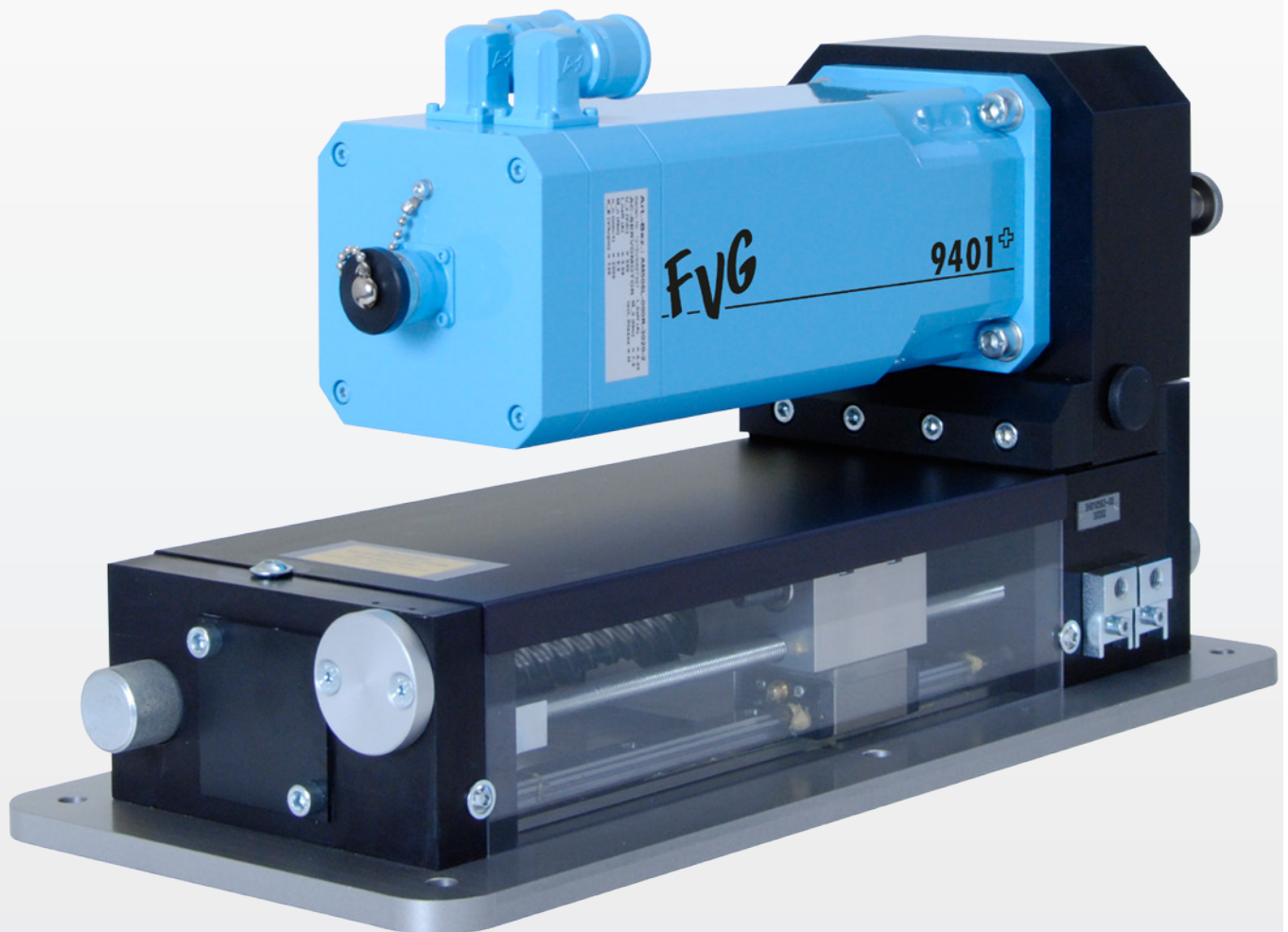


Regulation Unit FVG9401⁺

Versatile regulation unit for throttle valves,
injection pumps, accelerator pedals and
automatic gearboxes



Regulation Unit FVG9401+

The regulation unit FVG9401+ is a versatile linear actuator to operate throttle valves and injection pumps of internal combustion engines, as well as selector levers of automatic gearboxes and potentiometric pedal set-point adjusters.

