

Gearshift Equipment GSE9801⁺

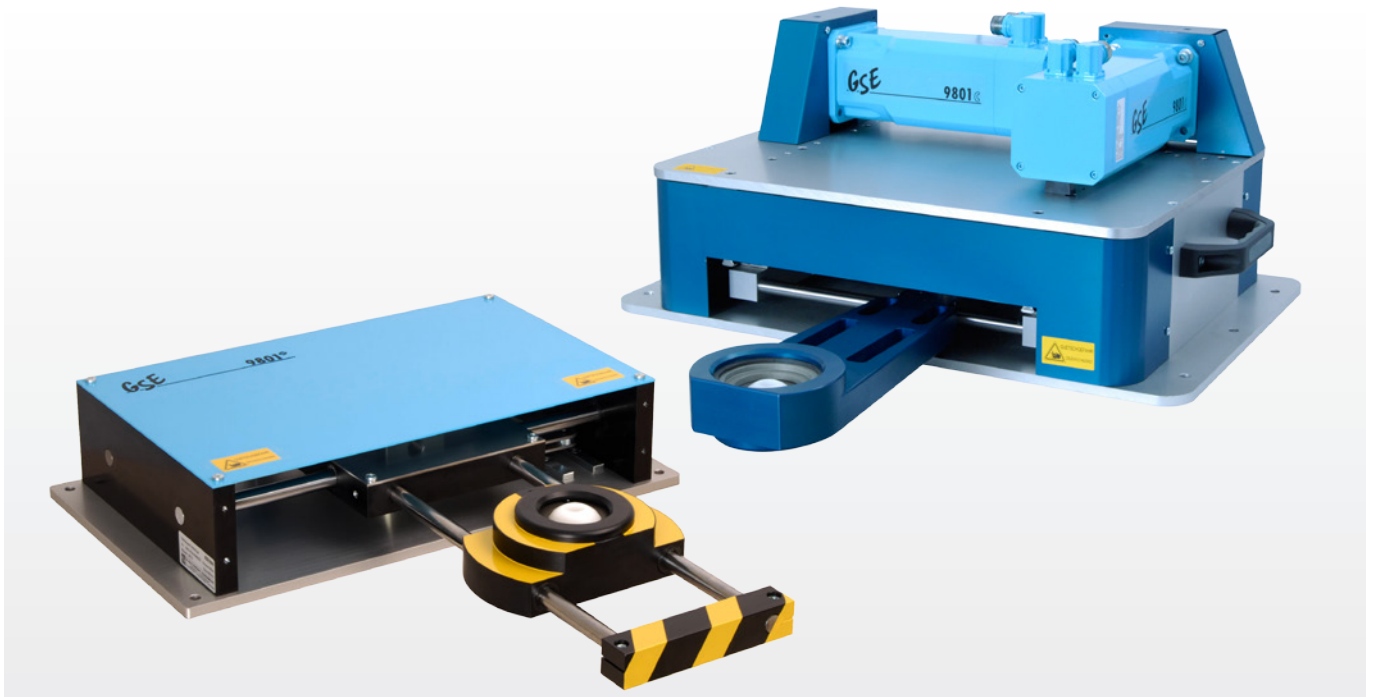
Automation system for shifting of vehicle gearboxes



Gearshift Equipment GSE9801⁺

The Gearshift Equipment GSE9801⁺ is an electro-mechanical system for the actuation of manual and automatic gearboxes. It includes two actuators moving two axes for the automatic shifting of gears in manual and automatic transmissions. These two actuators are coupled for example via flexible cables to a cross slide (option) which is movable in two axes to guide the shift lever. If

required the flexible cables can also be coupled directly to the respective gearbox. Compared to the GSE9801⁺, the GSE9801c does not require consoles for the mounting of the actuators. The new design takes up less space requirement in the test stand. The GSE9801⁺ can be used in stationary test benches.



