

SCHWARZ®
New motion starts here



With Iphone, Scan the QR code to get quick
links to download SCHWARZ software

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SCHWARZ
Integral actuator
SM/SC series.

About this brochure

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This brochure intends to introduce the functions and possible applications of SCHWARZ actuator SM/SC series. The document offers an introduction into an overview on products and brief explanations regarding design and function of electric SCHWARZ actuators. On the rear pages of this brochure, you will find partial technical parameters. For more detailed technical data and swift production selection, pls. consult us. The latest information can be found on our official internet at www.schwarz-tech.com

As part of a process of on-going product development, SCHWARZ reserves the right to amend and change specifications without prior notice.
The name SCHWARZ is a registered trademark.

Brochure No.SP05-2 English Product description

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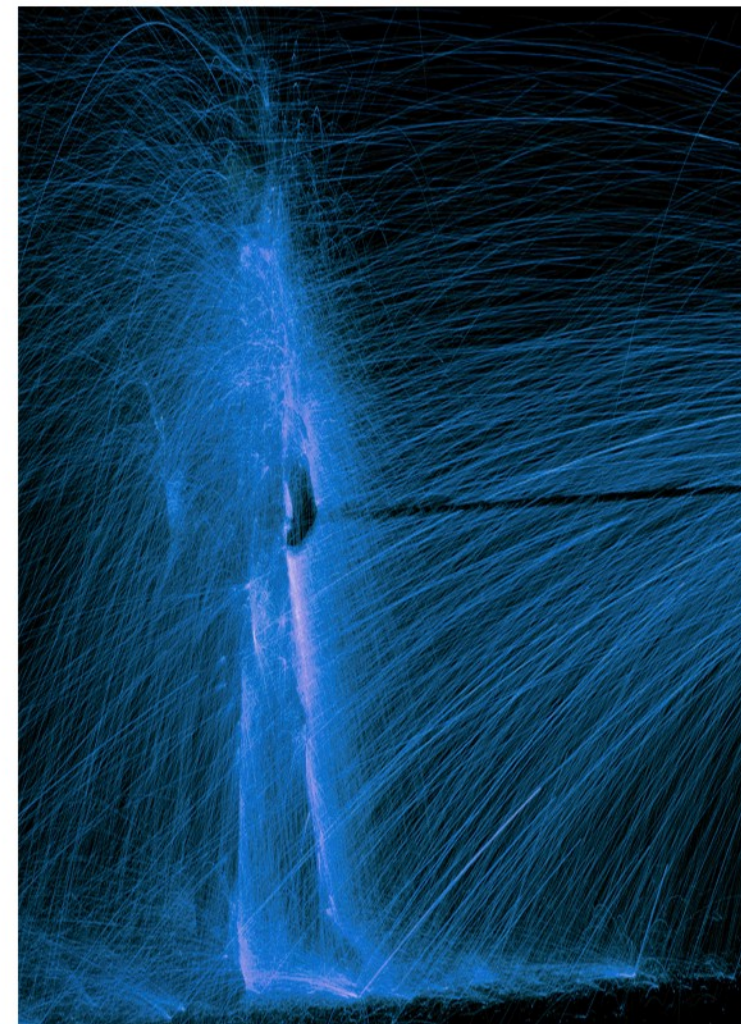


Schwarz is a professional producer of electrical actuators. Schwarzstein Corporation was established in 1973 by Mr. Michael Schwarz at Clausthal-Zellerfeld, Germany. Schwarz is a registered trademark for electrical actuators of this corporation. Schwarz actuators have gained unanimous recognition for stability and accessibility since the production of the first model.

As a family business in Germany, Schwarz inherits the notion that professionalism creates value, and develops steadily in the field of electrical actuators. Since the production of the its first INTELLIGENT actuator in 2005, Schwarz has caught up in the field of INTELLIGENT actuators, and become the forerunner. Schwarz has redefined INTELLIGENT actuators for people around the world, with a slogan “New Motions Starts Here”.

Users choose Schwarz actuators because of various reasons:

- ✓ They are stable. They guarantee automated industry.
- ✓ They are easy to use. They save users’ time and improve efficiency.
- ✓ They are specialized. They provide each special case with a special solution.
- ✓ A complete system of after-sale service includes every actuator in the system.



A wide range of application

Power Generation

- ✓ Fossil power plants (coal, gas, oil)
- ✓ Cogeneration power plants
- ✓ District heating
- ✓ Hydroelectric power plants
- ✓ Geothermal power plants
- ✓ Solar thermal power plants
- ✓ Biogas power plants

Not confined to the field of traditional power stations, Schwarz provides products for renewable energy generation such as solar-thermal plants, for carbon capture and storage, and for CO2 emissions reduction processes. When used in power plants, SCHWARZ actuators are characterised by their superior tolerance with regard to voltage, vibration, and temperature and can be adapted to any mounting position required.

Oil & Gas

- ✓ Tank farms
- ✓ Platforms
- ✓ Pipelines
- ✓ Refineries
- ✓ Pumping stations

Oil & gas are crucial energy sources for the industry. They are extracted, processed, and distributed using most sophisticated technologies and procedures. Due to the high potential hazards for people and environment, strict sets of regulations must be observed within the oil & gas sector. Schwarz actuators have a wide application in almost all upstream and downstream activities, whether it's in offshore production facilities or in transportation of finished products. SCHWARZ actuators are doing an excellent work in this field due to their distinguished characteristic of reliability and stability.

Industry

- ✓ Heating, ventilation & air conditioning
- ✓ Food industry
- ✓ Chemical/pharmaceutical industry
- ✓ Vessel and submarine ship building
- ✓ Steel mills
- ✓ Paper industry
- ✓ Cement industry

Any process technology requires pipes and valves and consequently SCHWARZ actuators. SCHWARZ are in a position to supply tailor-made solutions for various plant-specific requirements. This is possible due to the modular product design.

Water & Sewage

- ✓ Sewage treatment plants
- ✓ Water treatment plants
- ✓ Drinking water distribution
- ✓ Sewage disposal
- ✓ Seawater desalination
- ✓ Steel constructions for water systems

Water treatment and distribution is a field that Schwarz excels. This industry provides various opportunities for Schwarz. There is a soaring need for processes that fully utilize existing resources such as water recycle projects and desalination plants, due to the decreasing availability of water in many areas of the world.



SCHWARZ actuator's characteristics

SCHWARZ actuators based on the advanced technology have been developing constantly. SCHWARZ actuators with Apple Bluetooth communication which is the first utilized in the actuator field become famous all over the world benefited from the convenient setting, estate management and so on.

A long-life actuator

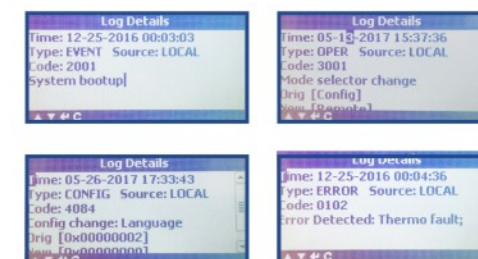
The concise design, the Bluetooth set, the convenient operation and setting based on user and comprehensive protection system make SCHWARZ have a reputation for being safe and reliable.

Simple setting

A humanized man-machine dialogue friendly interface makes it easy to do any settings. Intelligent mobile phone, e.g. Iphone downloaded with SCHWARZ Iphone software is easily connected with SCHWARZ actuator. It is convenient to do setting work or browse with mobile phones. A concise man-machine dialogue interface makes easy settings, the actuator's every information or parameter can be easily read via its man-machine interface especially via the mobile phone's screen.

Easy to troubleshoot

Readable and high-resolution screen provides the valve's running state and the actuator's alarm chart. Setting procedures, switching procedures, warning signals, failures, and running times are recorded in the time-stamped event report. The event report is a distinct component of the diagnostic features of the SCHWARZ controls.



SCHWARZ SM/SC series actuators provide the valve actuating mechanism the below powerful outstanding performance:

Modular design, its components are more versatile, and thus keep the high efficiency of maintenance and low maintenance cost.

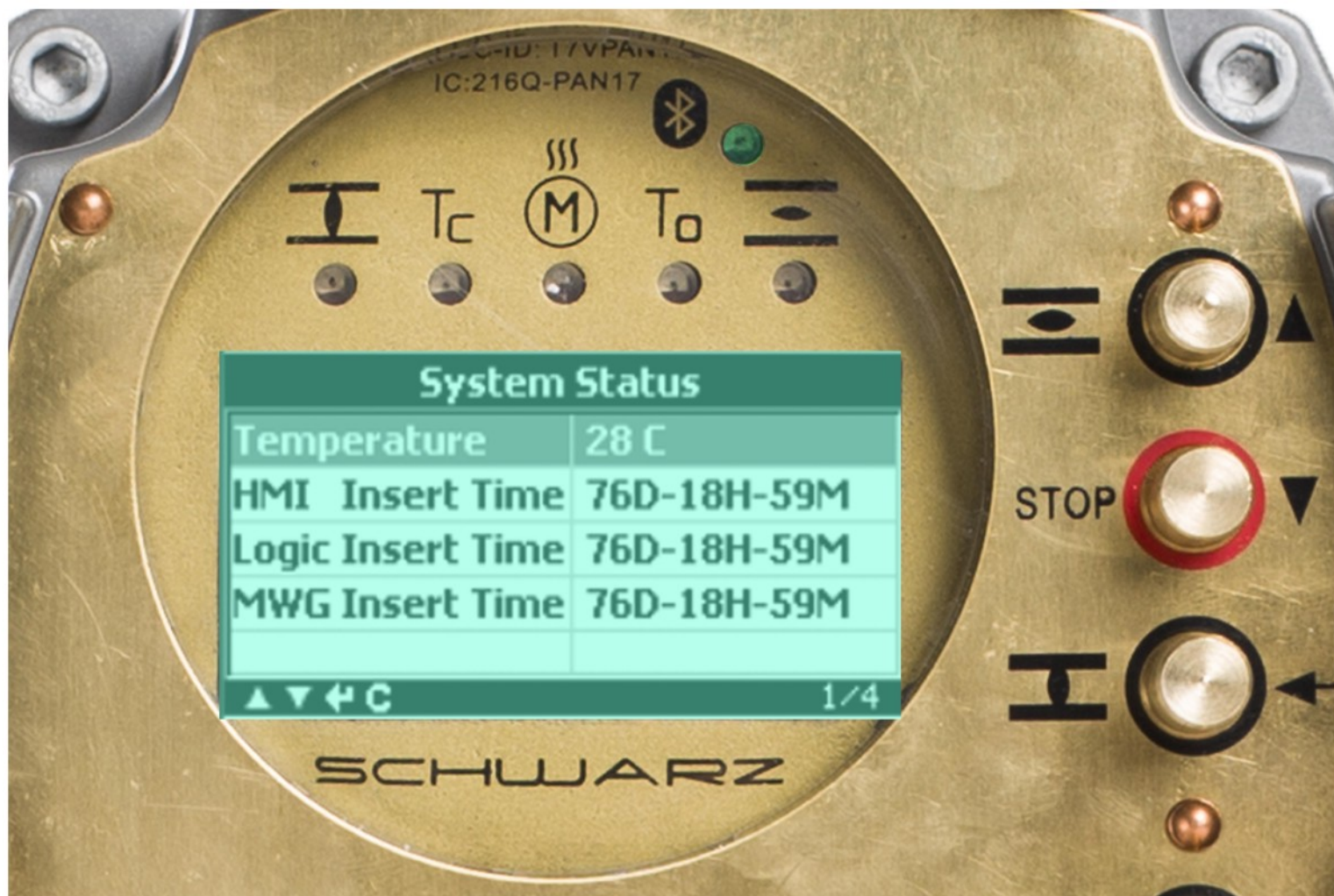
Three phase, single phase and DC motors can meet a variety of requirements.