The system consist of a highly precise actuator with a maintenance-free servo drive and a compact control and power electronics unit.

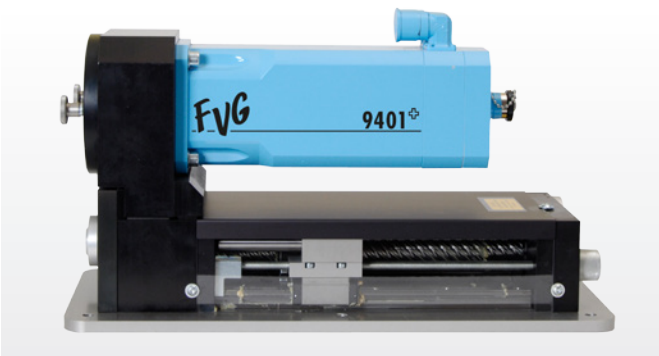


Main features

- Max. shifting travel: 180mm
- Max. shifting force: 700 N (2000 N temporarily)
- Max. shifting speed: 1.6 m/s
- Resolution and repetitive accuracy: $<\pm 0.05$ mm
- Absolute position measuring
- Push- and pull operation by 2 connection points
- Limitation of shifting force
- Connectable reset function with direction of action to be selected
- Extended Safety functions:
2-channel emergency stop and STO function
Optional Safely-Limited Speed (SLS)

Benefits and advantages

- Maintenance-free, convection cooled servocontrolled drive
- Mechanical coupling via FLEXBALL® cable or steel rod
- Adjustable mechanical stops
- Automatic set-point standardization
- Different modes of operation selectable by configuration menu
- Comfortable software module to operate selector levers of automatic gearboxes
- Standard delivery scope includes selectable language modules in English, French or German



The actuator

The actuator

The actuator of the regulation unit FVG9401+ includes a brushless servomotor and mechanical coupling, alternatively by FLEXBALL® cable or by steel rod.



Version with front panel

Version with front panel

The power- and control electronics are mounted in a 3 RU- 19"-rack. The operation is supported by a large LC-display and a suitable keyboard at the front panel. The rack design allows e.g. the installation even in a 600 mm wide switch cabinet.



Version with status code display

Version with status code display

A 3-digit status code display indicates every operating condition. The device is operated and set up through the test bench control or a Miniterminal (MT1). Connecting an external hand terminal (HT9201) allows the use of all operating and diagnostic functions.

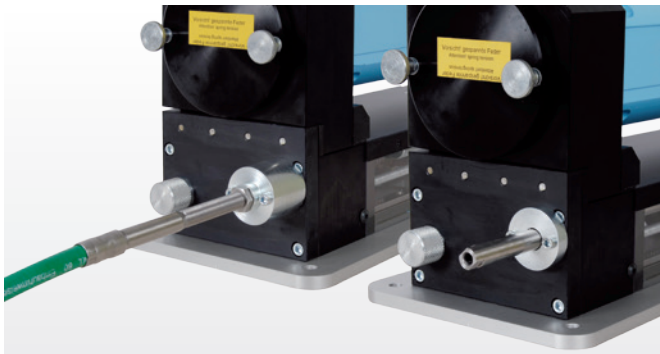


LC-display with suitable keyboard

The operation

Operation and setting-up are supported by a large LC-display with background lighting and a suitable keyboard at the front panel. The control panel and the converter rack can be placed separately at different locations.

Options and accessories for the Regulation Unit FVG9401+



Flexball® cable or steel rod

Flexball® cable or steel rod

The variable mechanical design offers a two-sided, mirrorsymmetrical coupling possibility for the FLEXBALL® cable or the steel rod. In addition it is possible to change the direction of action for both the actuator and the mechanical retraction equipment.