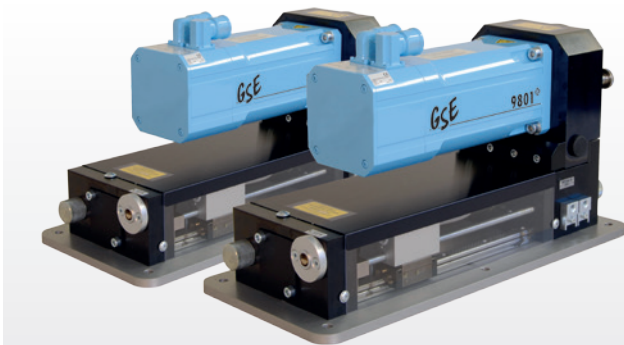
Main features

- 8 forward gears, 4 reverse gears, 1 idle position can be stored per gearbox
- Max. shifting travel in 2 axes: 180 mm / 200 mm*
- Max. shifting force in 2 axes: 800 N (2000 N temporarily)
- Max. shifting speed: 1.6 m/s

*GSE9801c version

Benefits and advantages

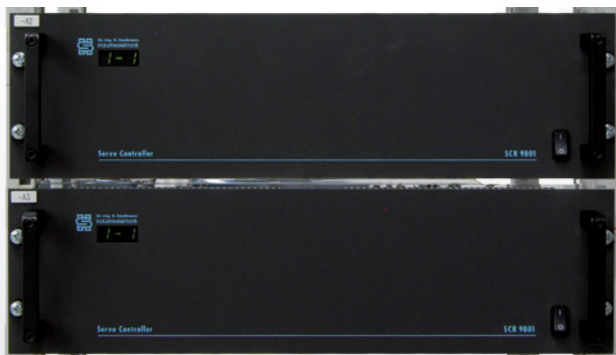
- Menu-guided operation and display of shifting conditions as well as parameters by means of the delivered hand terminal HT9201
- A lot of possibilities for setting of parameters like e.g. type of gearbox, number of forward- and reverse gears, shifting modes, shifting ramps, shifting speeds, shifting forces and number of test steps. etc.
- Data files for max. 32 different gearboxes can be stored. Selection via code designation. All data files are stored in the automatic gearshift control computer. No external storage is required
- Signal exchange with an external computer via serial interface (standard: RS232) to activate a multitude of functions like e.g. selection remote-controlled/manual operation, gearbox selection, gear selection, etc.
- Distance-controlled, force-limited gearshift control with test steps for gear change operation
- Standard delivery scope includes selectable language modules in English, French or German



The actuators

The actuators

These two actuators are coupled via flexible cables to a cross slide (option) which is movable in two axes to guide the shift lever. If required the flexible cables can also be coupled directly to the respective gearbox. The actuators of the GSE9801+ and of the actuation device for the clutch have position-controlled electric servomotors as driving elements. Thus they have a large number of advantageous features like e.g. free of maintenance, compact design, precise positioning, variable presettings for shifting force and speed.



Servo Controller SCR9801

The servo controller

Power supply of the motors is made by two servo controllers SCR9801 generating from the mains voltage the necessary supply voltage for the motors in amplitude and frequency. Each servo controller has a microcomputer-controlled guide- and control system converting in a dynamically high-quality manner the requested set values for speed, torque and position via the fed motors into the relating parameters. Each SCR9801 generates the intermediate circuit voltage as well as the required low voltages for the signal electronics from the mains voltage by itself.



The 3RU-19"-control rack

The 3RU-19"-control rack

The coordination of the motion sequence is made by the 19"-control unit. This rack contains a microcomputer, measuring- and isolation amplifier as well as the necessary low voltage mains supply units.

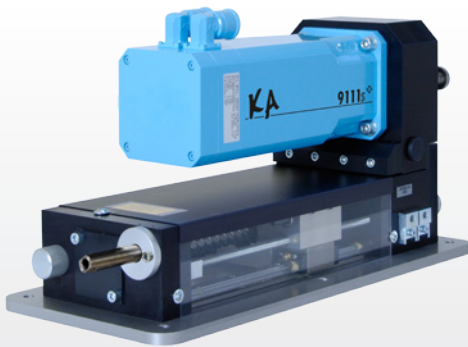


Hand terminal HT9201

The operation

The operation is fully menu-guided by a keyboard and illuminated large LC-Display (option) or by the hand terminal HT9201. Menu-guided setting of all relevant positions and parameters. The shifting conditions and parameters are shown on the display.