A simple and reliable torque and position measure method makes the actuator more reliable.

The application of the most advanced chip integration technology improve the operation speed and reliability of the built-in microcomputer.

The data can easily be uploaded to the cloud and thus asset management is more convenient for users.

Safe and reliable hand-electric switch, easy hand-shaking with side-mount hand wheel.



Reliability is the soul of SCHWARZ actuators

The reliability design runs through the reasonable system structure of SM/SC series actuator and its every element and every component.

The absolute encoder makes the message of the actuator's position and torque keep forever. The power fail and operating by hand wheel cannot effect its real position and torque value. A precise measure to force upon the valve is very important and necessary because the measured value is the basis for providing protection. SCHWARZ intelligent actuators utilize the most reliable measure method so far. The position and torque can be measured precisely no matter changes in voltage, frequency and environment temperature.

Non-intrusive setting makes the actuator lifelong seal **1**

Opening the cover is no need for SCHWARZ actuators for any setting and data extraction. Non-intrusive setting means no thru shaft. The actuators keeping absolute seal.

SCHWARZ knows well how important the industrial automatic control is. The loss caused by the equipment trouble cannot be made up by its favorable price. And thus SCHWARZ regard the reliability as the actuator's soul.

The elaboration of the SCHWARZ actuator's shell makes the actuators adapt wet, cold, hot and strong-corrosion- air environment and thus the actuator's reliability is guaranteed.

SCHWARZ actuator's wring seal design **2**

Protection class reaches IP68-continuous working for 72 hours with 6 meters under water. Wring-seal system ensure the inner elements are protected because the terminal board isolates the inner cabinet from the external circuit connection. So long as the terminal board is removed, Water cannot invade the actuator and thus the inner elements are protected well.



1



2



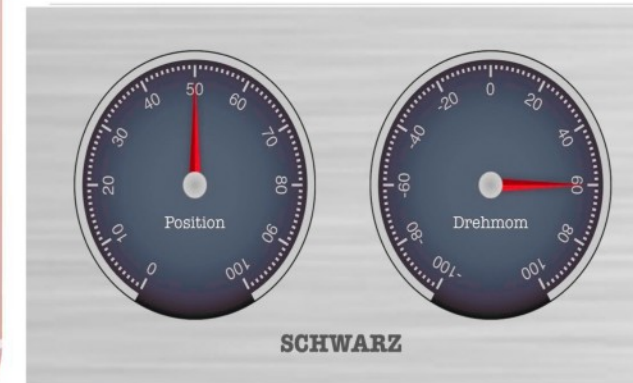


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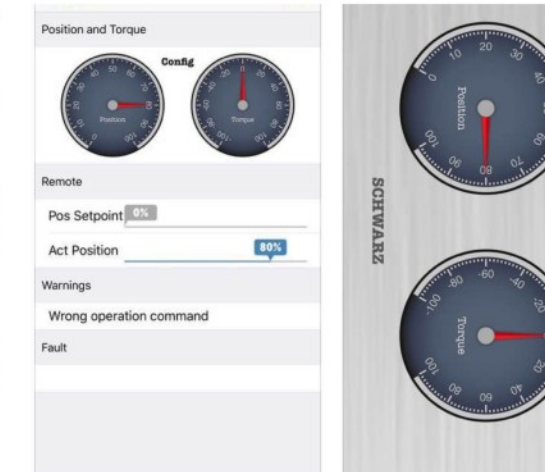
Systemstatus Finden Gerät

Schwarz

Verbunden ⓘ



3



Description

The Schwarz APP is a bluetooth based application which is designed for Schwarz actuator only. It can read and configure the actuator system settings through bluetooth connection in real time.

SCHWARZ——REDIFINE INTELLIGENT ACTUATORS

The product of actuator has the typical characteristics of being mechatronics. It has both machinery and electricity and also it has both hardware and software. So it provides the IT technology the platform to display.

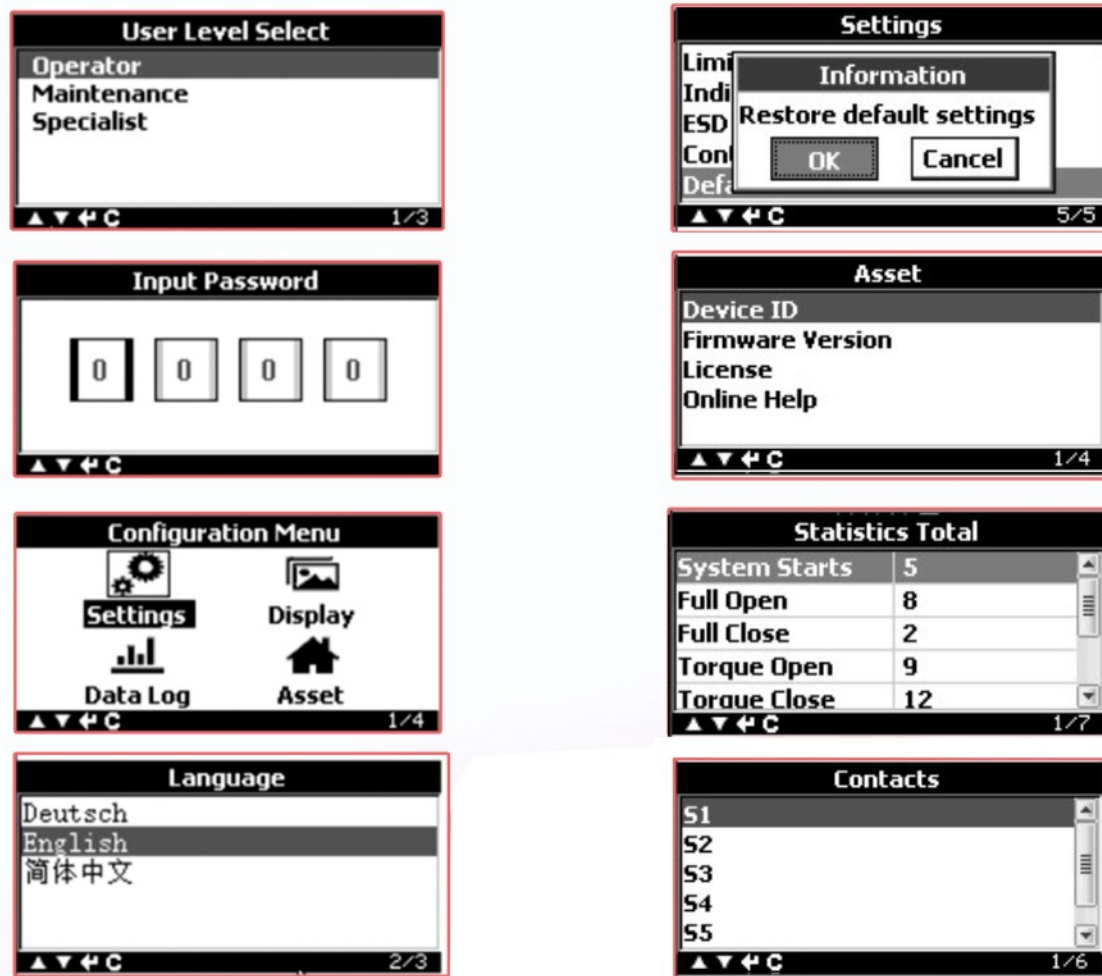
Schwarz redefines intelligent actuators with a slogan, "New Motion Starts Here". As we enter the 21st century where computer, communication and the internet have made unprecedented progress and changed our life, Schwarz is blending in, or making, the trend by applying and developing the most cutting-edge technologies to make intelligent actuators of the new era.

1 Stable Bluetooth communication has overcome the disadvantages of infrared ray communication. There is no distance or direction limit for Bluetooth. Bluetooth has also made it very convenient to connect the actuator with a computer.

2 iPhones, on which remote control App are installed, are highly accessible and stable. Users can download the Schwarz app in App Store. The Schwarz app can be used to make any adjustments to the actuator, and manage assets.

Attention: Password is needed for Bluetooth control, in case of phones being stolen and wrong users. Different passwords have different ways to use, as indicated in the manual of Schwarz actuators.

3 With Iphone, Scan the QR code to get quick links to download SCHWARZ software



SCHWARZ REDIFINE INTELLIGENT ACTUATORS

SCHWARZ has more than forty languages. But it only provides three languages when leaving the factory so as to make the human-machine interface more succinct.

Multiple languages are available. German, English and Chinese are included in the default version. Schwarz actuators are compatible with over forty other languages, which need to be installed specifically on demand.

Schwarz actuators can be upgraded on spot, by inserting an SD card. Newer versions of the software can be found on the official website of Schwarz.

Fast starting speed is not only to save time. The more important is its superior performance demonstrated.

The most advanced IT technology is utilized by SCHWARZ. The system software support dual back up. Only one of the two software can operate the system. Only one is upgraded when the upgrading the system so as to ensure the system security and stability and to avoid any accident. SCHWARZ can complete the system start within 6 seconds.

