

SCHUCK ACTUATORS AND CONTROL SYSTEMS TYPE SST

Flexible actuator and control system for 90° travel with Scotch-yoke principle for torques ranges up to 350,000 Nm.



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APPLICATIONS

90° pivoting angle All versions for Ex Zone I Ambient temperature -60 °C to +80 °C Initial torque of up to 350,000 Nm



MANUFACTORING

Casing and yoke made of extremely robust and ductile cast iron, GGG 40, with good dry running properties. For temperatures down to -60 °C and if required by customers, the casing and yoke can also be made of carbon steel.

Thorough testing of all the functions of the actuator and valve at the factory to ensure reliable operation.



PRODUCT FEATURES

- » Optimum adjustment of the actuator torque curve through the application of the Scotch yoke principle
- » Exact, proportional position indication through- out the entire actuator travel
- » Naturally ventilated basic actuator
- » Stops to ensure precise adjustment of the pivoting action and to accommodate the max. output moment
- » Maintenance-free due to plastic-coated bearing
- » Modular system with all parts in Stock



DESIGN

Manual actuators with handwheel

Electric actuators with electric motor and handwheel

Hydraulic actuators with hydraulic cylinder

Pneumatic actuators with pneumatic cylinder



WERKSTOFFE

SCHUCK ACTUATORS TYPE SST Type overview



TypE SST MANUAL ACTUATOR

VG - FG 00/31, 00/41

A number of different versions of the Type SST Schuck manual actuator are available for torques of up to 350,000 Nm. The design of the actuators means that they can be manually operated with minimum force. Conversion or retrofitting can be carried out at any time to meet with customer requirements.

All Type SST® Schuck manual actuators can additionally be fitted with electrical indicators to show when they have reached their limit position. All electrical components are suitable for Ex Zone I.E

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TYPE SST ELECTRICAL ACTUATOR

VG – FG 00/32, 00/42

A number of different versions of the Type SST Schuck electrical actuator are available for torgues of up to 350,000 Nm.

The actuators are provided with a handwheel for emergency use. The efficiency of the basic actuator is such that only a very small attached electrical actuator need be used.

The setting times are variable and are determined in accordance with customer requirements. Conversion or retrofitting can be carried out at any time to meet customer requirements.

All Type SST® Schuck electric actuators can additionally be fitted with electrical indicators to show when they have reached their limit position. All electrical components are suitable for Ex Zone I.

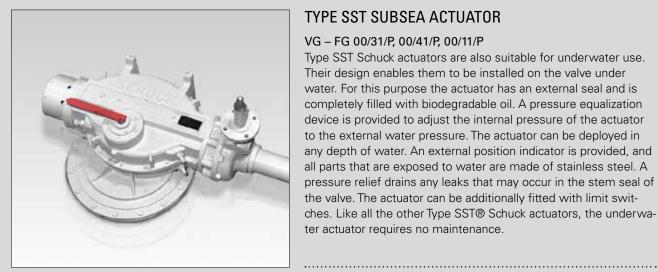
TYPE SST CYLINDER ACTUATOR

VG – FG 00/11, 00/12

A number of different versions of the Type SST Schuck hydraulic/ pneumatic actuators are available for torques of up to 350,000 Nm. A specific control system is always used to operate the hydraulic/ pneumatic actuators. This control system is located in a cabinet which is installed immediately adjacent to the actuator.

All actuator control systems are provided with hydraulic manual operation for emergencies.

Alle Antriebssteuerungen verfügen über eine hydraulische Handnotbetätigung.







TYPE SST SUBSEA ACTUATOR

VG - FG 00/31/P, 00/41/P, 00/11/P

Type SST Schuck actuators are also suitable for underwater use. Their design enables them to be installed on the valve under water. For this purpose the actuator has an external seal and is completely filled with biodegradable oil. A pressure equalization device is provided to adjust the internal pressure of the actuator to the external water pressure. The actuator can be deployed in any depth of water. An external position indicator is provided, and all parts that are exposed to water are made of stainless steel. A pressure relief drains any leaks that may occur in the stem seal of the valve. The actuator can be additionally fitted with limit switches. Like all the other Type SST® Schuck actuators, the underwater actuator requires no maintenance.