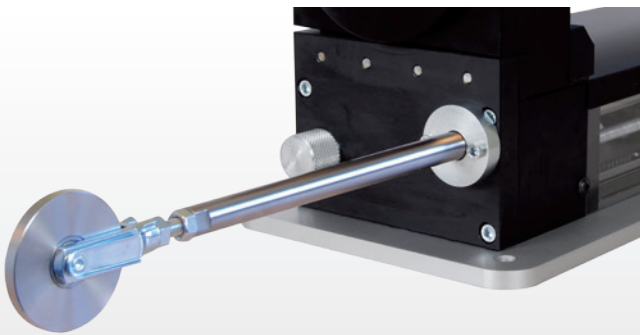
Options and accessories for the Gearshift Equipment GSE9801⁺



Clutch function KA9111⁺

Clutch function

Additionally a clutch actuator can be integrated into the system. This clutch-actuator KA9111⁺ is integrated by hard- and software into the control computer of the Gearshift Equipment GSE9801⁺. Power supply of the clutch-motor is made by a fourth servo controller SCR9801.



Steel rod with roller actuation

Actuation of clutch peddal

For every clutch the three positions basic, release and end position are adjustable. The single sections will be covered at various constant speeds or according to a displacement-time- profile. The effective travel range can be limited by mecha nical stops. The test unit is coupled through a push rod (steel tappet) or a Bowden cable (FLEXBALL[®] cable).



Force measuring

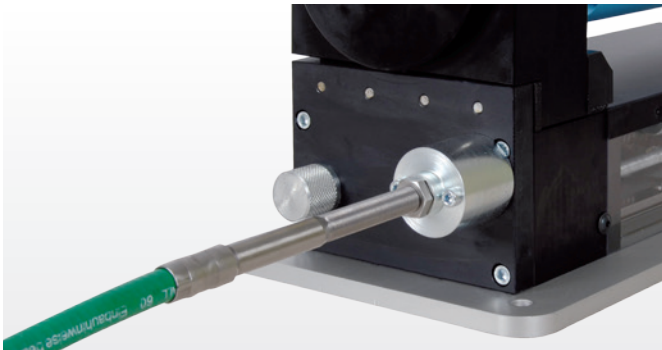
Force measuring

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

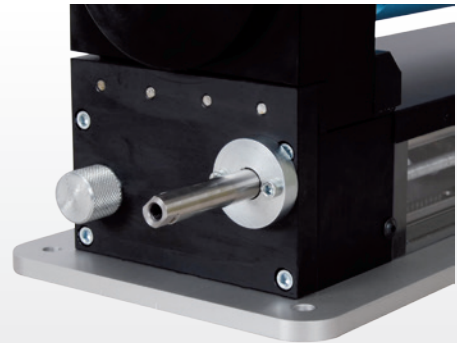
More options

- Software module for setting and shifting of Tiptronic-gearboxes
- Signals for clutch actuation with hydraulic or pneumatic adjusting cylinders
- Shifting- and selector force measurement
- Hard- and software integration of a clutch actuator
- Cross slide for the operation of gear shift levers
- Version as GSE9801c with compact actuator unit

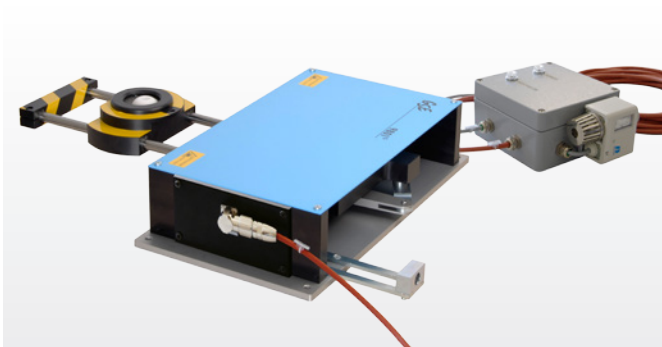
Accessories



Flexball® cable type DZ60 for Automatic Clutch KA9111+



Steel rod for Automatic Clutch KA9111+



Heating for the X/Y- cross slide



Front panel



One hand grease press inclusive grease filling

Data sheet for the Gearshift Equipment GSE9801⁺

Actuator (Standard version)

