SRU 40 MD

MASTERDRIVE

Dear Customer,

Congratulations on choosing a SCHUNK product. By choosing SCHUNK, you have opted for the highest precision, top quality and best service.

You are going to increase the process reliability of your production and achieve best machining results – to the customer's complete satisfaction.

SCHUNK products are inspiring.
Our detailed assembly and operation manual will support you.

Do you have further questions? You may contact us at any time – even after purchase. You can reach us directly at the mentioned addresses in the last chapter of these instructions.

Kindest Regards,

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Contents

1 Safety

1.1 Symbol key

You will find this symbol wherever hazards for persons **or** damage to the product are possible.

This symbol indicates important information on the product or its handling.

1.2 Appropriate use

The unit must only be used within the scope of its technical data. Appropriate use also includes compliance with the conditions the manufacturer has specified for commissioning, assembly, operation, the environment and maintenance. Using the unit with disregard to even a minor specification will be deemed inappropriate use. The manufacturer assumes no liability for any injury or damage resulting from inappropriate use.

1.3 Safety notes

The unit has been built according to the level of technology available at the time of delivery and is safe to operate. However, the gripper may still be dangerous if, for example:

- the unit is used, assembled or maintained inappropriately.
- the unit is used for purposes other than those it is intended for.
- The EC Machine Directive, the accident prevention regulations, the VDE guidelines, or the safety information and assembly notes are not adhered to.

All persons responsible for assembly, commissioning and maintenance of the unit are obliged to have read and understood all the operating instructions, in particular Chapter 1 on “Safety”. We recommend that the customer have this confirmed in writing.

The installation and deinstallation, assembly of the proximity switches, connection and commissioning may only be carried out by authorised, appropriately trained personnel.

Modes of operation and work methods that adversely affect the function and/or the operational safety of the unit are to be refrained from.

Never move any parts by hand as long as the power supply is connected.

Never reach into uncovered mechanisms and never reach in the swivelling area of the unit.

Always disconnect the power supply lines during assembly, conversion, maintenance and adjustment work.

Carry out maintenance, conversion and add-on work outside of the hazard zone.

During assembly, connection, adjustment, commissioning and testing, it is imperative to exclude the possibility that the fitter or any other person could accidentally activate the unit.

When using handling modules, protective covers must be used in accordance with the EC Machine Directive, Point 1.4.

Risks could arise due to objects falling or being thrown out. Measures must be taken to prevent potentially dangerous objects (processed workpieces, tools, chippings, fragments, waste etc.) from falling or being thrown out.

Additional holes, threads or attachments which are not supplied as accessories by SCHUNK may only be applied after obtaining the prior consent of SCHUNK.

The maintenance and servicing intervals must always adhered to. The intervals indicated refer to a standard working environment. Operating the unit in an environment in which it is subjected to abrasive dusts or corrosive and/or aggressive vapours and/or liquids requires the prior consent of SCHUNK.

Some parts of units which are equipped with internal springs are subject to **spring tension**. **Therefore, special care must be taken when dismantling these units.**

In case of an **“emergency stop”**, the unit may continue to move.
If SCHUNK SDV-P valves are used, the final position of an **“emergency stop”** can be secured **temporary** in any end position.

Above and beyond that, the safety and accident prevention regulations in force at the location of use also apply.

2 Scope of delivery

The scope of delivery comprises:

- Rotary actuator SRU-MD “Masterdrive”, depending on the version ordered

The accessories available are

- Trigger box MD-SE
- Connection cables

3 Mode of operation

The SRU-MD drive system is a combination of an electrical and pneumatic drive system. As compared to a conventional, purely pneumatic rotary actuator, the advantages of this system are:

- Swiveling mass inertia with short swiveling time
- No hydraulic shock absorber
- No monitoring of proximity switches
- 5 positions that can be freely taught and approached in the range between -3° to 183° when operating via trigger box MD-SE. For direct control using CAN bus, any number of positions are possible.
- Integrated valves

The SRU-MD is controlled using CAN bus or more simply by using the MD-SE control unit. Using five digital outputs of an SPC, it is possible to approach the five positions taught. Attaching and monitoring the proximity switch is unnecessary. Monitoring a position takes place via digital outputs at the MD-SE control unit.
Chapter 5 details the actuating of the SRU-MD and the related monitoring or setting of digital inputs or outputs. Learning the various positions is detailed in Chapter 7.