TYPE SST ACTUATOR WITH SPRING RETURN

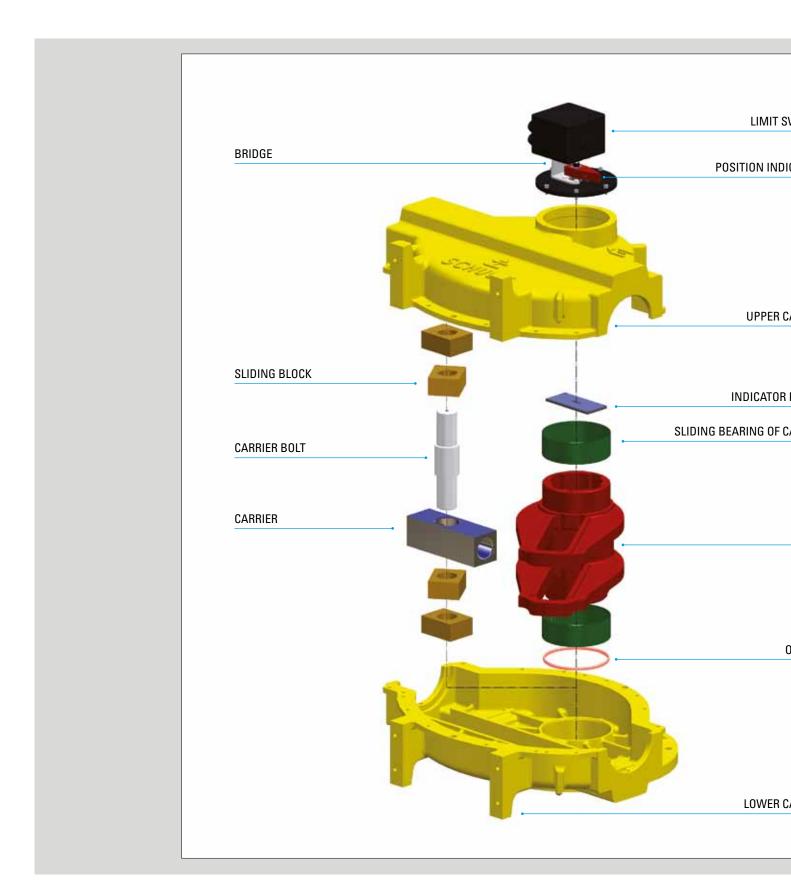
VG – FG 12/15

Type SST® actuators are also available with a spring return in a number of different designs for torgues of up to 350,00 Nm. Type SST® actuators with a spring return are operated by means of a pneumatic or hydraulic control system. This control system is located in a cabinet which is installed immediately adjacent to the actuator. The choice of actuator power for the control system is made in accordance with customer requirements. If the power supply to the actuator is interrupted the spring returns the actuator to the "safe" position. Conversion or retrofitting of remote control signals, additional signal detectors and ancillary accessories such as limit switches are possible at any time. All actuator control systems offer the option of hydraulic manual operation for emergencies.

TYPE SST EPICYCLIC GEAR

Schuck epicyclic gears have been developed as a modular system for torques of up to 4,000 Nm. The actuating shaft of the Schuck epicyclic gear is located directly above the pipe axis. The standard output conforms to DIN 5211 but can be adapted to order. The stop is located in the epicyclic gear. The Schuck epicyclic gear can be operated using a handwheel when surface-mounted or by means of an extension for subsurface installations. The gear can be supplied as a shaft-mounted transmission with a torque arm. The epicyclic gear can also be operated by means of an electric motor, with the option of an additional limit switch. The use of high guality materials combined with precision manufacturing ensures maximum efficiency and minimum play in the gear. It is filled with grease for at least eight years of maintenance free operation.

SCHUCK ACTUATORS TYPE SST Modular system and Scotch-yoke principle



VITCH CATOR

ASING

PANEL

ASING

YOKE

-RING

ASING

Modular system

Type SST Schuck actuators for 90° travel have been developed as a modular system. The same basic actuator design is employed. Basic actuators are produced in eight different sizes with initial torques ranging from 1,000 Nm to 350,000 Nm.