Two linear positioning unit with integrated brushless, convection cooled servomotor, absolute travel measuring system.		
Dimensions:	450 mm x 200 mm x 231 mm (L x W x H)	
Weight:	22kg	
Weight X/Y- cross slide (option):	18kg	
Weight GSE9801c incl. actuators:	65 kg	
Protection:	IP54	
Shifting travel:	180mm/200mm* in 2 axes	
Shifting force (Ta ≤ 70 °C):	600N (static) 2000N (temporarily: 10sec./4% duty cycle)	
Shifting force (Ta ≤ 40 °C):	800N (static) 2000N (temporarily: 10sec./4% duty cycle)	
Shifting force with FLEXBALL® calbe DZ60, 1.5 m	Travel	Push forces/ Pull forces
	160mm	500N
	180mm	350N
Shifting speed:	1.6m/s max.	
Resolution (actual travel value) and repetitive accuracy:	<±0.05mm	

* GSE9801c version

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
X/Y- cross slide (option):	-40 °C up to max. +70 °C (for the use in the low temperature range a heating (option) is required)

Electronics

2 servo controllers (SCR9801) for driving the motors. (For the clutch function there is an additional converter SCR9801 and motor needed.) Hand terminal HT9201 and keyboard to coordinate all motions.	
Dimensions SCR9801:	482.6 mm x 307 mm x 3 RU (L x W (without plugs) x H)
Weight SCR9801:	13kg
Dimensions control rack:	482.6 mm x 307 mm x 3 RU (L x W (without plugs) x H)
Weight control rack:	8kg
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 GSE9801 ⁺ has the following essential features:	
- Operation of the GSE9801 ⁺ with	- Analog interface - Binary inputs - Hand terminal - Serial interface (RS232) - Option: CAN (potential free) - Hand terminal HT9201
- Menu guided setting manual or motor force	
- A lot of possibilities for setting by means of parameters like type of gearbox, number of forward- and reverse gears, shifting modes, number of test steps	
- Data files for max. 32 different gearboxes can be stored	
- 8 forward gears, 4 reverse gears, 1 idle position can be stored per gearbox	
- Diagnostic functions	
- German, English or French language module	

Interfaces to peripheral units

Binary signals	
Relay contact outputs:	50V/100mA
Optocoupler inputs:	15V bis 24V
Plug-in connection:	Phoenix MC 1.5/16-STF-3.81
Analog interfaces	
Analog outputs:	0 bis ±10V/max. 5mA
Analog inputs:	0 bis 10V/>20kΩ (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
Connection possibility for a second hand terminal HT9201	

Power supply

Rated voltage servo controller:	3/PE AC 380V ... 480V $\pm 10\%$
Frequency servo controller:	50 ... 60 Hz
Safeguarding servo controller:	5A
Rated voltage control rack:	1/N/PE AC 230V $\pm 10\%$
Frequency control rack:	50 ... 60Hz
Safeguarding control rack:	2A
Installed load:	1.4kVA
Plug-in connection:	6-poles connector pair

Data sheet for the optional Automatic Clutch KA9111⁺

Actuator (Standard version)

Linear positioning unit with integrated brushless, convection cooled servomotor, absolute travel measuring system.			
Dimensions:	450 mm x 200 mm x 231 mm (L x W x H)		
Weight:	22 kg		
Protection:	IP54		
Shifting travel:	180 mm		
Shifting force ($T_a \leq 70\text{ °C}$):	1500 N (static) 2000 N (temporarily: 60 sec./25% duty cycle)		
Shifting force ($T_a \leq 40\text{ °C}$):	2000 N (static)		
Shifting force with FLEXBALL® cable DZ60, 1.5 m	Travel	Push forces	Pull forces
	160 mm	500 N	1250 N
	180 mm	350 N	850 N
Shifting speed:	0.64 m/s max.		
Resolution (actual travel value) and repetitive accuracy:	<± 0.05 mm		