Force measuring

Force measuring

The optional force measuring equipment is sensing the actuation force directly at the coupling point and makes it available as analog voltage.



Connection for Miniterminal MT1

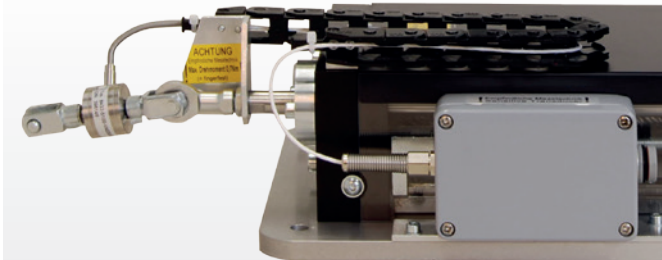
Connection for Miniterminal MT1

The Miniterminal MT1 which is available as an accessory can be plugged directly to the actuator without additional cabling. This allows the operator a direct view to the actuator or coupling point for all setting work.

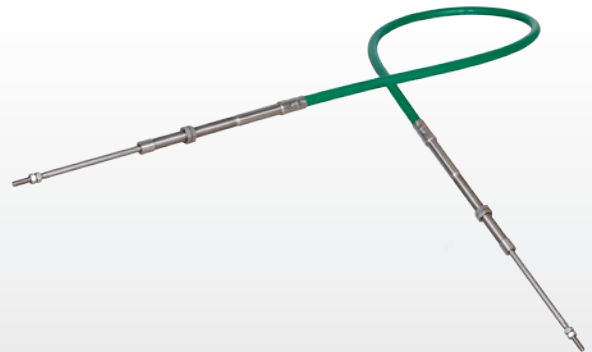
More options

- Maximum force input and actual value output of force (each potential free)
- Connection possibility of potentiometric pedal set-point adjusters at the regulation unit
- CAN-Interface
- Fieldbus connections via external modules
- Force measuring
- Version for high-speed operation

Accessories



External precision load cell



Flexball® cable type DZ60



Hand terminal HT9201



Miniterminal MT1



One hand grease press inclusive grease filling

Data sheet for the Regulation Unit FVG9401⁺

Actuator (Standard version)

Linear positioning unit with integrated brushless, convection cooled servomotor, absolute travel measuring system and mechanical reset function.			
Dimensions:	450 mm x 200 mm x 231 mm (L x W x H)		
Weight:	22kg		
Protection:	IP54		
Shifting travel:	180mm		
Shifting force (Ta ≤ 70 °C):	500N (static) 2000N (temporarily: 10sec./4% duty cycle)		
Shifting force (Ta ≤ 40 °C):	700N (static) 2000N (temporarily: 10sec./4% duty cycle)		
Shifting force with FLEXBALL® cable DZ60, 1.5m	Travel	Push forces	Pull forces
	160mm	500N	1250N
	180mm	350N	850N
Shifting speed:	1.6m/s max.		
Resolution (actual travel value) and repetitive accuracy:	<± 0.05mm		
Reset function			
Restoring force:	80N		
Reset time for distance of 100mm:	<500ms		

Temperature range actuator

Admissible range for the standard version:	-20 °C up to max. +70 °C (No condensing humidity allowed)
Option:	-40 °C up to max. +70 °C

Electronics

Control and power unit as a 3RU-19" rack. IGBT-converter for the servomotor. LC-display and keyboard at the front panel for operation of the FVG9401 ⁺ . The front panel of the power and control panel is removable.	
Dimensions:	482.6 mm x 307 mm x 3 RU (L x W (without plugs) x H)
Weight:	13kg
Protection:	IP20

Temperature range electronics

Admissible range:	0 °C up to max. +40 °C (No condensing humidity allowed)
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Software

The standard software for operating the FVG9401+ has the following essential features:	
- Operation of the FVG9401+ with	- Analog interface - Binary inputs - Hand terminal - Serial interface (RS232) - Option: CAN (potential free)
- Manual or automatic set-up	
- Max. 32 parameter sets can be stored for the modes of operation accelerator pedal, selector lever or pedal set-point adjuster	
- Diagnostic functions	
- German, English or French language module	

