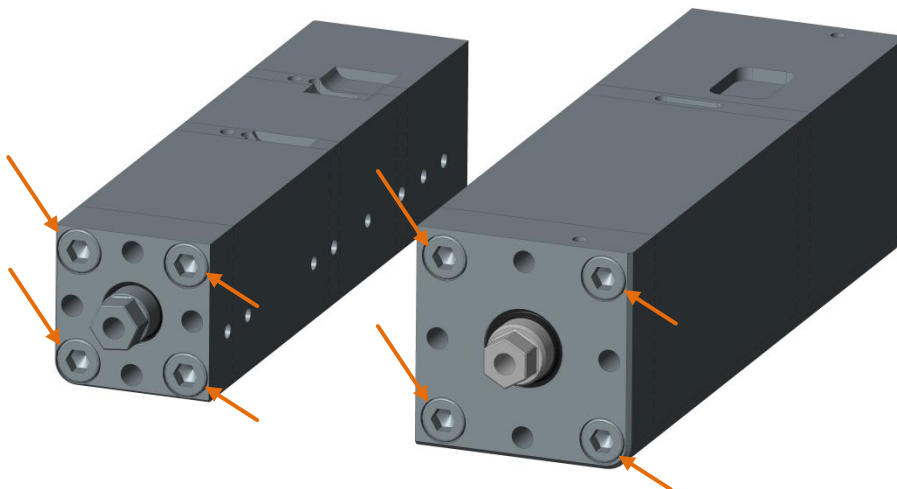
2. Remove cover with valve block from actuator.