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 KA9111 ⁺ . 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:	13 kg
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 KA9111+ has the following essential features:	
- Operation of the KA9111+ 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	

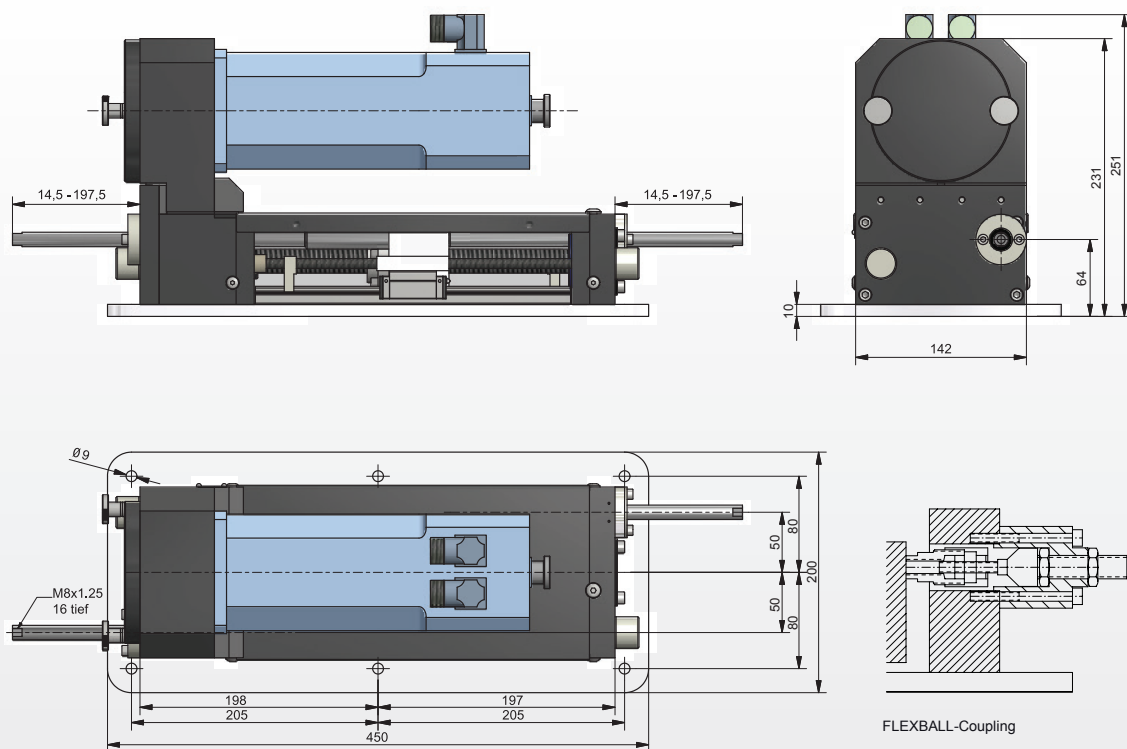
Interfaces to peripheral units

Binary signals	
Relay contact outputs:	50 V/100 mA
Optocoupler inputs:	15 V up to 24 V
Plug-in connection:	Phoenix MC 1.5/16-STF-3.81
Analog interfaces	
Analog outputs:	0 up to ± 10 V/max. 5 mA
Analog inputs:	0 up to 10 V/ $> 20\text{ k}\Omega$ (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
Connections for Miniterminal MT1	
Plug-in connection:	Push-Pull