4 Technical data

Adjustable swivel range	-3° to 183°
Maximum mass moment of inertia	0.11 kg m²
Swiveling time (180°)	Approx. 0.4s...0.7s (load dependent)
Voltage supply	24 V DC via MD-SE
Positioning accuracy	< 0.1°
Repeat accuracy	<0.05°
Operating temperature	5 °C to 55 °C
Operating pressure	6 bar ± 0.5 bar

Please refer to our current catalog for additional technical data.

5 Assembly and connections

5.1 Assembly

For connection dimensions, please refer to the corresponding drawings in the latest catalog or our CAD data service on the Internet (link at www.schunk.com).

Important!
For the assembly of the rotary actuator, all pneumatic and electrical energy supplies must be disconnected.

- Please also observe the safety notes in Chapter 1.3.

After the assembly, it must be ensured that an approach to the position of - 6° is possible. This is necessary so that the actuator can be referenced after switching on or after an interruption of the electrical power supply.

5.1.1 Fastening on the base side

The rotary actuator can be assembled from the output side. Threads are provided in the housing for fastening from the other side. For the safe transmission of lateral forces, centering sleeves are to be used (contained in the scope of delivery).

5.1.2 Fastening on the side

For fastening on the side, there are 4 threaded holes available; for centering, there are 2 mounting holes for alignment pins (not included in the scope of delivery).

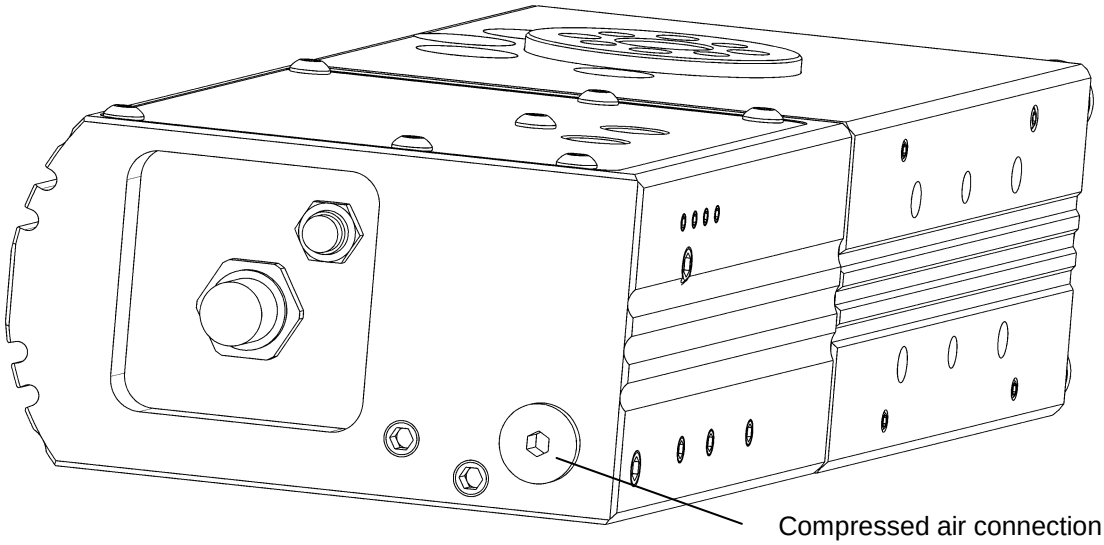
5.1.3 Mounting options at the pinion

We recommend using the four threaded holes for screws, as well as the two recesses for centering sleeves.

5.2 Connections to the SRU-MD

5.2.1 Compressed air connection

To assemble the compressed air connection, the mounted dummy stopper must be removed and the connection supplied must be screwed into place. The following illustration shows the screwed-in dummy stopper on delivery.