3. Unscrew 4 screws from both actuators and remove bracket for shift cable.

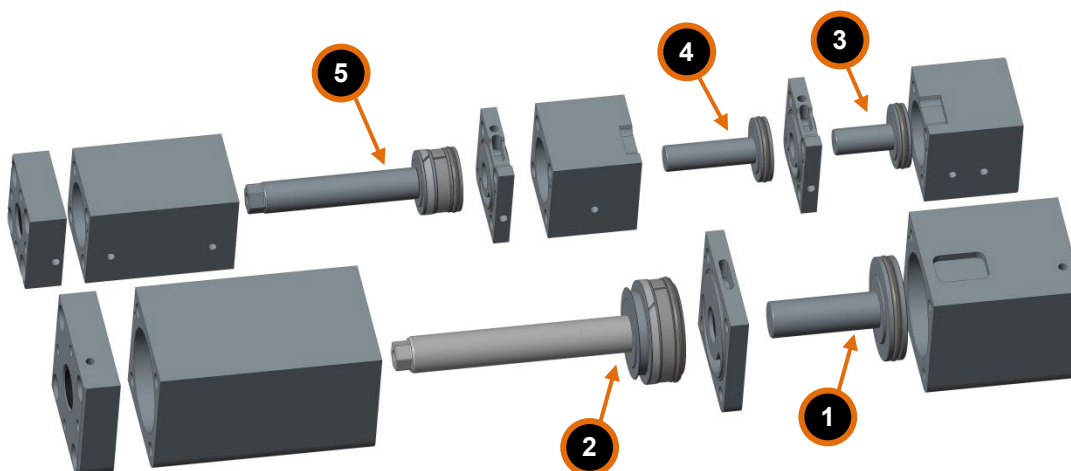


4. Unscrew 4 screws from both actuators.



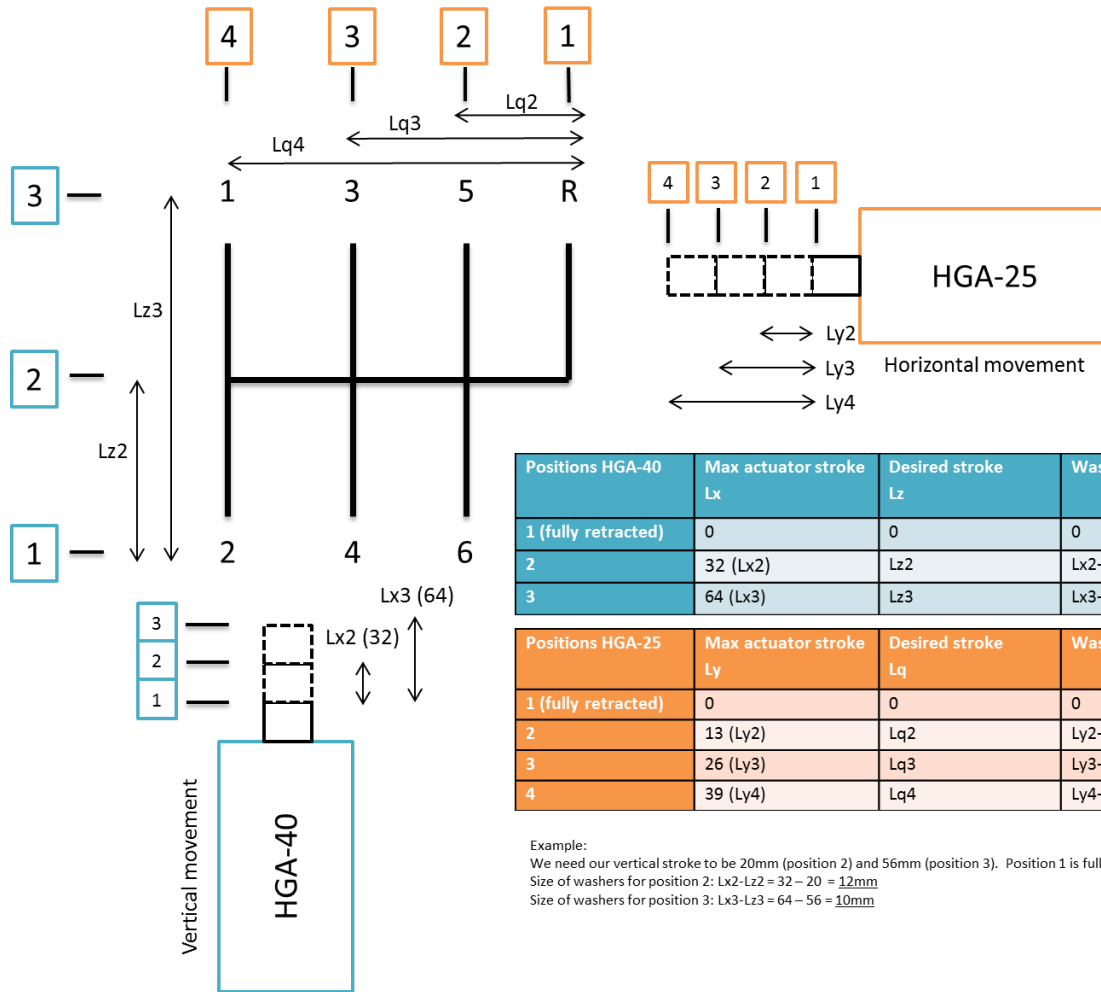
5. Carefully disassemble the actuators. Take care of all seals and actuator lubrications. Add or remove washers on each piston rod, to shorten/extend stroke for each positions. See chapter “Stroke/Washer calculation” in the bottom.

- ① washer location for adjusting position 2 of vertical actuator
- ② washer location for adjusting position 3 of vertical actuator
- ③ washer location for adjusting position 2 of horizontal actuator
- ④ washer location for adjusting position 3 of horizontal actuator
- ⑤ washer location for adjusting position 4 of horizontal actuator



6. Assemble the cylinder back. Take care of all the seals – must be lubricated. Check the lubrication when assembling the actuator. Please refer to “General Service/Mounting Rules”.

Stroke calculator



Positions HGA-40	Max actuator stroke Lx	Desired stroke Lz	Washers required
1 (fully retracted)	0	0	0
2	32 (Lx2)	Lz2	Lx2-Lz2
3	64 (Lx3)	Lz3	Lx3-Ly3

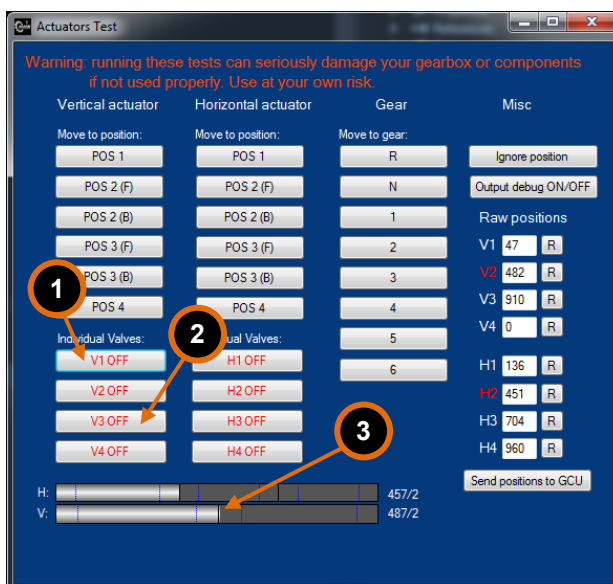
Positions HGA-25	Max actuator stroke Ly	Desired stroke Lq	Washers required
1 (fully retracted)	0	0	0
2	13 (Ly2)	Lq2	Ly2-Lq2
3	26 (Ly3)	Lq3	Ly3-Lq3
4	39 (Ly4)	Lq4	Ly4-Lq4