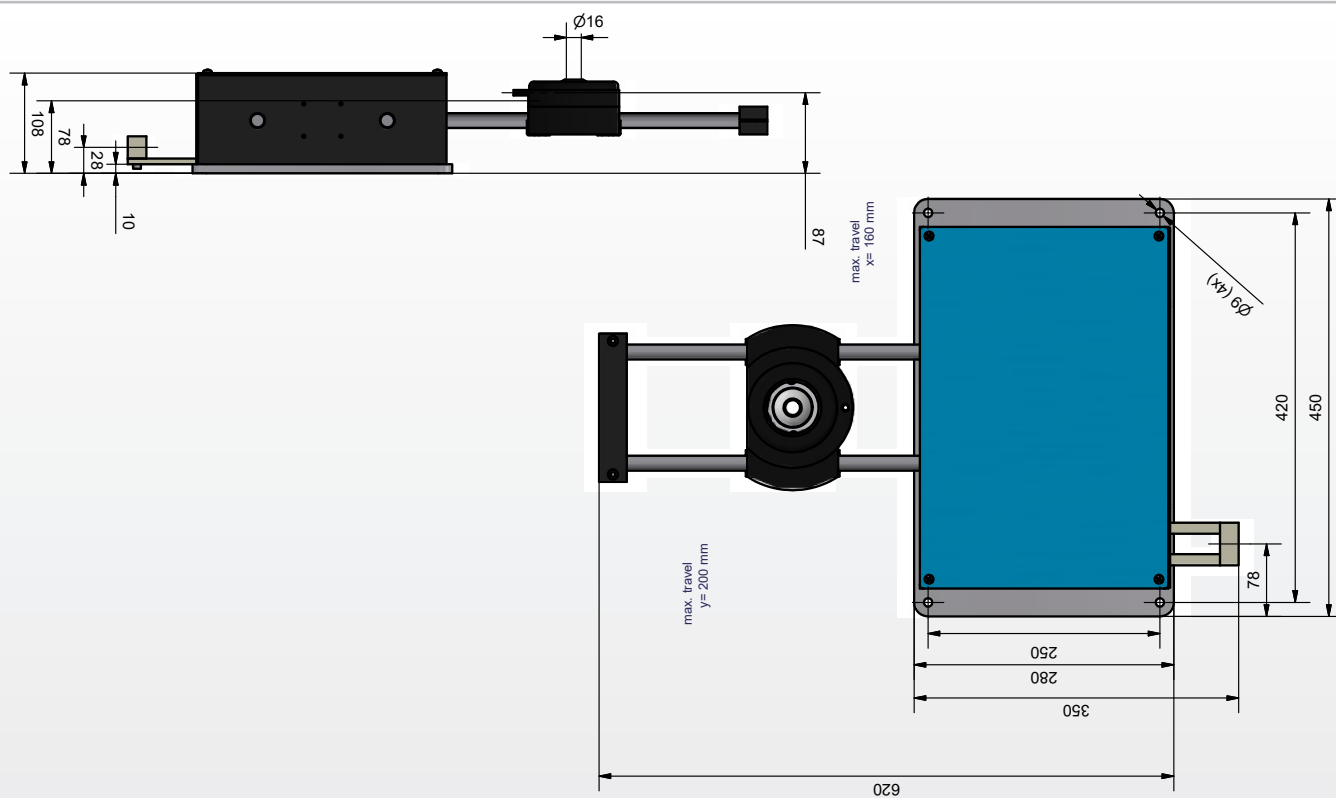
Power supply

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

Dimensions for the Gearshift Equipment GSE9801⁺

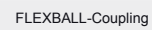


Actuator standard version with optional steel rod



X/Y-cross slide (option)

12/16



Gearshift Equipment GSE9801+

Order information for the Gearshift Equipment GSE9801⁺

1. Gearshift Equipment GSE9801⁺

Order information	
1.1	Gearshift Equipment GSE9801 ⁺ in standard version, consisting of 2 actuators, 2 servo controllers (SCR9801) 3RU-19", 1 superior control system rack, incl. all connector pairs and connection cables between the racks, (without electronic cabinet), no inserts, incl. hand terminal HT9201, incl. GSx- release box, incl. setting up of GSE9801 ⁺ at place of application and instruction of operating staff (max. 3 working days, without travel expenses)