The unit has a central compressed air connection. Compressed air may not be connected at any other place. Only filtered compressed air (10 microns) may be used; dry or lubricated. We recommend you connect the unit to the compressed air supply via a separate maintenance unit. **The operating pressure required by the SRU-MD is 6 bar ±0.5 bar.**

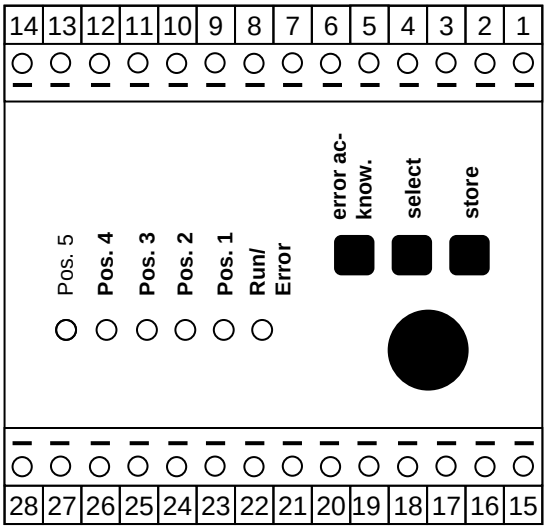
5.2.2 Electrical connection

The electrical connection to the SRU-MD is established using a 5-pin circular connector.

5.2.3 Control unit MD-SE

The control unit MD-SE is used to actuate the control electronics installed in the SRU-MD. Here, the communication between MD-SE and SRU-MD takes place via the CAN bus. Using digital inputs at the control unit, up to 5 different positions can be approached; using 5 digital outputs, the system reports back when the respective position has been reached. The monitoring of magnetic switches directly at the rotary actuator and related wiring between the rotary actuator and SPC are not necessary. Instead of monitoring the 5 digital outputs, it is also possible to monitor one single digital output (position reached). This output is always set upon reaching one of the 5 possible positions and deleted upon the forced exit of the position by outside forces by more than 1°.

Three buttons and one potentiometer are available for the use of the MD-SE control unit.



Key	Function
store	Prior to learning procedure: Press for 1 second: Unit is set to the potentiometer/learn mode Press for 3 seconds: Unit is set to the manual/learn mode During the learning procedure: Save the individual positions by selecting the key
select	During the learning procedure: Selecting a required position Exiting the learning mode
error acknow.	Acknowledging error messages

5.2.4 Terminal assignment of the MD-SE control unit

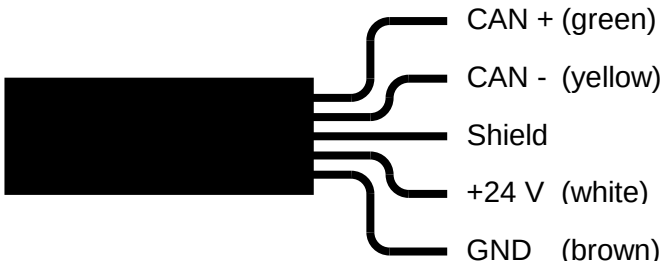
Terminal	Name	I/O	Active	Function
1	24 V	I		24 V DC power supply
2	GND	I		GND
3	Shield	-		Shield
4	24 V	I		Bridge on terminal 1
5	GND	I		Bridge on terminal 2
6	Pos. #1	I	high	When applying a high signal (24 V), the system swivels to Pos. #1, provided this has been taught.
7	Pos. #2	I	high	When applying a high signal (24 V), the system swivels to Pos. #2, provided this has been taught.
8	Pos. #3	I	high	When applying a high signal (24 V), the system swivels to Pos. #3, provided this has been taught.
9	Pos. #4	I	high	When applying a high signal (24 V), the system swivels to Pos. #4, provided this has been taught.
10	Pos. #5	I	high	When applying a high signal (24 V), the system swivels to Pos. #5, provided this has been taught.
11	Halt	I	low	When applying a low signal (0 V), the SRU-MD is immediately stopped and the valves ventilated. For operation, there must be a permanent high signal (24 V).
12	error acknow.	I	high	Acknowledging an error that has occurred
13	Reset	I	high	Restarting the MD-SE control unit
14	-	-		n.c.
15	-	-		n.c.
16	Shield	-		Connection of the SRU-MD with the connection cable to the SE-MD control unit.
17	GND	I		
18	24 V	I		
19	CAN -	I		
20	CAN +	I		
21	-	-		n.c.
22	Error	O	low	After an error occurs, this output is set to low (0 V) and the unit is set to the error mode.
23	Position reached	O	high	After reaching one of the Positions #1 - #5, this output is set to high (24 V). After leaving the position, this output is reset to low (0 V).
24	Pos. #5 reached	O	high	After reaching Position #5, this output is set to high (24 V). After leaving the position, this output is reset to low (0 V).
25	Pos. #4 reached	O	high	After reaching Position #4, this output is set to high (24 V). After leaving the position, this output is reset to low (0 V).
26	Pos. #3 reached	O	high	After reaching Position #3, this output is set to high (24 V). After leaving the position, this output is reset to low (0 V).
27	Pos. #2 reached	O	high	After reaching Position #2, this output is set to high (24 V). After leaving the position, this output is reset to low (0 V).
28	Pos. #1 reached	O	high	After reaching Position #1, this output is set to high (24 V). After leaving the position, this output is reset to low (0 V).