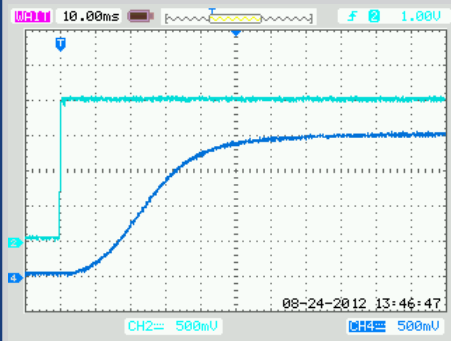
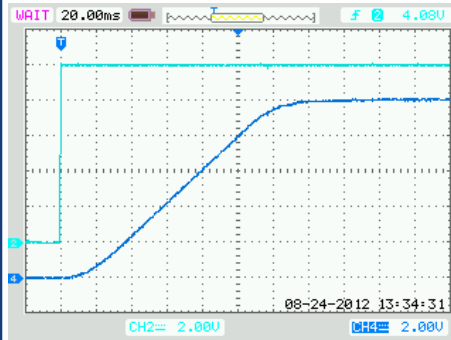
Interfaces to peripheral units

Binary signals	
Relay contact outputs:	50V/100mA
Optocoupler inputs:	15V up to 24V
Plug-in connection:	Phoenix MC 1.5/16-STF-3.81
Analog interfaces	
Analog outputs:	0 up to $\pm 10V$ /max. 5mA
Analog inputs:	0 up to 10V/ $> 20k\Omega$ (each potential free)
Plug-in connection:	Phoenix MC 1.5/16-STF-3.81
Serial interfaces	
Type:	RS232 (potential free)
Plug-in connection:	D-Sub-9
External connection for hand terminal	
Type:	RS422
Plug-in connection:	D-Sub-15
Connection for Miniterminal MT1	
Plug-in connection:	Push-Pull