Example:
 We need our vertical stroke to be 20mm (position 2) and 56mm (position 3). Position 1 is fully retracted.
 Size of washers for position 2: $Lx2-Lz2 = 32 - 20 = 12mm$
 Size of washers for position 3: $Lx3-Lz3 = 64 - 56 = 10mm$

Adjusting the cables

Example here shows 01E gearbox, but same rules apply to all cable gearboxes. Instructions assume that cables travels for each positions have already been adjusted. Please note that this procedure is for one actuator only (vertical, that is in and out of the gear actuator in our example). You need to do the same for other actuator as well.

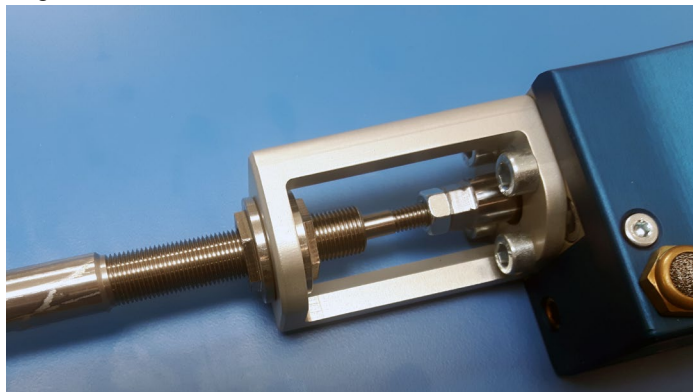
1. With cables installed on the gearbox, manually shift the gearbox to neutral. Actuator cable should be disconnected.
2. Go to the GCU Software. Click “Test” on the right/bottom side under General/Sensors tab. Shift the actuator to neutral position (01E has neutral position at vertical 2). Click V1 ① and V3 ② (in this order) located under Individual valves section. This should move the actuator to middle position ③ (position 2). This position is referred to as a center later in the document.



3. Actuator is now locked. Connect the cable to the actuator and tighten the M6 nut (M12 is not tightened). You can do this by rotating the actuator or rotating the actuator rod. Rod will be unable to rotate if the actuator is locked. To unlock it, press V3 and V1 (in this order) to unlock it. Lock it back (V1 + V3 in this order) once you have it connected.



- Gently tighten the M12 nut without moving the bowden cable. Just let it position itself. Moving the bowden cable will also change the cable center so if you move the bowden too much, this will need to be adjusted again.



- Unlock the actuator by clicking the V3 and V1 under the test window (in this order).
- Using your hand try to move the cable at the actuator gently in and out to, while watching the position in the software. If cable is properly centered, you should get same movement left and right over the center. If not, untighten the M6 nut and move the cable in direction needed and tighten it back. Do this until the cable is perfectly centered and that cable moves evenly left and right over the center.