5.2.5 Power supply of the MD-SE control unit

The MD-SE control unit must be supplied with 24 V DC / 5A.

5.2.6 Connection to SRU-MD

The connection of SRU-MD to the MD-SE control unit is made using the supplied connection cable via screw terminals. The following illustration shows the connection assignment of the cable and the terminals to the MD-SE control unit.



16	Shield
17	GND
18	24 V
19	CAN -
20	CAN +

5.2.7 Connection to an SPC

With an SPC, the SRU-MD is controlled via the digital inputs and outputs of the MD-SE control unit.

5.2.8 Digital inputs

To initiate a swivel movement, a high signal (24 V) must be applied at the corresponding digital inputs Pos. #1 - #5.
Be aware that a high signal (24 V) is constantly applied at Terminal 11.

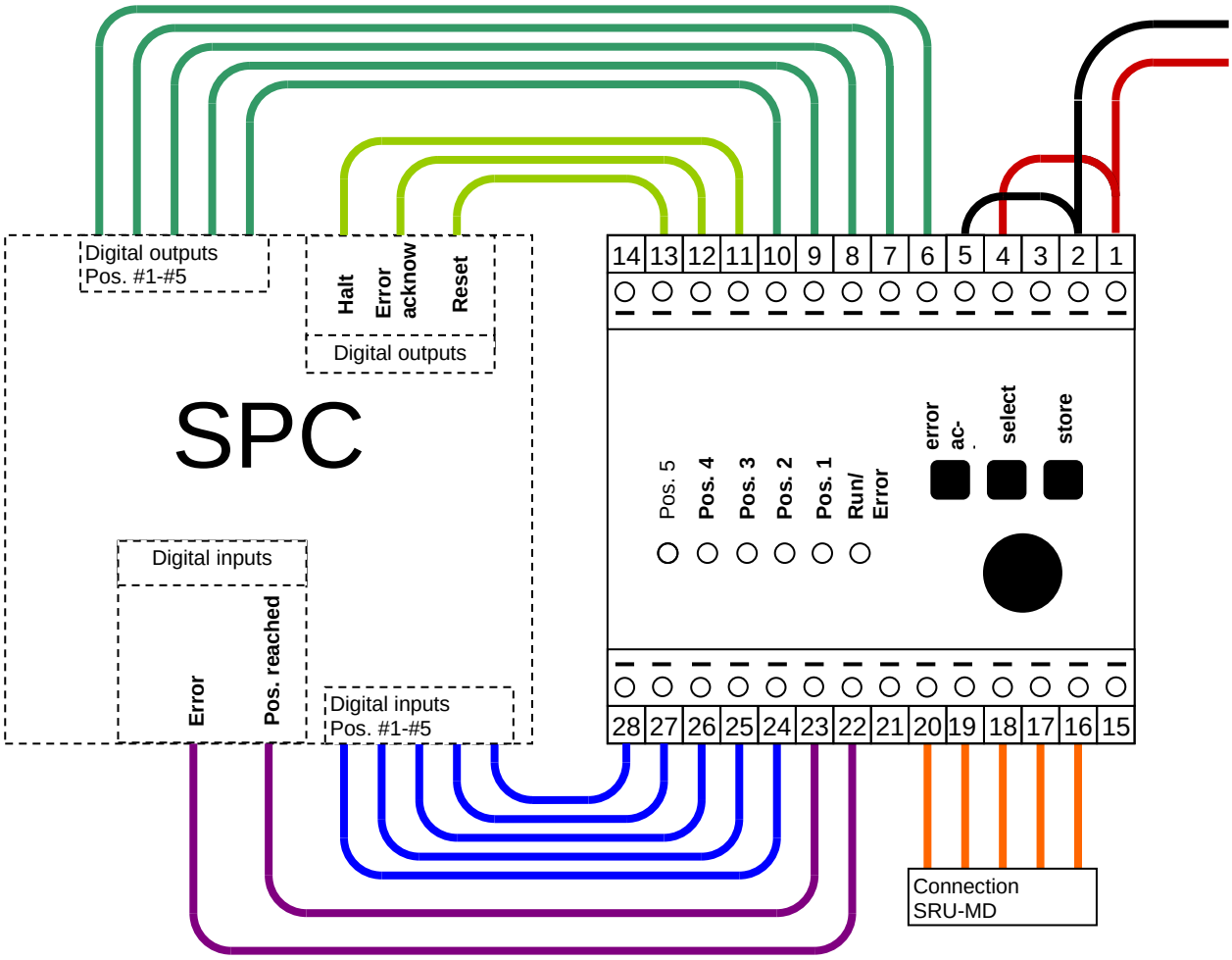
5.2.9 Digital outputs

On the MD-SE control unit, there are seven digital outputs available.
Via the outputs

- Pos #1 reached
- Pos #2 reached
- Pos #3 reached
- Pos #4 reached
- Pos #5 reached

the system issues a high signal (24 V) when the corresponding position is reached.