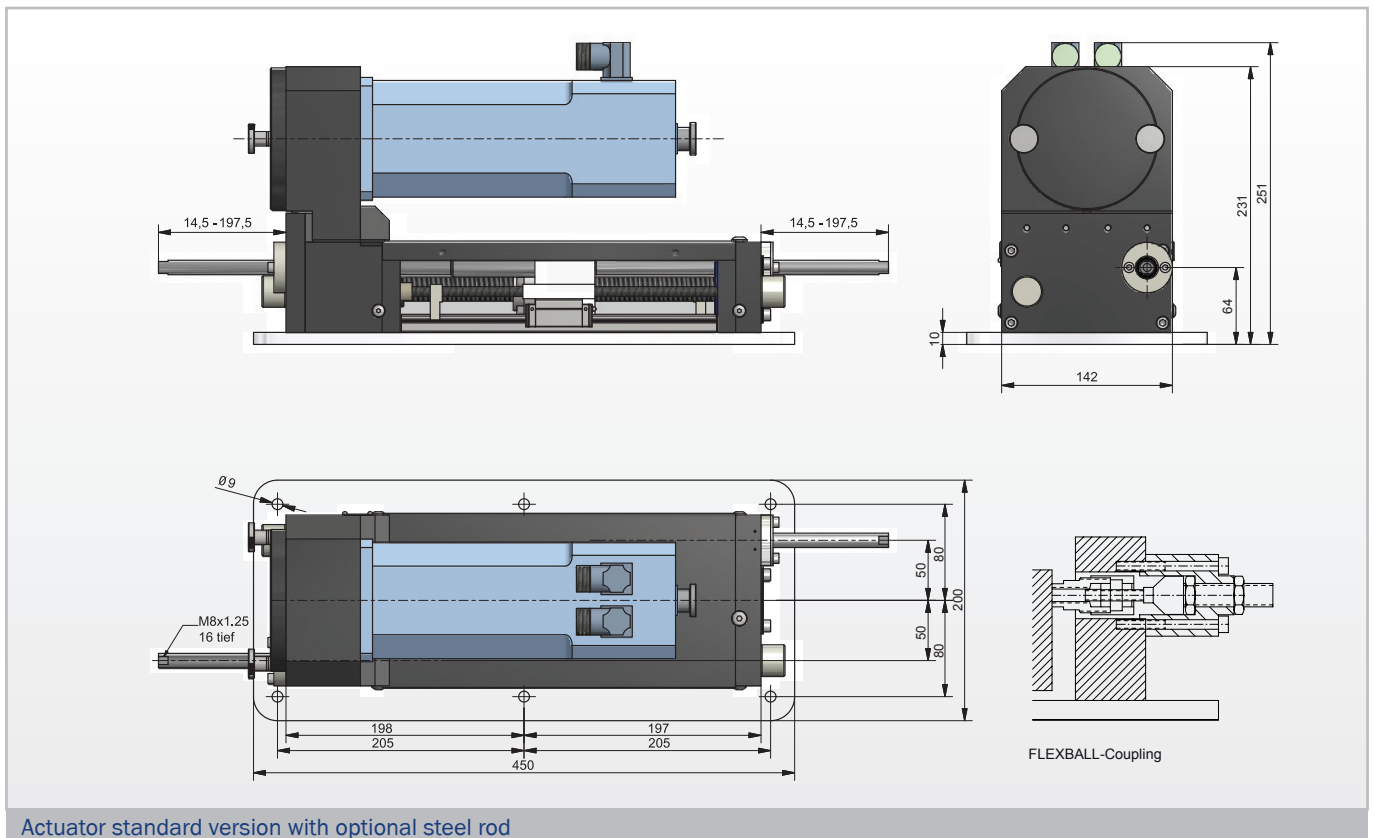
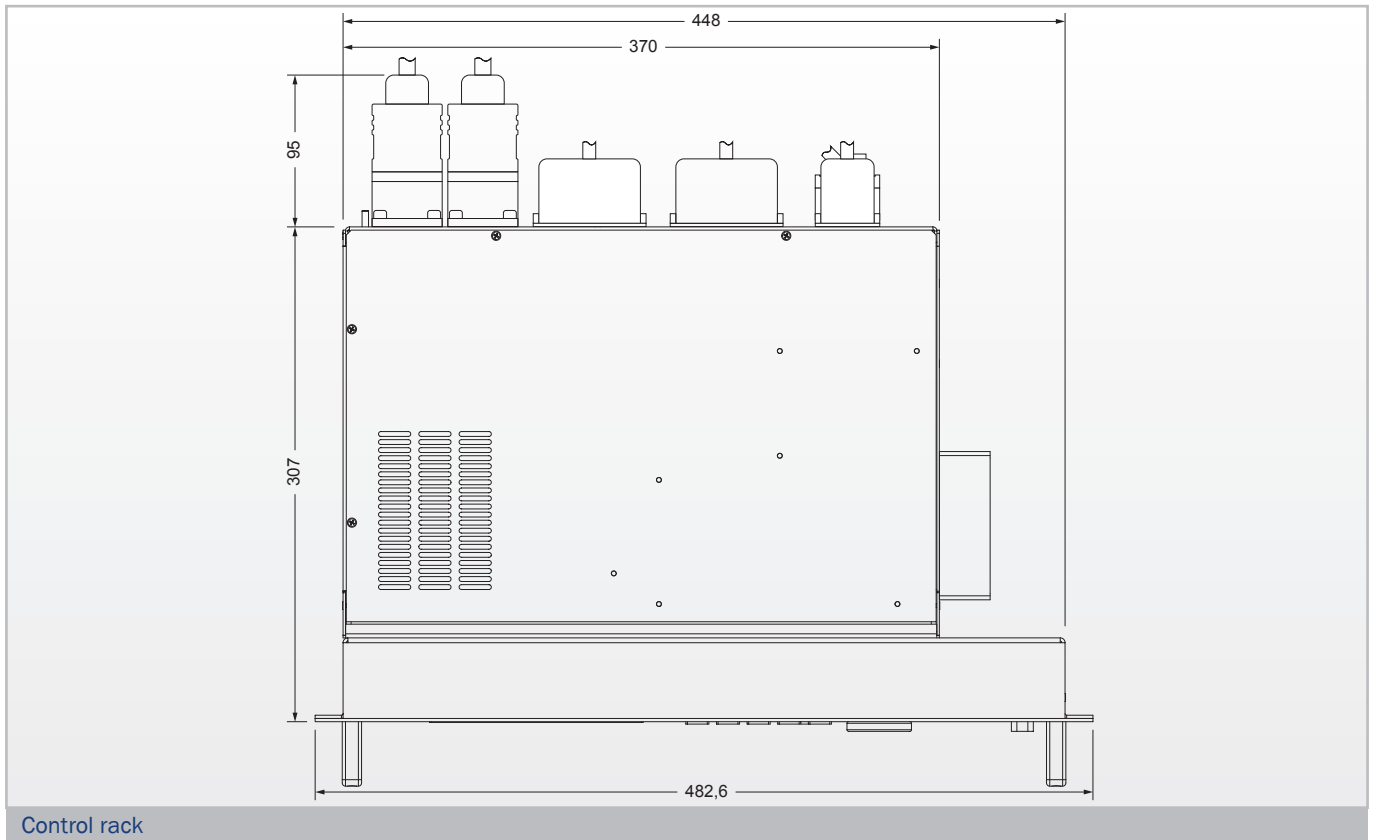
Power supply