2. Options:

Order information	
2.1	Extended temperature range (– 40 °C up to + 70 °C) for the actuators
2.2	Force- and travel measuring equipment for GSE9801 ⁺ incl. software module
2.3	Signals for clutch actuation with hydraulic or pneumatic adjusting cylinders
2.4	Software-Modul 2 - Selector lever operation of automatic gearboxes
2.5	Software-Modul 3 - Extension of Software module 2 to Tiptronic-gear
2.6	Software-Modul - For tabular conversion to mechanical gear positions (16 forward-/4 rear gears, 2 neutral positions)
2.7	Hard- and software module for the operation of the GSE9801 ⁺ without X/Y- slide with direct connection to the actuators
2.8	Potential free interface type RS232
2.9	Potential free interface type RS422
2.10	Potential free interface type TTY
2.11	Field bus connection Profibus
2.12	Field bus connection CAN

3. Accessories:

Order information	
3.1	X/Y- cross slide for moving a shift lever without FLEXBALL® cables without heating
3.2	Heating for the X/Y- cross slide with heating control, incl. 10 m cable
3.3	Protection cover for the X/Y- cross slide with electronic contact
3.4	Gearshift Equipment GSE9801c (compact), Optional special version with a compact drive unit with 2 actuators
3.5	External second hand terminal HT9201 incl. connection cable, 3 m and connector
3.6	Display panel incl. key pad
3.7	Electronic cabinet (Schroff, RAL7035) incl. installation and commissioning of GSE9801 ⁺ components
3.8	Electronic cabinet (Rittal, RAL7035) incl. installation and commissioning of GSE9801 ⁺ components

3.9	Installation and commissioning of components of GSE9801 ⁺ in a special cabinet requested or made available by the customer (cabinet not included)
3.10	Air/Air-cooling unit incl. mounting into an electronic cabinet for increased ambient temperature range from 0 °C up to +55 °C
3.11	Air/Water-cooling unit incl. mounting into an electronic cabinet for increased ambient temperature range from 0 °C up to +55 °C

4. Cables:

Order information	
4.1	Connection cable between servo controller (SCR9801) and actuator GSE9801 ⁺ without force measurement, length 15 m
4.2	Connection cable between servo controller (SCR9801) and actuator GSE9801 ⁺ without force measurement, length 20 m
4.3	Connection cable between servo controller (SCR9801) and actuator GSE9801 ⁺ with force measurement, customized length

5. Service:

Order information	
5.1	Installation and commissioning of GSE9801 ⁺ at the place of application incl. instruction of the operating staff of max. 3 persons (without travel expenses)

Order information for the optional Automatic Clutch KA9111⁺

1. Automatic Clutch KA9111⁺

Order information	
1.1	Automatic clutch actuator KA9111 ⁺ for GSE9801 ⁺ , without inserts and mechanical coupling elements, incl. all connector pairs and connection cables inside an electronic cabinet, (only in combination with GSE9801 ⁺), incl. Installation and commissioning of at the place of application (without travel expenses)

2. Options:

Order information	
2.1	Force- and travel measuring equipment for KA9111 ⁺ incl. software module

3. Accessories:

Order information	
3.1	Extended temperature range for the clutch actuator (-40 °C up to +70 °C)
3.2	Analog potential free output „clutch-distance“ 0....10V for GSE9801 ⁺ , potential free
3.3	Steel rod with insert for version without force measuring, 180 mm travel
3.4	Steel rod with insert for version with force measuring, 180 mm travel
3.5	FLEXBALL [®] cable insert for version without force measuring
3.6	FLEXBALL [®] cable insert for version with force measurement
3.7	FLEXBALL [®] cable type DZ60, 1.5 m, 180 mm travel
3.8	FLEXBALL [®] cable type DZ60, customized length
3.9	Miniterminal MT1 incl. connection cable, 1.5 m and connector
3.10	Hand terminal HT9201 incl. connection cable, 3 m and connector
3.11	One hand grease press. incl. grease filling (370 g) for the extended temperature range standard temperature - 40 °C ... + 70 °C
3.12	Grease refill tube (370 g) for the temperature range - 40 °C up to + 70 °C

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 KA9111 ⁺ into electronic cabinet (electronic cabinet not included)



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