The "**Pos reached**" output is always set upon reaching a position learned (24 V) and reset upon leaving (0 V).
The "**Error**" output is set when an error occurs (24 V) and can only be reset by applying a high signal at the "error acknow." input or by pressing the "error acknow" key on the MD-SE control unit.

The following illustration shows an example of the connection of an SPC to the MD-SE control unit in order to be able to approach a total of 5 positions.



6 Handling and start-up

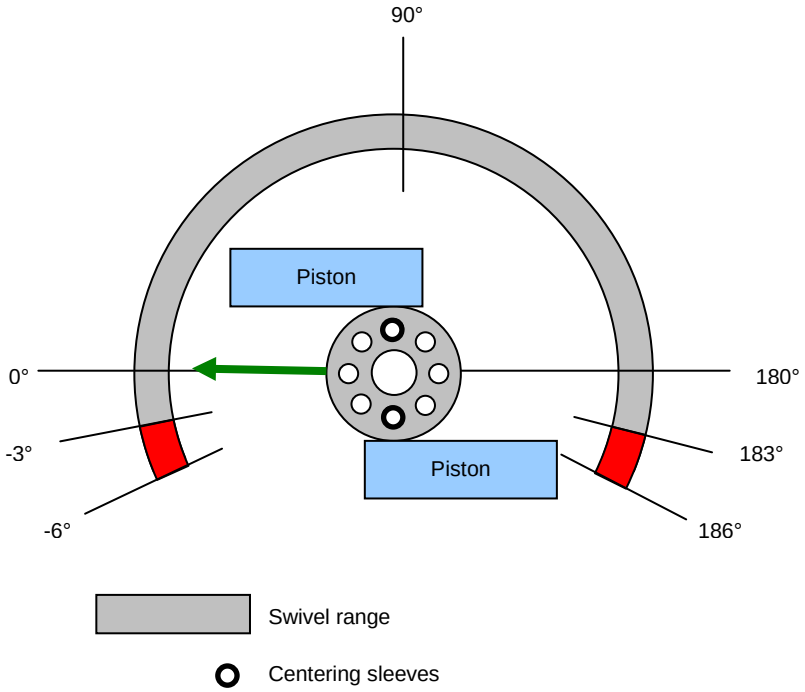
6.1 Handling

It is imperative that you take the following points into account when handling the SRU 40 MD:

- The unit may only be operated with a vertical swivel axis.
- A working pressure of 6 bar ± 0.5 bar must be applied in a stabile manner. We recommend you connect separately the SRU 40 MD to a separate supply unit.
- It is imperative that the maximum mass moment of inertia not ever be exceeded.
- The 24 V power supply must be able to deliver a current of 5 A on a constant basis.
- Swiveling to -6° must be ensured for referencing.