Reset to defaults

SCHWARZ actuators are easily to reset to defaults if they are in disorder. This way the actuator is easily to restore to factory state. This setting needs the maintenance code. Please refer to the operation manual.

Data record

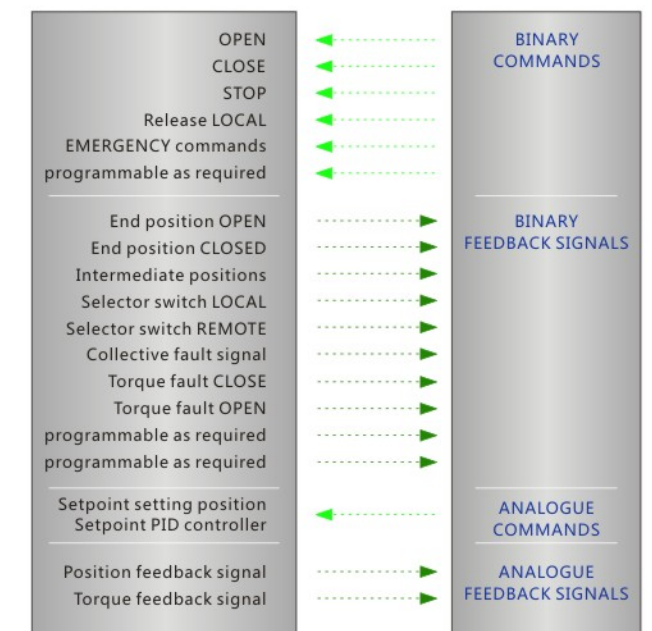
Setting procedures, switching procedures, warning signals, failures, and running times are recorded in the time-stamped event report. Based on this, further analysis to the operating environment and reason of the fault can be impossibly made.

Asset management

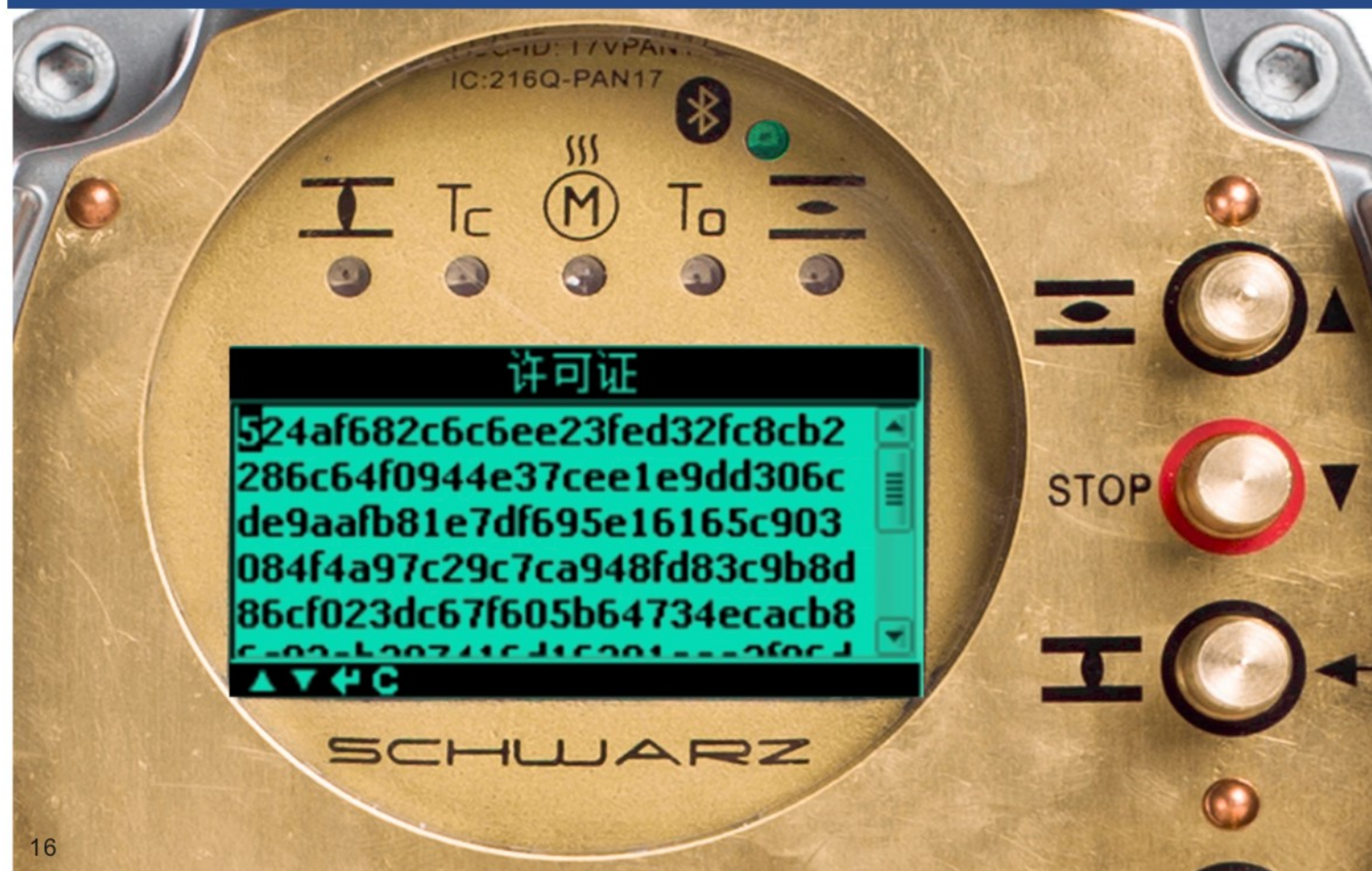
Ensure its user the legible interests. Every SCHWARZ actuator has the only license which is also kept as forever file by SCHWARZ when leaving the factory so as to make lifelong service tracking possible. The user can distinguish via SCHWARZ official web to ensure its right and interests.

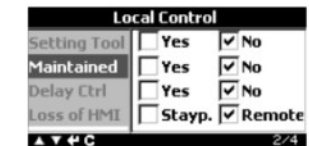
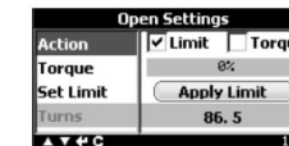
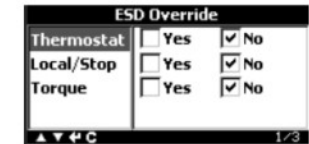
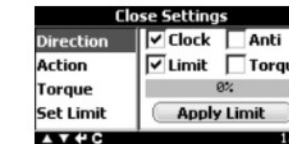
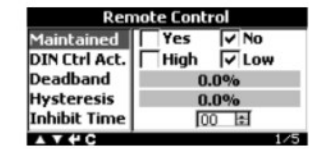
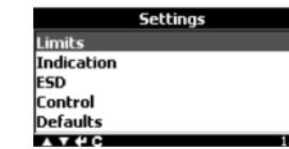
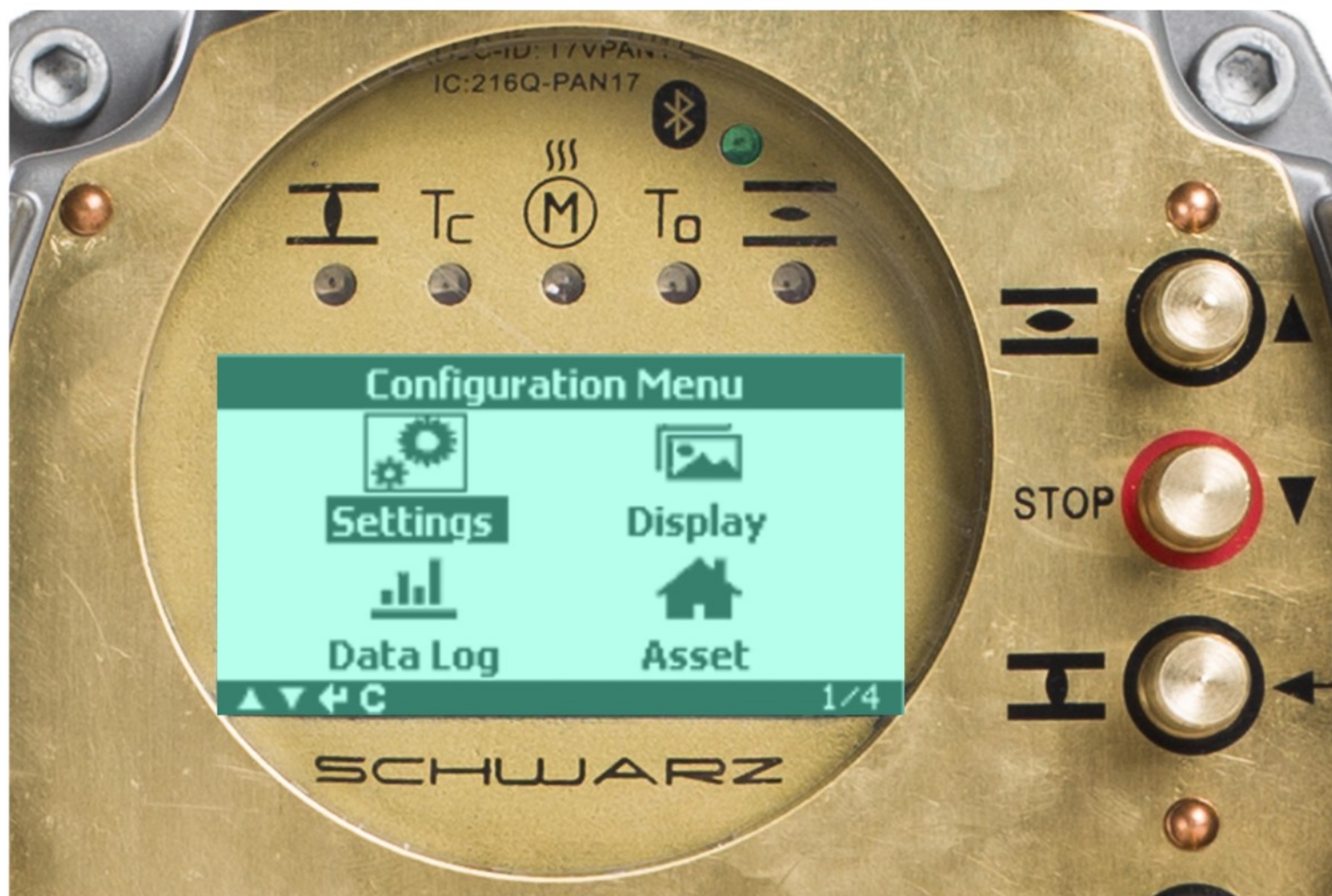
Signal assignment of outputs can be modified at a later date via the controls SC device setting. Depending on the version, SCHWARZ controls provide:

- > Up to six binary inputs e.g. operation commands OPEN, STOP, CLOSE, enable signals for local controls, EMERGENCY commands, etc.
- > Up to ten binary output e.g. for feedback of end positions, intermediate positions, selector switch position, failures, etc.
- > Up to two analogue inputs (0/4 – 20 mA) e.g. for setpoint reception to control the positioner
- > Up to two analogue outputs (0/4 – 20 mA) e.g. for feedback of valve position or torque
- > The binary inputs and outputs are potential-free, analogue outputs are galvanically isolated.