The basic actuator consists of a lower and upper casing containing the pivoting yoke. Both parts are made from robust and ductile cast iron. Customers also have the option of a casing and yoke made of carbon steel. The basic unit, together with the attachments, forms a complete, fully functioning actuator. The choice of attach ments is determined by the required input energy. The input energy can be applied either manually, hydraulically, pneumatically or electrically. Universal attachment points are provided on both the right and left sides, thus enabling the use of the various designs of pivoting actuator, either manual, electrical, hydraulic or pneumatic, with the option of a spring return. The modular system permits retrofitting at any time.

Basic actuator variants						
Туре	Torques ranging					
VG	1.000 Nm					
WG	4.000 Nm					
AG	8.000 Nm					
BG	20.000 Nm					
CG	40.000 Nm					
DG	85.000 Nm					
EG	150.000 Nm					
FG	350.000 Nm					

Scotch-yoke principle

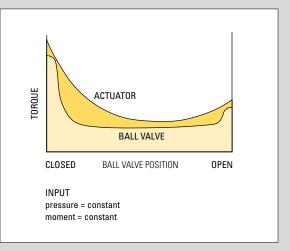
The linear input movement of, for example, a hydraulic cylinder, is converted into the required 90° pivoting movement by means of the sliding blocks and guide track, in accordance with the Scotch yoke principle. The linear movement of the attachments acts on the lever arm of the yoke via the carrier, the carrier bolt and the sliding blocks.

The advantage of the Scotch yoke principle is that the output torque is adjusted to the ball valve at a constant input torque or input pressure.

With their very limited friction Scotch yoke actuators are highly efficient and permit a very compact design. The actuators are self locking and jerk free.

All bearings are dry-running and plastic- coated, and do not require any lubrication with grease or oil. The internal parts are only greased to protect against corrosion. The basic element is maintenance free. The actuator has a very long working life.

Each actuator is fitted with a mechanical position indicator. The proportional position of the ball valve is indicated throughout the entire actuator travel. The pivoting action is limited by stops which are set up in accordance with the maximum torque. The actuator stops absorb the maximum input torque and maximum input force.



Principle characteristics of actuator and ball valve torque

SCHUCK ACTUATORS TYPE SST Additional attachments



D TORQUE LIMITER

The torque limiter protects the actuator and downstream components from excessive initial torque. If, after the torque limiter has responded, the pressure falls to a permitted level, the torque limiter is automatically turned off. The torque limiter is deployed in association with pneumatic and gas over oil actuators.

L LIMIT SWITCH

The limit switch is a compact, enclosed unit which has been specially developed for the SST®. The limit switch ensures that there are no moveable parts outside the actuator. The limit switch contains four mechanical reversing switches, which enable the movement commands to be cancelled at the end position, and a signal to be given when the end positions have been reached. Inductive proximity switches can also be used as an alternative. All electrical components are suitable for Ex Zone I.

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P PRESSURE EQUALIZATION SYSTEM A pressure equalization system is available to avoid exposing the gear or the actuator to excess pressure when the actuator is being used underwater. For this purpose the actuator is filled with biodegradable oil. A plastic membrane provides a seal between the actuator and the surrounding medium. The internal pressure of the actuator is thereby adjusted to that of the water, enabling the actuator to be used at any depth.



Q ENERGY STORAGE DEVICE

The energy storage device enables the ball valve to be operated several times, even if the power used to control it has failed. The size and design of the energy storage device can be varied to meet customer requirements and the operating conditions.



R ADJUSTMENT SET FOR AUTOMATIC PIPE FRACTURE RESPONSE

The rate of pressure drop is set by simulating a pipe fracture. An adjust- ment set is available as an option for this purpose. A fine adjustment valve is used to simulate the pressure drop per minute.

Subsequently the switching point of the automatic pipe fracture response is set using the built in adjustment valve. The adjustment set can be retrofitted in all cases.



Y HYDRAULIC EMERGENCY MANUAL OPERATION

The hydraulic emergency manual operation can be used to safely set pneumatic and/ or spring return actuator systems to the required position. The hydraulic emergency manual operation can be retrofitted at any time.



SCHUCK CONTROL SYSTEM TYPE C Electro-hydraulic

Left: Actuator with control system, installed on a 20" ball valve.

Right: Actuator with remote control OPEN/CLOSE and Type SEC-100 electronic control system (see page 16) for monitoring and driving the hydraulic actuator control system.