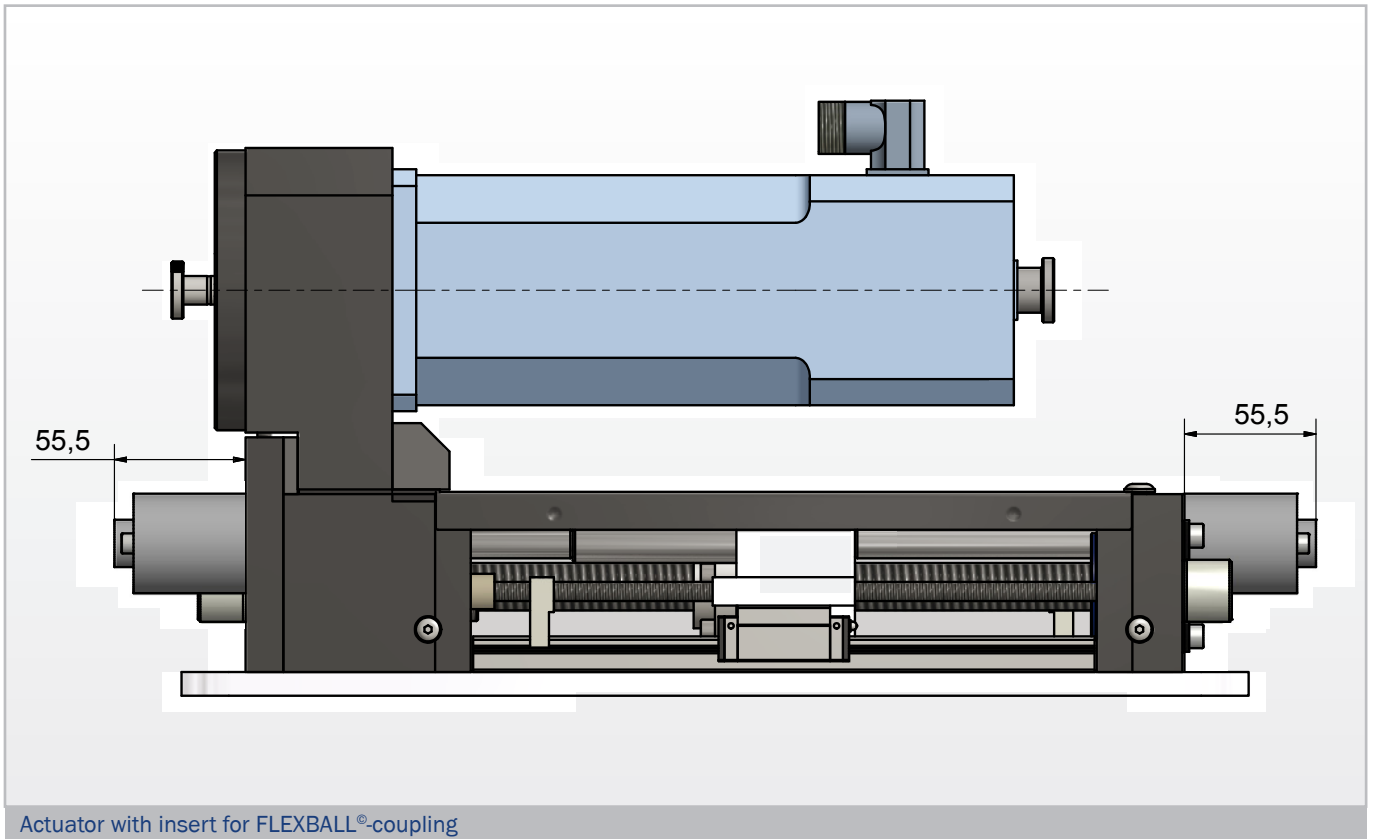
Rated voltage:	3/PE AC 380V ... 480V $\pm 10\%$
Frequency:	50 ... 60Hz
Installed load:	1.4kVA
Plug-in connection:	6-poles connector pair