SCHWARZ REDIFINE INTELLIGENT ACTUATORS





Ease of operation, people oriented

All SCHWARZ actuators can connect to Iphone via Bluetooth. All settings can be done via Iphone.

All settings also can be done via the actuator's man-machine interface.

There are four push buttons: up, down, enter and reset. The operation keep the same as the habit of operating other intelligent device such as mobile phone.

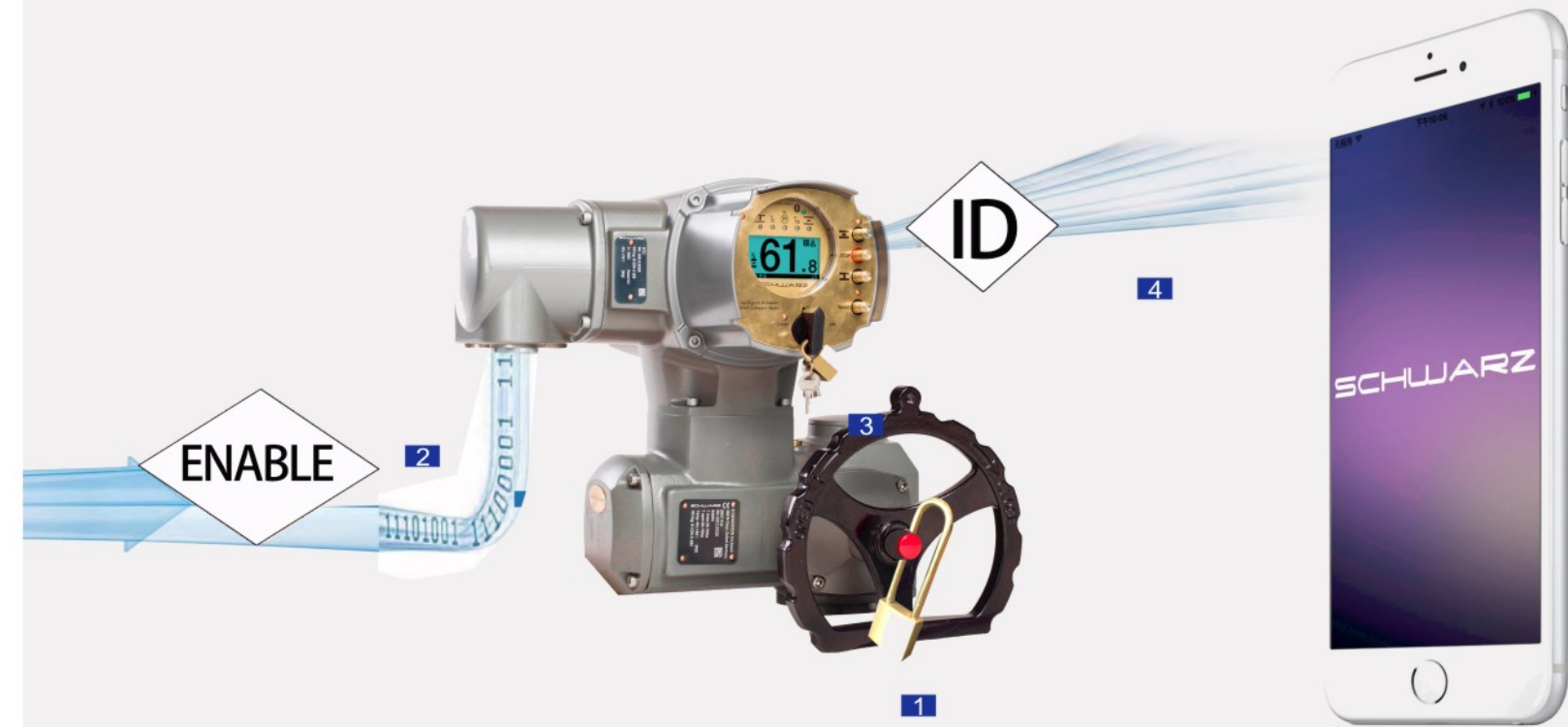
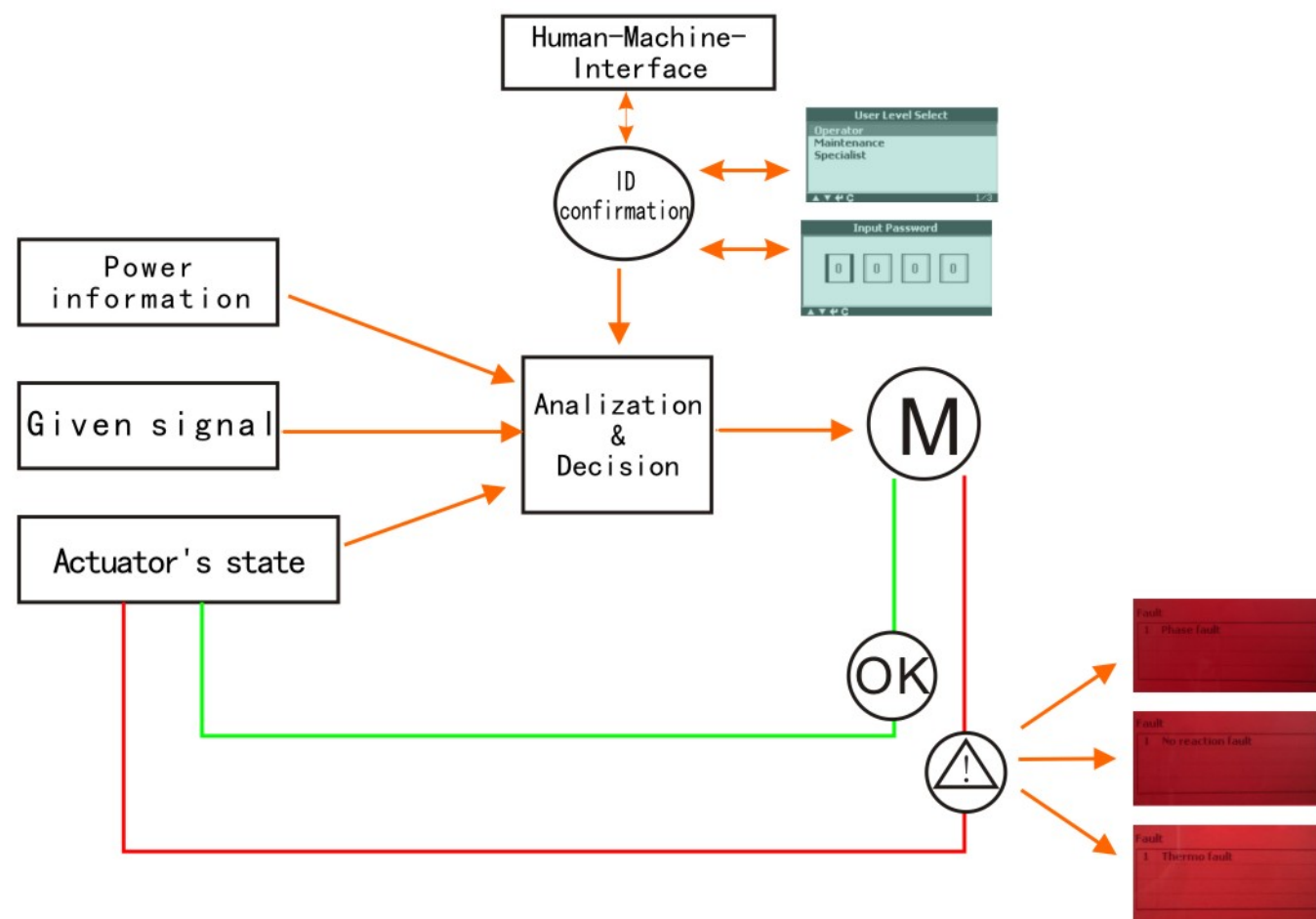
SCHWARZ actuator benefit from the further development of man-machine interface. Besides abundant information can be displayed, a highly intuitive menu is showed for convenient settings, updating and diagnose.

SCHWARZ constantly imagine itself to be in the customer's position and try its best to reduce the pay in time and effort because of a lot of work in settings and diagnose.

SCHWARZ constantly imagine itself to be in the customer's position and try its best to reduce the pay in time and effort because of a lot of work in settings and diagnose.

Humanized logical menu structure. Only to check a single box, easy and simple.

A flat menu organizational structure with a high resolution screen brings up everything listings for you. Even no operation manual around you, you don't need to worry about making mistakes. Modular design concept, the replacement is convenient. SCHWARZ sticks to universality principle so all electronic cards except one interface card are in common use no matter what type actuators they are – switching, modulating or field bus types. In this way the customer replaces the cards easily and save the relevant replacing cost as much as possible.



Protection is Everywhere

✓ The auto correction of phase sequence. No matter what the phase sequence of the client part that connects to a Schwarz actuator is, the actuator will operate in the correct direction.

✓ The one-phase protection of a three-phase actuator. The electronics parts of a Schwarz actuator monitor the three phases of the power source. If the actuator runs in one-phase, the actuator would prohibit the circuit to excite the reversing contactors, and send an error message.

✓ The protection of override. If during operation the actuator was imposed on a wrong or overly large torque, the control unit will shut down the actuator and send an error message.

✓ The protection of overheating of the motor. The heat sensitive switch on the coil of the motor would turn off when the motor has a high temperature.