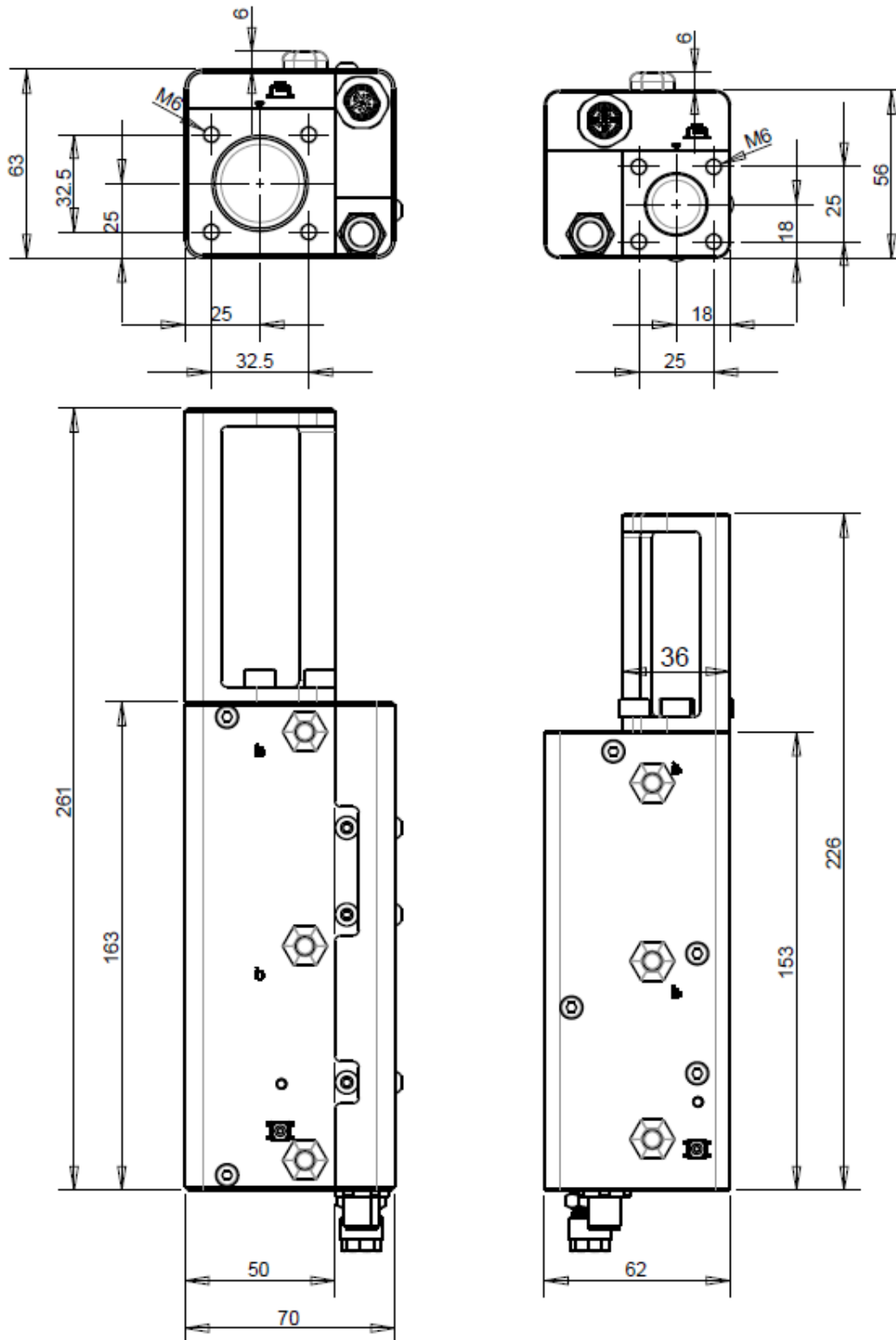


Actuators Test

Warning: running these tests can seriously damage your gearbox or components if not used properly. Use at your own risk.

Vertical actuator	Horizontal actuator	Gear	Misc
Move to position:	Move to position:	Move to gear:	Ignore position
POS 1	POS 1	R	
POS 2 (F)	POS 2 (F)	N	Output debug ON/OFF
POS 2 (B)	POS 2 (B)	1	Raw positions
POS 3 (F)	POS 3 (F)	2	V1 47 R
POS 3 (B)	POS 3 (B)	3	V2 482 R
POS 4	POS 4	4	V3 810 R
		5	V4 0 R
Individual Valves:	Individual Valves:	6	H1 136 R
V1 OFF	H1 OFF		H2 451 R
V2 OFF	H2 OFF		H3 704 R
V3 OFF	H3 OFF		H4 960 R
V4 OFF	H4 OFF		
			Send positions to GCU
H: <input type="text" value="457/2"/>			
V: <input type="text" value="487/2"/>			

Technical drawing



Servicing

The gear actuator must be re-assembled once a year (remove piston from cylinder) cleaned and lubricated. Cylinder can be cleaned outside and inside with brake cleaner or gasoline (not nitro). Seals, bushing and internal cylinder bore must be lubricated with FESTO grease LUB-KB1-SILIKONFREI-20ML.

Replace G1/8 silencer on the actuator with new one once a year.