6.2 Adjustable swivel range

The following illustration shows the adjustable swivel range and the related orientation of the pinion in 0° position.



6.3 Initial startup

Important!
Prior to the initial startup of the unit, ensure that the safety instructions specified in Chapter 1.3 and the required handling instructions in Chapter 6 are observed.

For the initial startup of the rotary actuator, at least two approachable angles must be taught (see Chapter 8). The MD-SE control unit also signals it is ready for operation without any angle learned, but it is set into the error mode in this case if an attempt is made to approach a position via the digital inputs .

6.4 Restarting a unit that has been taught

The angles learned remain saved in SRU-MD even after the power supply has been interrupted. Thus, it is not necessary to teach SRU-MD again if the MD-SE control unit is replaced. Be aware that SRU 40-MD carries out a reference movement to approx. -6° after the power supply is interrupted.

7 Teaching modes

You can teach up to five different positions in the swivel range from -3° to 183°. In this case, there are two different teaching modes available. The difference between them is that in the process the unit is moved either by using a turning knob on the MD-SE control unit or moved manually.
For the teaching process, you can program in any sequence the angle positions to be taught. For example, the following can be taught:

- Pos. #1 - an angle of 0°
- Pos. #2 - an angle of 180°
- Pos. #3 - an angle of 90°.

So that SRU-MD can be set to one of the two teaching modes, a low level (0V) must be applied to the 5 position inputs of the MD-SE control unit.
For reasons of safety, a low level (0V) must be applied to the 5 position inputs when leaving a learning mode, otherwise the unit will be set to the error mode.

7.1 Potentiometer/learn mode

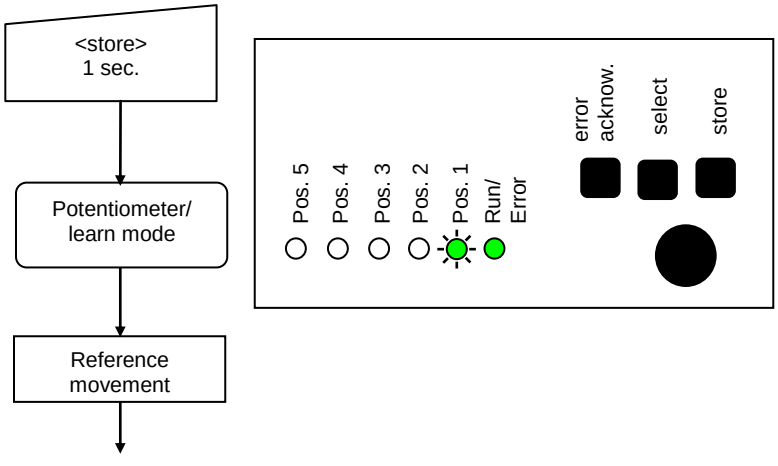
For the potentiometer/learn mode, you set the angles to be learned by using a turning knob on the MD-SE control unit. By pressing the **<store>**key for **1 sec**. on the MD-SE control unit, the unit is set into the potentiometer/-learn mode. The "**Pos. #1**" LED begins to **flash 1x per second** (1 Hz).

Important!
After the unit has been set to the potentiometer/learn mode, a reference movement to approx. -6° is automatically carried out (if the unit was not previously referenced). The reference movement is signaled by a running light on the MD-SE control unit. After the -6° position has been reached, the unit moves to the 0° position and the leaning process may be started. Ensure that the 6°-position can be approached.

The following illustration clarifies the procedure for the potentiometer/learn mode:

Press the store key for 1 sec. After 1 sec., the Pos. #1-LED starts to flash slowly and the unit is set into the potentiometer/learn mode.

Important! The unit automatically carries out one reference movement to approx. -6°. The reference movement is signaled by a running light at the LEDs of the MD-SE control unit.



With the turning knob, approach the first angle to be taught.

By pressing the “store” key, you can save the first angle at Pos. #1. The LED at Pos. #2 flashes, and the unit is ready to have Pos #2 be taught.

With the turning knob, approach the second angle to be taught.

By pressing the “store” key, you can save the second angle at Pos. #2. The LED at Pos. #3 flashes, and the unit is ready to have Pos #3 be taught.

Do you want the system to learn more angles?

Yes: Approach third angle with turning knob

No: Press “select” key 3 times to exit potentiometer/learn mode.