- ✓ The protection of stalling. If the motor was excited and there was no changing in actual position for more than ten seconds, the actuator would stop and be irresponsive for any operations for one minute, and send an error message with a red screen flashing in order to protect the coil of the motor.
- ✓ The protection of instant reversal. If the actuator receives the command of instant reversal, the time delay circuit would compensate the unnecessary wearing of gearbox. This function can also confine the surge current via reversing contactors.
- ✓ The break protection of the Can bus. If a poor contact results in open circuit in the Can bus, the actuator would stop and remain in current position, and send an error message. The actuator would not go back to operation until the Can bus recovers in order to prevent mis-operation.
- ✓ Password protection. Password protection is an important feature of Schwarz actuators. Unauthorized personnel are not allowed to make any change to the actuator. There are three levels of password: operators, maintenance and professional engineers. See manual for details.
- ✓ The hand wheel locking unit. Manual mode can be locked with the hand wheel locking unit. **1**
- ✓ Long range locking of the on-site control of the SC unit. The on-site control of the SC unit is available only when the actuator receives the excitation signal. **2**
- ✓ Lock of the mode switch. **3**
The mode switch can be protected in three positions: LOCAL, OFF, REMOTE.
- ✓ Protection of SC Bluetooth communication. **4**
Password pairing is needed between a mobile device and a SCHWARZ actuator.



Flexibility and modular design

1 One of the features of the SM-SC series is that the connection parts of different parts can be rotated by 90 degrees. This feature prevents the screen being upside down and cable dock facing up, and thus ensures the actuator is easy to operate.

3 The SM-SC model is flexible to use. The SM model alone is a simple actuator, which can be used with a motor control cabinet. If the user chooses the MCC cabinet to control the actuator, Schwarz can also provide a simpler actuator with only the SM part. The extraordinary mechanical performance of the SM part alone can satisfy the need of the user.

2 SM and SC models can be used either as a whole or separately. When environmental conditions are harsh, such as high temperatures and intense vibrations, SM and SC model could be used separately, with a wire connecting them together. Because the SM and SC part are connected electronically instead of mechanically. Additionally, the SM model is equipped with side-mounted hand wheel, which makes it easy for users to operate.

Various kinds of driving mode

SCHWARZ actuators have several forms of mechanical output. Besides multi-turn output, there are others output forms:

- to lift up the valve stem by turning the nut
- to be a linear actuator by connecting to a linear thruster
- to be a quarter-turn actuator by connecting a worm wheel gearbox
- to be a base-lever actuator to drive a fan by connecting a worm wheel gearbox with base and lever
- to be still a multi-turn actuator with amplification by connecting a bevel gearbox.

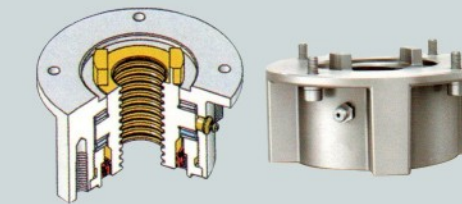
SCHWARZ provides varied output forms to meet different applications. Please refer to relevant document-SCHWARZ gearboxes.

The combination of SCHWARZ actuators and gearboxes is not only for enlarging the force but also forming varied outputs to meet the actual varied applications.



Various kinds of driving mode

Output A



Apply to thrust mode

SM-SC actuators

Mounted with linear thrust unit LT



The max thrust: 200KN
Stroke length: 50mm-500mm
Apply to globe valves and control valves

Mounted with multi-turn gearbox GB



Torque: up to 15,000NM
Apply to gate valves, globe valves, sluice valves and barrages.



Reasonable design works as a prerequisite to ensure a stable quality. SCHWARZ intelligent SM-SC actuators rationality of the structure is tested by practice. SM-SC actuators consist of its mechanical part-SM and its electronic control part-SC.

The use of SM-SC is flexible. SM as a simple actuator can be used alone if there is Motor Control Cabinet (MCC) supplied. SM and SC models can be used either as a whole or separately. When environmental conditions are harsh, such as high temperatures and intense vibrations, SM and SC model could be used separately, with a wire connecting them together.

SM is equipped with side-mounted hand wheel, which makes it easy for users to operate because of a mechanical gain between the hand wheel and output.

4 Limit and torque encoder MWG

Hall sensor with magnetic pulsing system can measure the position and torque precisely without any switches. The intelligent encoder can also record the temperature and vibration. The brass gears have a reliable transmission and a long lifetime.



1 Hand operation

Driving hand wheel can be an emergency operation when the main power is off. A hand-auto clutch ensures safe operation even if the motor is turning. An instant of the motor idling may be possible. Any danger of human or equipment can be always avoided.

2 Non-intrusive setting

All the actuator's setting and diagnose can be performed via man-machine dialogue interface screen or Iphone device loaded with SCHWARZ software.

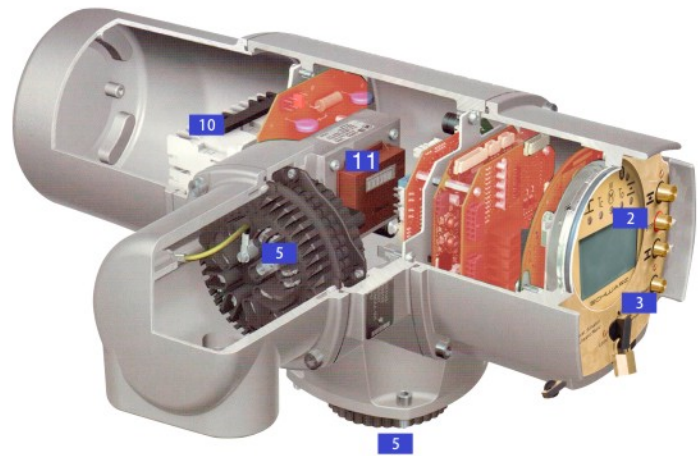
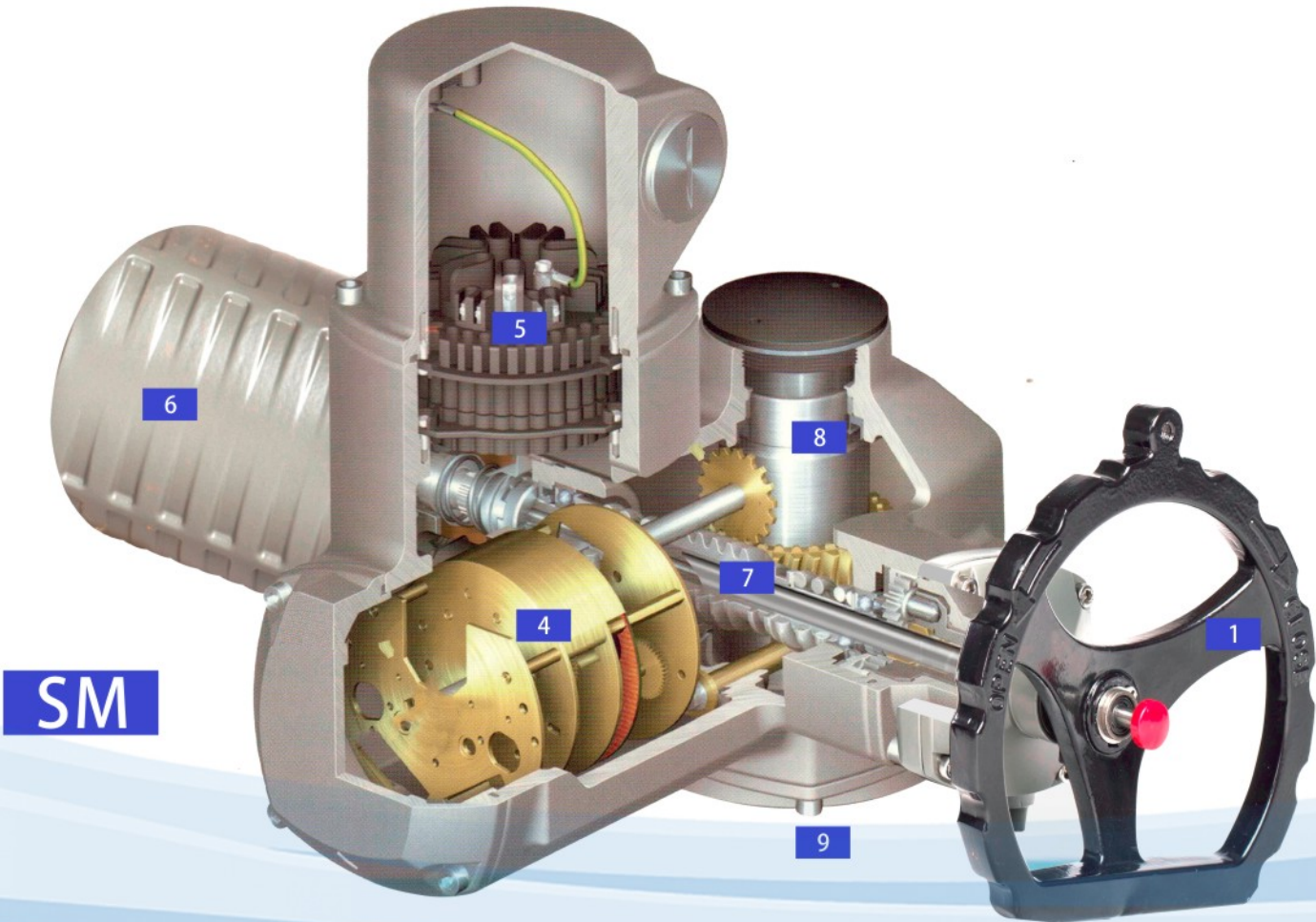
3 Local control

Local push buttons and lockable selector switch with local, off and remote states interact with hall sensor on electronic boards, avoiding a stem across the section and keeping a good seal.

5 Terminal box

SCHWARZ actuator follows the idea of unification. The actuator can be disconnected and reconnected to the terminal box quickly. This way can reduce the downtime and avoid wiring error effectively.

Wring-seal system ensure the inner elements are protected because the terminal board isolates the inner cabinet from the external circuit connection. So long as the terminal board is removed, Water cannot invade the actuator and thus the inner elements are protected well.



SC



6 Motor

A low-inertia and high-torque motor makes it reach the top speed rapidly. There is precise temperature transmitter. The power will be cut off when the motor temperature reach 140 degrees. The thermal switch recover when the temperature is down to 120

7 Driving gears

A worm and worm wheel structure with self-locking avoid the actuator's turning by an external drive. The worm and worm soaked in oil and grease can apply to the biggest environment differences.