Features

Compact design reduces the amount of pipes and screw fittings required

Built in, seawater-resistant oil recircu- lating reservoir with non-pressurized, permanent oil level indicator, with electrical monitoring of oil level

Automatic reset to normal use following emergency manual operation (eliminates risk of incorrect operation)

Low drive power

Separate and infinitely variable adjustment time for OPEN and CLOSE

On-site manual control

Remote control

Emergency manual operation with hand pump

Low maintenance with self-cleaning/self-ventilating oil circulation

Electrical supply and control voltage if required by customer

The modular system permits use of one or more different signal receptors and additional attachments

Pad lock for securing in OPEN or CLOSED position (optional)



Testing

Thorough testing of the actuator and valve ensures reliable operation.

Applications

Offshore/onshore, substations, pipeline blocking devices and safety shut-off valves

All versions for Ex Zone I

Ambient temperature -60 °C to +80 °C

Operating pressure up to 200 bar

Rapid closure < 15 sec. up to 48" is possible

Design

24VDCor400VACmotor, 1.1kW

Air motor

Up to 3 strokes when powered by accumulator

e.g. in response to power failure (ESD)

Control voltage 24 V DC, 110/220 V DC/AC, 230 V AC, 5 Watt

Manufactoring

Control system made of seawater- resistant materials

Stainless steel pipes and screw fittings

Compact, lockable and seawater-resistant control cabinet

SCHUCK CONTROL SYSTEM TYPE G Gas over oil Basic control system

Left: Actuator with control system for a 48" ball valve

Right: Control system with remote OPEN/CLOSE with torque limiter. Also with pad lock for securing in OPEN position



Features

Compact design reduces the amount of pipes and screw fittings required.

Small gas-over-oil reservoir

No oil discharge

Automatic reset to normal use following emergency manual operation (eliminates risk of incorrect operation)

Low drive power

Separate and infinitely variable adjustment time for OPEN and CLOSE

On-site manual control

Remote control

Emergency manual operation with hand pump

Low maintenance with self-cleaning/self-ventilating oil circulation

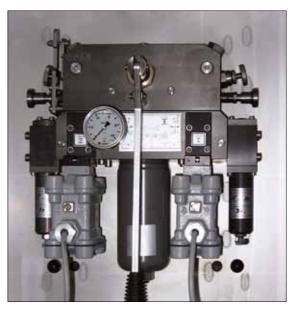
Electrical control voltage if required by customer

The modular system permits one or more different signal receptors and additional attachments.

Pad lock for securing in OPEN or CLOSED position (optional)

Testing

Thorough testing of the actuator and valve ensures reliable operation.



Applications

Offshore/onshore, substations, pipeline blocking devices and safety shut-off valves

All versions for Ex Zone I

Ambient temperature -60 °C to +80 °C

Operating pressure up to 160 bar

Rapid closure < 15 sec. up to 48" is possible

Design

Standard type with emergency manual operation

Operated by own medium

With automatic response in event of pipe fracture (optional)

With power failure response system (ESD) (optional)

Control voltage 24 V DC, 110/220 V DC/AC, 230 V AC, 13 Watt

Manufactoring

Control system made of seawater- resistant materials

Stainless steel pipes and screw fittings

Compact, lockable and seawater-resistant control cabinet

SCHUCK CONTROL SYSTEM TYPE G Gas over oil Supplementary signal receptors

Left: Control system with remote OPEN/CLOSE operation and CLOSE action in the event of pipe fracture, with test and measurement device for use with automatic pipe fracture response. Pad lock provided for securing in OPEN position.

Right: Control system with remote OPEN/CLOSE operation and CLOSE action in the event of loss of voltage or pressure, with torque limiter. Also with pad lock for securing in OPEN position.



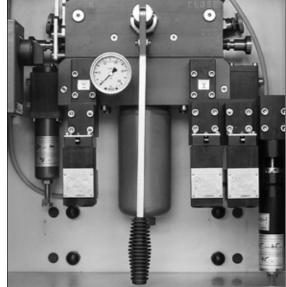
Automatic pipe fracture response Function 1h The pressure differential valve 23 is installed on the basic control unit using a modular construction and a sandwich plate.