Control response

Set-shifting travel:	180 mm
Shifting force:	400 N
Actual travel:	10V \equiv 100% \equiv 180 mm
Measuring instrument:	Storage oscilloscope 1GS/s, 100MHz
	Set-point: 20% \equiv 32mm
	Set-point: 100% \equiv 180mm

Dimensions for the Regulation Unit FVG9401+





Actuator with insert for FLEXBALL[®]-coupling

Order information for the Regulation Unit FVG9401⁺

1. Regulation Unit FVG9401⁺

Order information	
1.1	Regulation unit type FVG9401 ⁺ (travel 180 mm) with control panel, standard version without inserts, incl. all connector pairs and technical manual
1.2	Regulation unit type FVG9401 ⁺ (travel 180 mm) with status code display, standard version without inserts, incl. all connector pairs and technical manual

2. Options:

Order information	
2.1	Extended temperature range for the standard version actuator -40 °C up to +70 °C
2.2	Force measuring with potential free analog output of actual force
2.3	Input maximum force and output value for force (each analog and potential free)
2.4	Field bus connection Profibus DP (external module)
2.5	Field bus connection CAN
2.6	Foreign language module

3. Accessories:

Order information	
3.1	Steel rod with insert for version without force measuring, 180mm travel
3.2	FLEXBALL [®] cable insert for version without force measuring
3.3	FLEXBALL [®] cable type DZ60, 1.5m, 180mm travel
3.4	FLEXBALL [®] cable type DZ60, customized length
3.5	Miniterminal MT1 incl. connection cable, 1.5 m and connector
3.6	Hand terminal HT9201 incl. connection cable, 3 m and connector
3.7	One hand grease press. incl. grease filling (370 g) for the extended temperature range standard temperature - 40 °C ... + 70 °C
3.8	Grease refill tube (370 g) for the temperature range - 40 °C up to + 70 °C
3.9	Spare filter insert for control panel

* FLEXBALL[®] is a registered trademark of the Company DURA Deutschland GmbH

4. Cables:

Order information	
4.1	Connection cable set between control rack and actuator, length 15 m
4.2	Connection cable set between control rack and actuator, length 20 m
4.3	Connection cable set between control rack and actuator, customized length

5. Service:

Order information	
5.1	Installation and commissioning of FVG9401* into electronic cabinet (electronic cabinet not included)



Dr.-Ing. S. Haußmann Industrieelektronik
Ingenieurbüro Dr.-Ing. S. Haußmann

Beutwang 4
72622 Nürtingen
Germany

Phone: +49 7022 9565-0
Fax: +49 7022 9565-501

sales@sh-el.de
www.sh-el.de



QM-System
ISO9001:2015