10 Reversing contactors

Reversing contactors is for standard version. For modulating duty we recommend thyristor without mechanical wear and tear



Thyristor

11 Power supply board

The source of power for actuators. Provide DC and AC electric power.

12 Controlling module

CPU with software is included. Process the actuator's feedback and command signals.

8 Output hollow shaft

The valve stem driven by the output hollow shaft stretches out from the hollow shaft. For a longer stroke valve the actuator is mounted with a protection tube.

For torque-mode output the driving sleeve is located in the interior of hollow shaft.

9 Driving flange

ISO5210 standard. Varied connection modes are available

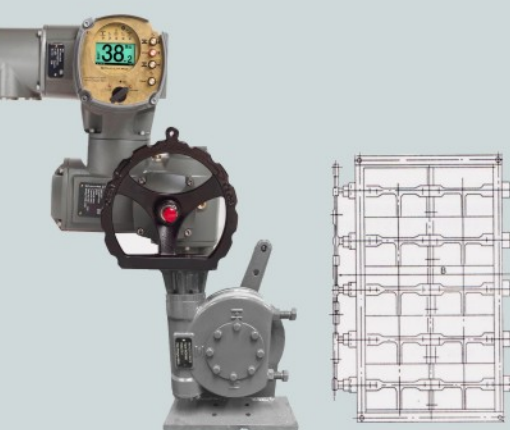


Mounted with worm wheel gearboxes GW

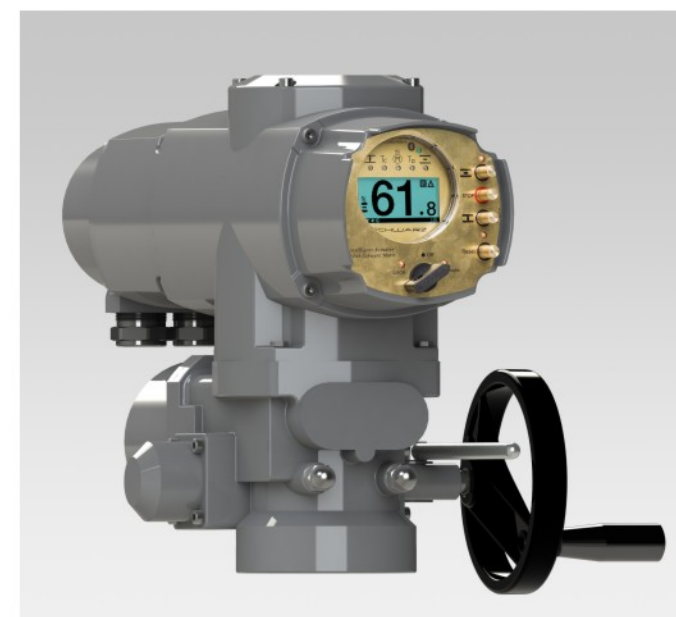


Torque: up to 500,000NM
Apply to quarter-turn devices such as ball valves and butterfly valves.

Mounted with base-lever worm wheel gearboxes GWF



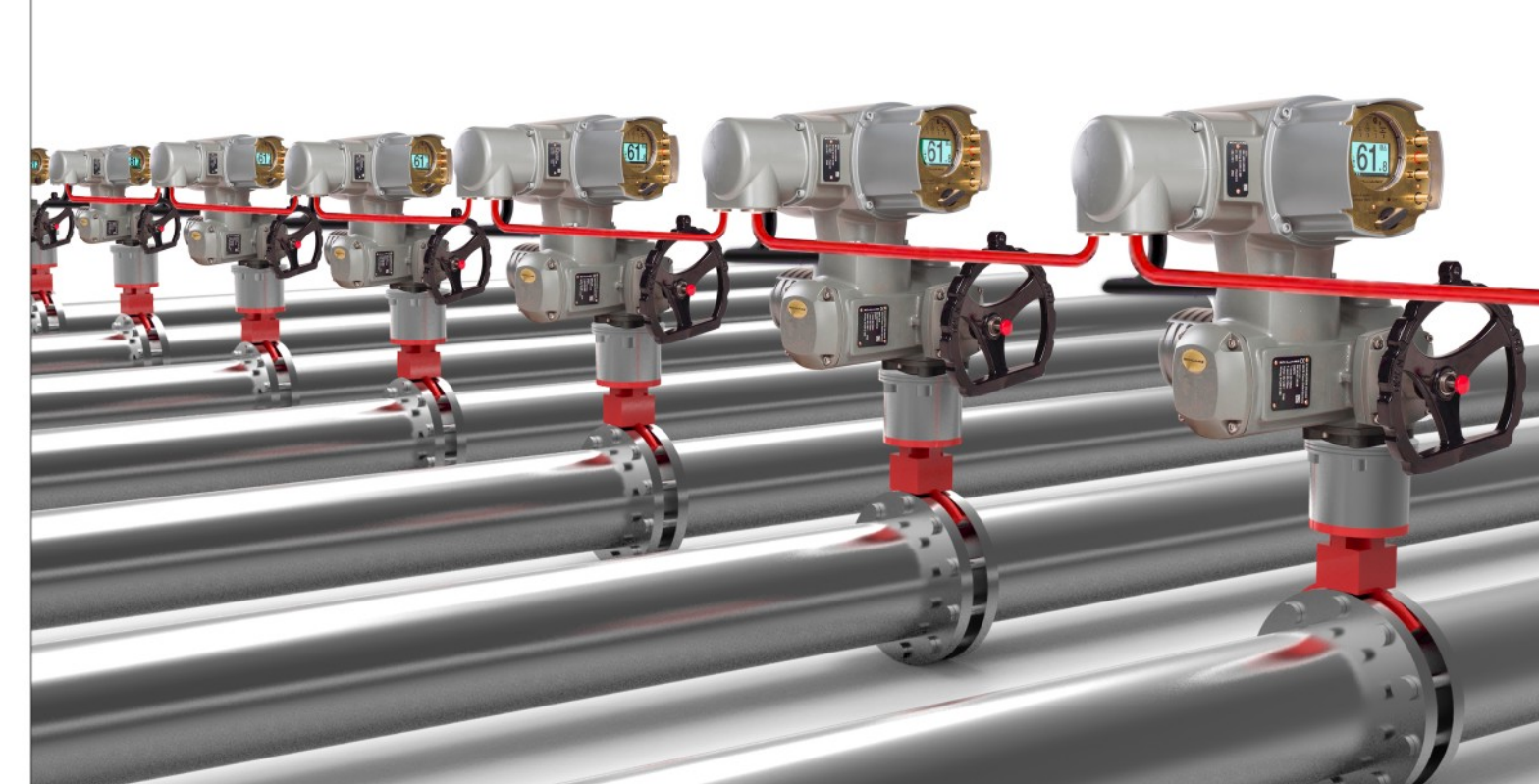
Torque: up to 35,000NM
Apply to butterfly valve with a lever and damper



Quarter-turn actuator SMQ/SC

Quarter-turn actuators are used in abundance in actual control application. For example butterfly valves, ball valves and dampers are driven widely by quarter-turn actuators. SM/SC+GW can implement the quarter-turn application. Sometimes a compact actuator (not combined with an exterior gearbox) can save space considering of space limitation on site. SCHWARZ increases quarter-turn actuator SMQ/SC series to SM/SC family. SMQ/SC actuators as a compact-actuator mode share the same control system including limit and torque encoder- MWG.

SMQ/SC's mechanical part-SMQ collects the function of SM+GW. SMQ's interior gearing transfers the multi turn to quarter turn. Generally SMQ is less in both volume and weight. For large quarter-turn actuators SM+GW is preferred because of a wide range of output torque. Pls. refer to SCHWARZ relevant technical data.

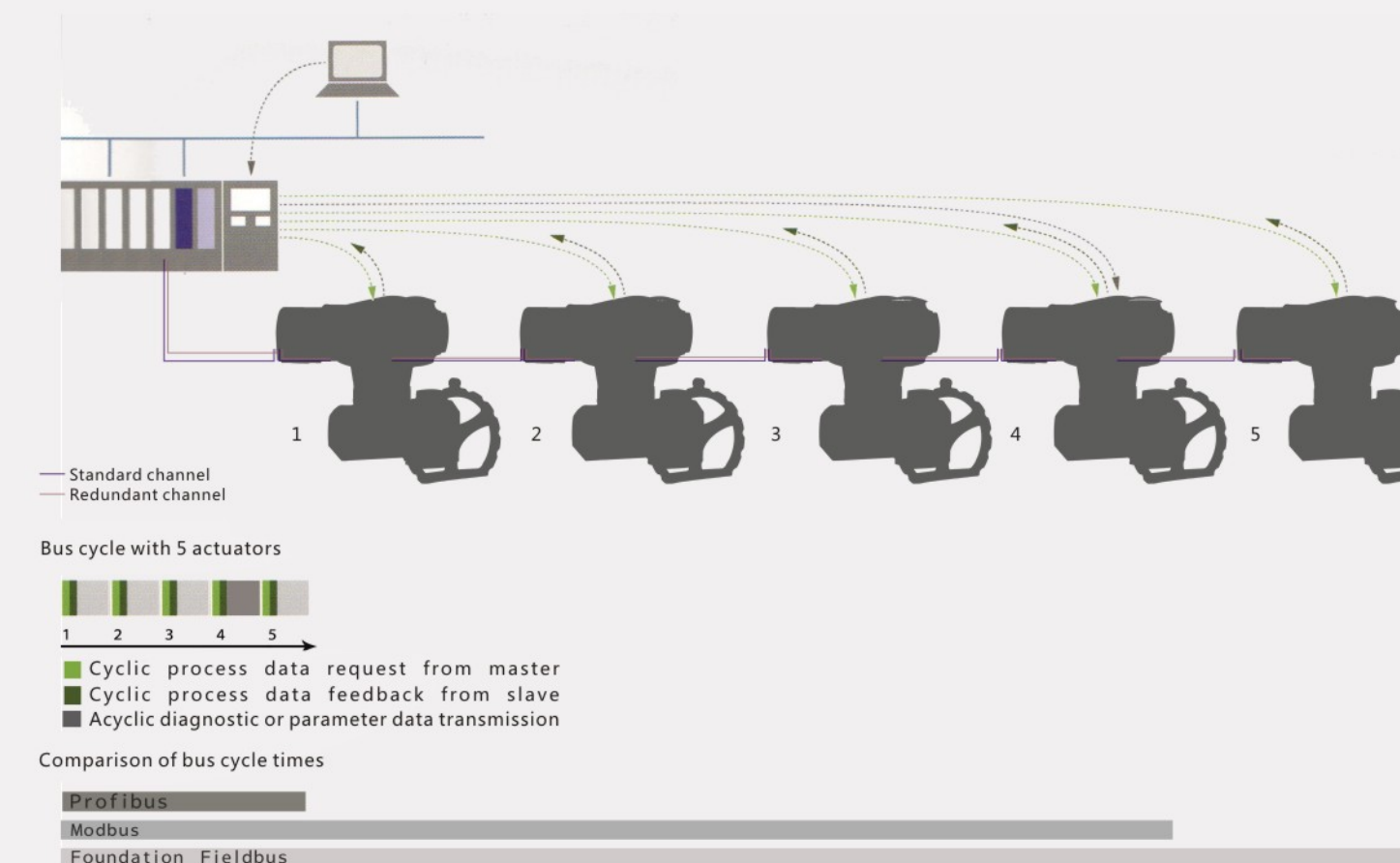


Fieldbus control

With the development of communication technology fieldbus control mode is used more and more-widely in the automation field. Cost reduction is one of the main factors in favor of fieldbus technology. In addition, introduction of serial communication in process automation has proven as an innovation driver for field devices and consequently for actuators. Concepts for efficiency gains such as remote parameterization or Plant Asset Management would not be feasible without fieldbus technology. SCHWARZ actuators with fieldbus have advance world level.