Function

In addition to providing a basic control function the ball valve will close if the pipe fractures. However, the automatic system does not respond to brief, slight pressure fluctuations or a slow, continuous loss of pressure. The automatic pipe fracture response system is activated according to the rate of pressure drop in the pipeline in relation to the pressure drop period.

Pipe fracture will close the valve and prevent any further operation of the actuator. The automatic pipe fracture response system is available with automatic or manual reset.

A compact test and measurement device (shut-off valve and fine adjustment valve as shown in the illustration) enable the pipe fracture response unit to be checked and adjusted at any time.



Emergency CLOSE in the event of pressure loss, Function 4a and in the event of voltage failure, Function 6a

The solenoid valve 4c and the pressure-operated valve 52 are installed on the basic control unit using modular construction and a sandwich plate.

Function

In addition to the basic control function, in the event of a power failure and/or loss of pressure the ball valve will close. Power failure or loss of pressure will prevent any further operation of the actuator.

The CLOSE function in the event of power failure/ pressure loss can be maintained with automatic or manual reset.

SCHUCK CONTROL SYSTEM TYPE K Pneumatic Actuators with spring release

Top left: Actuator with spring to open application and limit switch

Top right: Type K control system with two solenoid valves (1 x ESD) and heating

Bottom left: Actuator with spring to close application

Bottom right: Type K control system with drier/filter and pressure regulator, and a high pilot





Features

Compact design reduces the amount of pipes and screw fittings required

Low drive power

Separate adjustment times for OPEN and CLOSE

On-site manual control

Remote control

Electrical supply and control voltage if required by customer

The modular system permits one or more different signal receptors and additional attachments

Testing

Thorough testing of the actuator and valve ensures reliable operation.





Applicattions

Offshore/onshore, substations, pipeline blocking devices and safety shut-off valves

All versions for Ex Zone I

Ambient temperature -60 °C to +80 °C

Operating pressure 2 to 12 bar (pneumatic), 10 to 150 bar (high pressure)

Rapid closure < 15 sec. up to 48" is possible

Design

Operated by own medium

Operated by compressed air

With power failure response system (ESD)

Control voltage 24 V DC, 110/220 V DC/AC, 230 V AC, 13 Watt

Manufactoring

Control system made of seawater- resistant materials

Stainless steel pipes and screw fittings

Compact, lockable and seawater-resistant

SCHUCK CONTROL SYSTEM TYPE KY Hydro-pneumatic

Left: Actuator with control system, installed on a 28" ball valve

Right: Control system with remote ON/OFF control and automatic pipe fracture response. Automatic pipe fracture response with optional measuring device



Features

Compact design reduces the amount of pipes and screw fittings required.

Built-in, seawater-resistant oil recircu- lating reservoir with non-pressurized, permanent oil level indicator

Automatic reset to normal use following emergency manual operation (eliminates risk of incorrect operation)

Low drive power

Separate and infinitely variable adjustment time for OPEN and CLOSE

Local manual control

Remote control

Emergency manual operation with hand pump

low maintenance with self-cleaning/self-ventilating oil circulation

Electrical supply and control voltage if required by customer

The modular system permits one or more different signal receptors and additional attachments.

Pad lock for securing in OPEN or CLOSED position (optional)

Testing

Thorough testing of the actuator and valve ensures reliable operation.



Applications

Offshore/onshore, substations, pipeline blocking devices and safety shut-off valves

All versions for Ex Zone I

Ambient temperature -60 °C to +80 °C

Operating pressure up to 160 bar

Rapid closure < 15 sec. up to 48" is possible

Design

Standard type with emergency manual operation

Operated by own medium

Operated by compressed air

With automatic response in cases of pipe fracture (optional)

With power failure response system (ESD/optional)

Control voltage 24 V DC, 110/220 V DC/AC, 230 V AC, 13 Watt

Manufactoring

Control system made of seawater- resistant materials

Stainless steel pipes and screw fittings

Compact, lockable and seawater-resistant control cabinet

SCHUCK CONTROL SYSTEM TYPE X Electro-hydraulic

Left: Control system using 24 V/DC Ex d design in control cabinet

Right: Pipeline blocking unit with actuator and control system, installed on a 36" ball valve. Telecontrol technology, monitoring and voltage supply in the remote control cabinet.