SCHWARZ actuator's control is connected to wide communication and control system including those main international open bus protocol.

- Profibus DP
- Modbus RTU
- Foundation Fieldbus

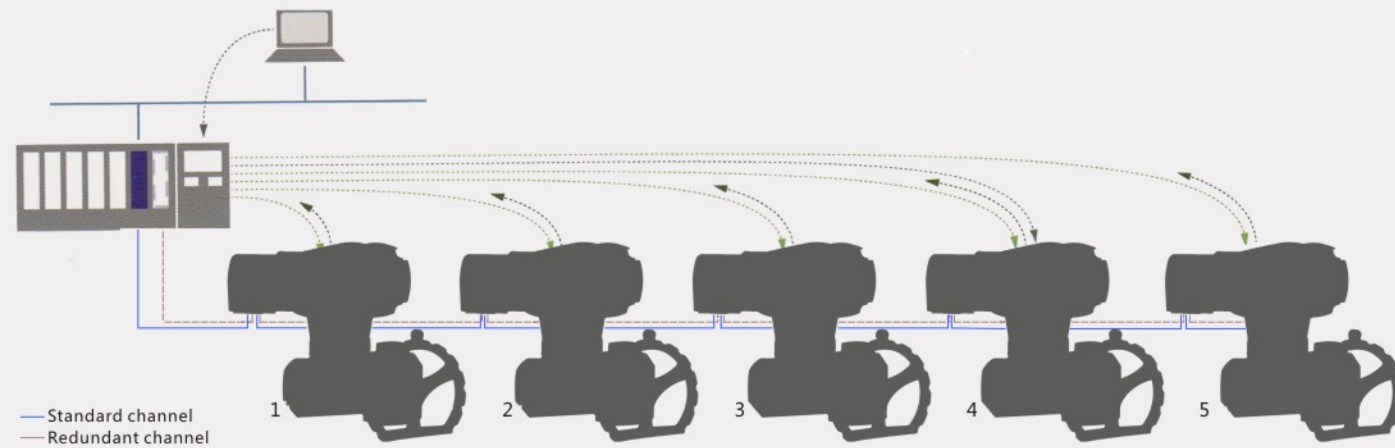


Profibus DP

Profibus offers a complete family of fieldbus versions: Profibus PA for process automation and Profibus DP for automating plants, power plants and machines. Due to its simple and robust physical layer (RS-485) and the different service levels DP-V0 (fast cyclic and deterministic data exchange), DP-V1 (acyclic access to device parameters and diagnostic data) as well as DP-V2 (further functions such as time stamp or redundancy), Profibus DP is the ideal solution for plant automation.

- > International standard, IEC 61158/61784 (CPF3), www.profibus.com
- > Large installation base
- > Standardized integration within the DCS (FDT, EDD)
- > Large selection of devices
- > Typical applications: Power plants, sewage treatment plants, water treatment plants, tank farms

- SCHWARZ actuators with Profibus DP
- > Support Profibus DP-V0, DP-V1 and DP-V2
 - > High speed data exchange (no less than 1.5 Mbit/s - corresponds to approx. 0.3 ms/actuator)
 - > Integration within the DCS via FDT or EDD
 - > Cable length up to approx. 10 km (no less than 1,200 m without repeater)
 - > Up to 126 devices can be connected
 - > Option: Redundant line topology as an option
 - > Option: Data transmission via fibre optic cables

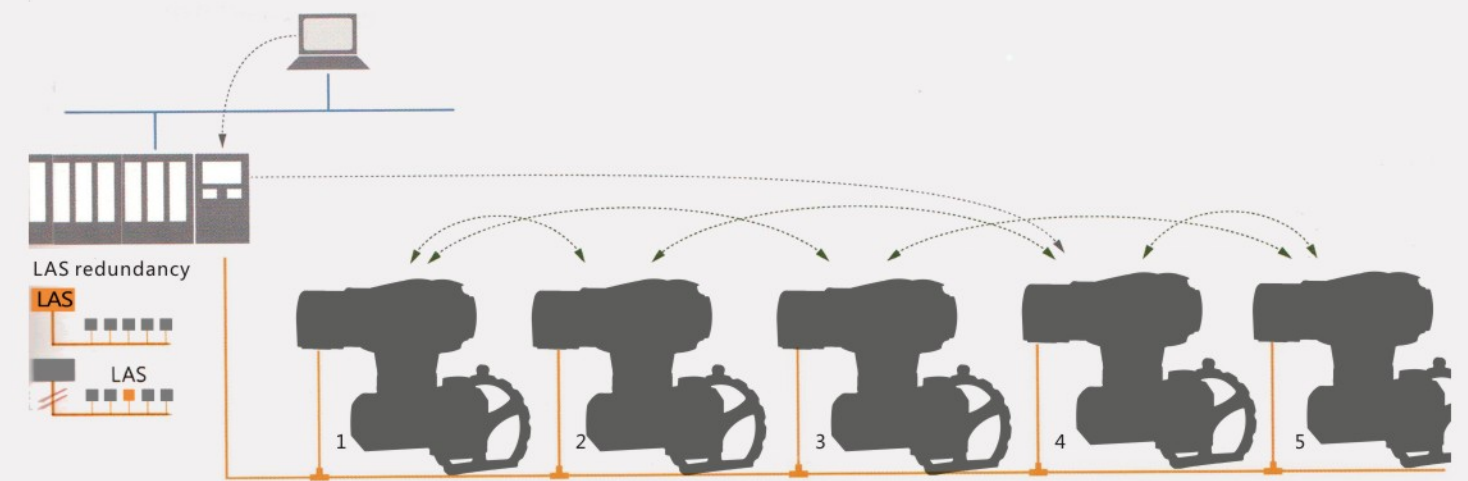


Bus cycle with 5 actuators



- Cyclic process data request from master
- Cyclic process data feedback from slave
- Acyclic diagnostic or parameter data transmission

Comparison of bus cycle times



Bus cycle with 5 actuators



- Cyclic data exchange between process participants (publisher <> subscriber)
- Acyclic diagnostics or parameter data transmission (report distribution, client server)

Comparison of bus cycle times



Fieldbus control MODBUS

For plant automation and similar to Profibus, the simple and robust physical layer RS-485 is often used.

In comparison with other fieldbus technologies, Modbus is simple but has a multi-functional fieldbus protocol. It offers all services required for plant automation, e.g. exchange of simple, binary information, analogue values, device parameters or diagnostic data.

On the basis of this physical layer, Modbus supports various telegram formats, e.g. Modbus RTU or Modbus ASCII. Using the Modbus TCP/IP version based on Ethernet, vertical integration into a host automation system is often implemented.

- > International standard, IEC 61158/61784 (CPF15), www.modbus.org
- > Simple protocol
- > Worldwide distribution
- > Largely sufficient for many simple automation tasks
- > Typical applications: Water and wastewater treatment plants, pumping stations, tank farms

SCHWARZ actuators with Modbus RTU

- > Fast data exchange (up to 115.2 kbit/s - corresponds to approx. 20 ms/actuator)
- > Cable length up to approx. 10 km (No less than 1,200 m without repeater)
- > No less than 247 devices can be connected
- > Option: Redundant line topology
- > Option: Data transmission via fibre optic cables.

Foundation Fieldbus (FF) was explicitly adapted to the requirements of process automation. Transmission physics of the FF H1 protocol used at field level are based on IEC 61158-2 and ISA SP 50.02. These standards define the framework for data transmission and energy supply of simple field devices using the same cable pair. FF H1 supports various topologies. In combination with junction boxes or segment barriers, extremely flexible cable installations are possible. Apart from conventional line and tree structures, FF H1 supports point-to-point topology or other structures with one trunk combined with individual spurs leading to the field devices.

Foundation Fieldbus data interfaces are based on standardized function blocks, for example AI (Analog Input), or AO (Analog Output) whereby their inputs and outputs can be linked. Therefore, FF fieldbus devices can directly communicate with each other provided that the segment is equipped with a Link Active Scheduler (LAS) to coordinate FF communication.

SCHWARZ actuators with Foundation Fieldbus
SCHWARZ actuators support FF H1 version.

- > Data exchange at 31.25 kbit/s, typical cycle time 1s
- > Cable length up to approx. 9.5 km (No less no 1,900 m without repeater)
- > No less than 240 devices can be addressed, typically 12 to 16 field devices are available
- > Integration within the DCS via DD or FDT
- > SCHWARZ actuators support LAS and thus adopt the tasks of the link active scheduler.

SM MULTI-TURN ACTUATORS AND SQ PART-TURN ACTUATORS

SM MULTI-TURN ACTUATORS FOR OPEN-CLOSE DUTY

The following data applies to actuators with 3-phase motors, operated in type of duty S2 - 15 min/classes A and B in compliance with EN 15714-2. For further information on other motor types and types of duty, refer to separate technical and electrical data sheets.

Type	Output speeds at 50 Hz1	Setting range for tripping torque	Number of starts Starts max.	Valve mounting Aange	
	RPM	NM	1/h	ISO5210	DIN3210
SM07	11-120	30-70	120	F07 or F10	G0
SM12	11-120	40-120	100	F10	G0
SM30	11-120	120-300	80	F14	G1/2
SM50	11-120	200-500	60	F14	G1/2
SM100	11-120	400-1000	60	F16	G3

SMR MULTI-TURN ACTUATORS FOR MODULATING DUTY

The following data applies to actuators with 3-phase motors, operated in type of duty S4 - 25 %/class C in compliance with EN 15714-2. For further information on other motor types and types of duty, please refer to separate technical and electrical data sheets.

Type	Output speeds at 50 Hz1	Setting range for tripping torque	Maximum torque for modulating duty	Number of starts Starts max. 2	Valve mounting Aange	
	rpm	NM	NM	1/h	ISO5210	DIN3210
SMR07	11-60	35-70	35	1800 ¹	F07或F10	G0
SMR12	11-60	60-120	60	1500 ¹	F10	G0
SMR30	11-60	150-300	150	1200	F14	G1/2
SMR50	11-60	250-500	250	1200	F14	G1/2
SMR100	11-60	500-1000	500	1000	F16	G3

SMQ QUARTER -TURN ACTUATORS FOR OPEN-CLOSE DUTY

The following data applies to actuators with 3-phase motors, operated in type of duty S2 - 15 min/classes A and B in compliance with EN 15714-2. For further information on other motor types and types of duty, refer to separate technical and electrical data sheets.

Type	Stroke time at 50 Hz	MAX torque	Number of starts Starts max.	Valve mounting Aange
	S/90 degrees	NM	1/h	ISO5211
SMQ05	7.5-40	50	120	F05
SMQ10	7.5-40	100	100	F05/F07
SMQ20	7.5-40	200	80	F10
SMQ30	7.5-40	300	60	F10
SMQ40	7.5-40	400	60	F10
SMQ60	7.5-40	600	60	F14
SMQ90	7.5-40	900	60	F14
SMQ120	7.5-40	1200	60	F16
SMQ150	15-60	1500	60	F16
SMQ200	15-60	2000	60	F16
SMQ250	15-60	2500	60	F16
SMQ350	15-60	3500	60	F25

SMQ QUARTER-TURN ACTUATORS FOR MODULATING DUTY

The following data applies to actuators with 3-phase motors, operated in type of duty S4 - 25 %/class C in compliance with EN 15714-2. For further information on other motor types and types of duty, please refer to separate technical and electrical data sheets.

Type	Stroke time at 50 Hz	MAX modulating torque	Number of starts Starts max.	Valve mounting Aange
	S/90 degrees	NM	1/h	ISO5211
SMQR05	7.5-40	25	1800 ¹	F05
SMQR10	7.5-40	50	1500 ¹	F05/F07
SMQR20	7.5-40	100	1200	F10
SMQR30	7.5-40	150	1200	F10
SMQR40	7.5-40	200	1200	F10
SMQR60	7.5-40	300	1200	F14
SMQR90	7.5-40	450	1200	F14
SMQR120	7.5-40	600	1200	F16
SMQR150	15-60	750	1200	F16
SMQR200	15-60	1000	1200	F16
SMQR250	15-60	1250	1200	F16
SMQR350	15-60	1750	1000	F25

Environment temperature

-20°C --+70 (Standard)
-60--+60(Low temperature, optional)
0—120(High temperature, opertional)

Shell

Waterproof IP68, NEMA4 and 6

Lubrication

Aluminium-base greases (EP mode)

Material

Spheroidal graphite cast iron, High strength aluminum alloy, Steel, Aluminium bronze, Polycarbonate

Overcoat layer

Dry powder, epoxy polyester, with high anticorrosive effects

Seismic performance

According to EN60068-2-6, in the frequency range 10-200HZ, SCHWARZ SM-SC actuators' seismic degree reach 1g without fatigue

Noise level

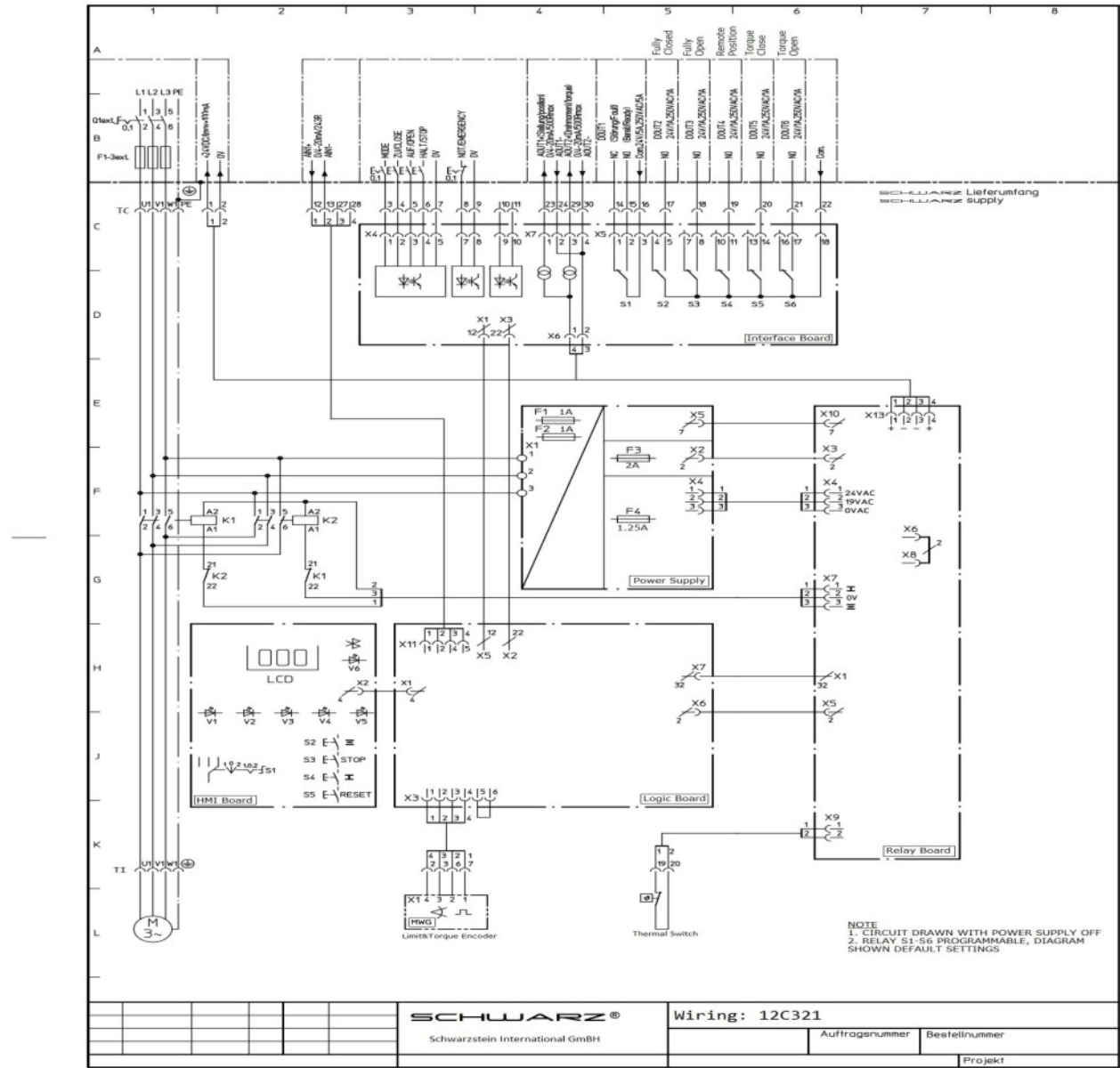
SM-SC actuators generate the noise less than 72dB(A)

Fieldbus control

Wiring/Terminal

All wirings show 50-pin-plug-socket teminals. Each actuator is attached detailed wring when delivery.

SCHWARZ plug/socket connector			
	Power contacts	Protective earth	Control contacts
No. of contacts max.	6 (3 equipped))	1 (leading contact)	50 pins/sockets
Designation	U1, V1, W1, U2, V2, W2	PE	1 to 50
Connection voltage max.	750V	-	250V
Rated current max.	25A	-	16A
Type of customer connection	Screw connection	Screw connection for ring lug	Screw connection, crimp-type (option)
Connection diameter max.	6mm ²	6mm ²	2.5mm ²
Material - pin socket carrier	Polyamid	Polyamid	Polyamid
Material - contacts	Brass	Brass	Brass, tin plated or gold plated (option)



Typical wring for example. The exact wiring diagram can be found at www.schwarz-tech.com

Thread dimensions of cable entries (selected choice)	
	Electrical connection S
M-threads (standard)	1 × M20 × 1.5; 1 × M25 × 1.5; 1 × M32 × 1.5
Pg-threads (option)	1 × Pg 13.5; 1 × Pg 21; 2 × Pg 29
NPT-threads (option)	2 × 3/4" NPT; 1 × 1/4" NPT
G-threads (option)	1 × G 3/4" ; 1 × G 1/4"

Operational functions
Type of seating programmable
Automatic correction of the direction of rotation upon wrong phase sequence
Positioner
Feedback of intermediate positions
Approaching the intermediate positions directly from remote
Programmable EMERGENCY behaviour
Failure behaviour on loss of signal
Torque by-pass

Monitoring functions
Valve overload protection
Phase failure/phase sequence
Motor temperature (limit value)
Monitoring the admissible on-time (type of duty)
Manual operation activated
Operating time monitoring
Reaction upon receipt of operation command
Motion detector
Wire break monitoring, analogue inputs
Temperature of electronics
Monitoring of position transmitter in the actuator
Monitoring of torque sensing

Diagnostic functions
Operating data logging
Electronic device ID
Maintenance recommendations regarding O-rings, lubricant, reversing contactors, and mechanics.

SUPPLY VOLTAGES/MAINS FREQUENCIES

3-phase AC current

Voltages	Frequency
V	HZ
220; 230; 240; 380; 400; 500; 660; 690	50
440; 460; 480; 575; 600	60

1-phase AC current

Voltages	Frequency
V	HZ
220	50
115; 230	60

Permissible auctuations of mains voltage and frequency

- Standard for SM
 - Mains voltage: ±10 %
 - Frequency: ±5 %
- Option for SC
 - Mains voltage: -30 %
 - Requires special sizing when selecting the actuator.

Motor insulation classes

	Insulation classes
3-phase AC motors	F, H
1-phase AC motors	F