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Features

Highly efficient

Small cable cross-sections

Independent of mains supply

Rapid adjustment times

Small hydraulic reservoir

Low oil volume

Compact design

Low maintenance

Good reliability

Self-cleaning, self-ventilating oil circulation

Can be retrofitted

Remote control

Emergency manual operation with hand pump

Electrical supply if required by customer

Automatically reverts to normal operation following emergency manual operation

Testing

Thorough testing of the actuator and valve ensures reliable operation.



Applications Offshore/onshore, substations, pipeline blocking devices

All versions for Ex Zone I

Ambient temperature -60 °C to +80 °C

Operating pressure up to 200 bar

Design

Hydraulic compact unit for autonomous operation

Solar-powered

Control and monitoring via the GSM network

24VDCor400VACmotor 500 Watt, with reversible pump

Air motor

With electrical insulating for potential insulating in case of cathodic corrosion protection (CCP)

Manufactoring

Control system made of seawater- resistant materials

Stainless steel pipes and screw fittings



GSM Global System for Mobile Communication

Available as an option in connection with monitoring of cathodic protection (CP)

SCHUCK CONTROL SYSTEM TYPE SEC-100 Electronic control system

Left: Actuator with remote control Type SEC-100 electronic control system for monitoring and operating the hydraulic actuator control system

Right: User interface of the Type SEC-100 electronic control system



Features

Built-in plain text display with additional LED for showing operating status

Built-in illumination

Low drive power

Electrical supply and control voltage as required by customer

Precise adaptation of system program to meet specific customer requirements (customizing)

Operation via six capacitive function keys

Update via Bluetooth is possible (NON-INTRUSIVE)

Bus-interface available

Function keys can be used to alter parameters (NON-INTRUSIVE)

Local manual control

Remote control/local control (lockable)

Multi-language menu

Monitoring of running times

Monitoring of oil level

Monitoring of system pressure

Phase monitoring

Short circuit and broken wire monitoring

The SEC-100 has been set up to process various other readings



Testing

Thorough function tests of the SEC-100 with the actuator and valve to ensure trouble-free operation.

Applications

Offshore/onshore, substations, pipeline blocking devices and safety shut-off valves

All versions for Ex Zone I

Ambient temperature -60 °C to +80 °C

Design

Voltage supply: 400 V AC

Type of protection: IP67

Ex-protection: II2G EEx d[ia] IIB T6

Control voltage: 24 V DC, 110/220 V DC/AC, 230 V AC, 5 Watt

Main switch with three positions, 0 – Local – Remote (lockable)

Operation via six capacitive function keys

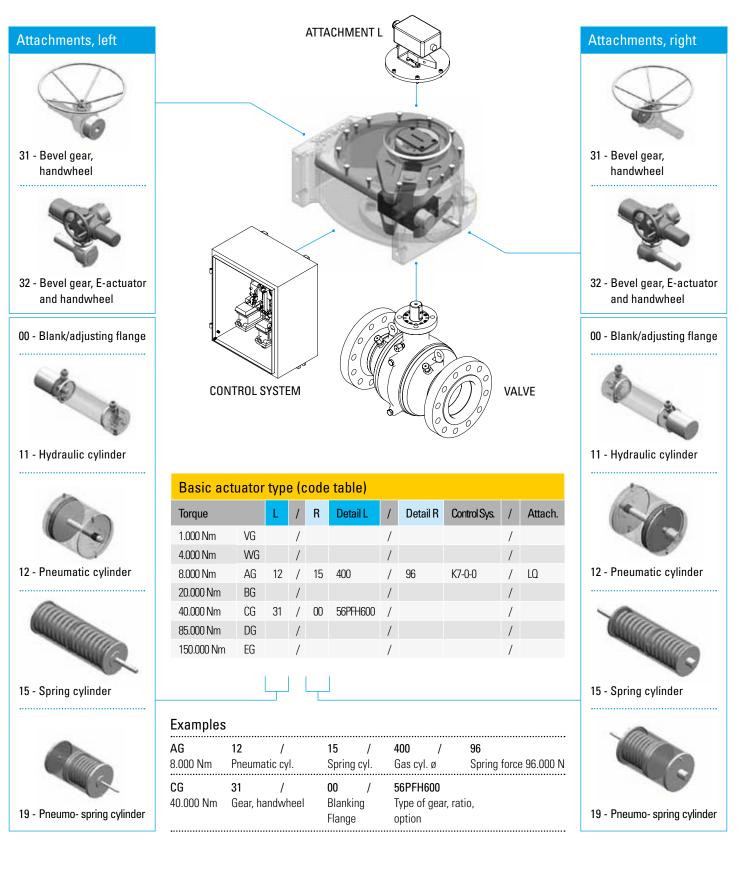
Manufactoring

SEC-100 housing made of aluminum (painted)

Threaded cable connectors made of brass

Compact, screwed control cabinet

SCHUCK ACTUATORS Type codes for actuators



SCHUCK CONTROL SYSTEMS

Type codes

Schuck type code for control systems										
Actuator system		Remote control		Signal receptors			Additional attachments			
		Standard with Actuating time adjustment Manual OPEN/CLOSE Emergency manual		Reset: a = Automatic, h = Manual Priority: p = Signal with priority						
		oper	ation	CLOSE		OPEN				
0	Without control system	0	Electrical OPEN/CLOSE	0 a/h	Without	0 a/h	А	Locking device		
А	Gas-over-oil actuator with circulation system	1	Pneumatic OPEN/CLOSE	1 a/h	Automatic pipe fracture response for gas	1 a/h	В	Pressure regulator		
В	Electro-pneum. actuator with hydraulic damping	2	Electrical OPEN	2 a/h	Pressure differential switch	2 a/h	С	Solar package		
С	Electro-hydraulic actuator with pump	3	Electrical CLOSE	3 a/h	Pressure level exceeded	3 a/h	D	Torque limiter		
D	Pneumatic hydraulic varia- ble speed	4	Pneumatic OPEN	4 a/h	Pressure level not reached	4 a/h	E	Electr. position indicator		
Е	Gas hydraulic variable speed	5	Pneumatic CLOSED	5 a/h	Control pressure failure	5 a/h	F	Radio control		
F	Gas-over-oil actuator with level compensator	6	Manual operation	6 a/h	Power failure	6 a/h	G	Electronic Line Guard		
G	Gas-over-oil actuator wit- hout level compensator	7	Electrical OPEN/CLOSE p=0 =>OPEN	7 a/h	High pressure time release	7 a/h	Н	Contact pressure seating rings for ball valve		
Н	Hydraulic actuator	8	Electrical OPEN/CLOSE P=0 =>CLOSE	8 a/h	Power applied	8 a/h	Κ	Pneumatic / hydraulic limit switch		
К	Pneumatic actuator	9	Electrical OPEN/CLOSE p = 0 => CLOSE, without man. emergency operation	9 a/h	Manual emergency	9 a/h	L	Electric limit switch		
KY	Pneumatic actuator with hydraulic emergency manu- al operation	10	Hydraulic OPEN/CLOSE	11 a/h	Automatic pipe fracture response for gas/liquids	10 a/h	М	Emergency manual operated gear		
L	Gas-over-oil actuator with circulation system, with pneumatic support	11	Electrical OPEN/CLOSE Control signal Power failure CLOSE Power input OPEN	12 a/h	Electric pipe fracture response for gas/liquids	11 a/h	N	Switchover to auxiliary power		
М	Subsea hydraulic	12	Electrical OPEN/CLOSE Con- trol signal Power failure OPEN Power applied CLOSE	13 a/h	Automatic pipe fracture response with hydraulic transform	12 a/h	0	LOCAL/REMOTE		
W	Subsea pneumatic					13 a/h	Р	Pressure equalization system		
Р	Gas over oil variable speed					14 a/h	Q	Energy store		
Х	Electro-hyd. actuator with left/ right continuous motor pump					15 a/h	R	Adjustment set for automatic pipe fracture response		
							S	Automatic seat ring control system		
							Y	Hydraulic emergency manual operation		

Example for using the type code: G0-1ap7h-0-Q

» Actuator system: Gas over oil without level compensator

» Electrical remote control OPEN/CLOSE

» Closesignal: Automaticpipefractureresponseforgaswithautomaticresetandpriority, High pressure time release with manual reset

» Energy storage device



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