With the turning knob, approach the third angle to be taught.

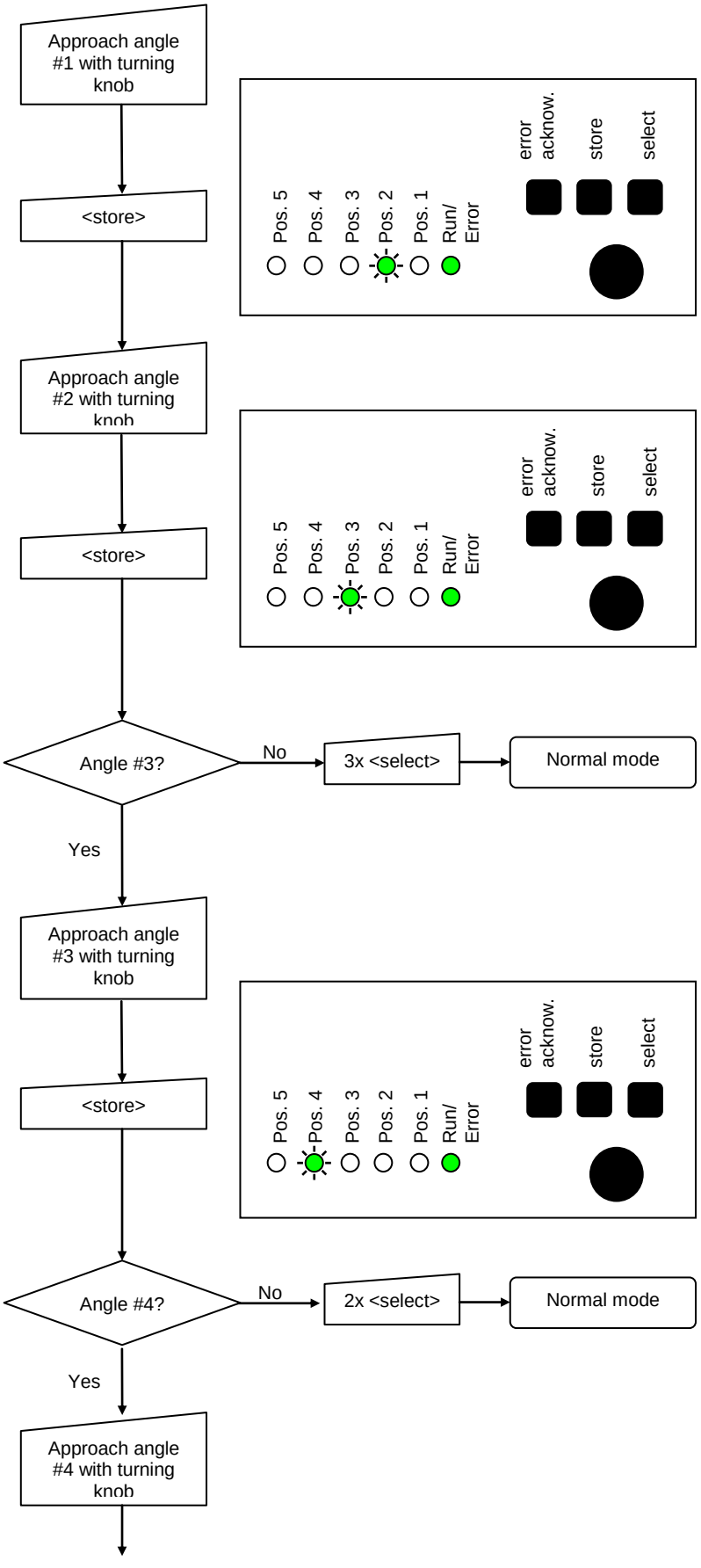
By pressing the “store” key, you can save the third angle at Pos. #3. The LED at Pos. #4 flashes, and the unit is ready to have Pos #4 be taught.

Do you want the system to learn more angles?

Yes: Approach fourth angle with turning knob

No: Press “select” key 2 times to exit potentiometer/learn mode.

With the turning knob, approach the fourth angle to be taught.



By pressing the “store” key, you can save the fourth angle at Pos. #4. The LED at Pos. #5 flashes, and the unit is ready to have Pos #5 be taught.

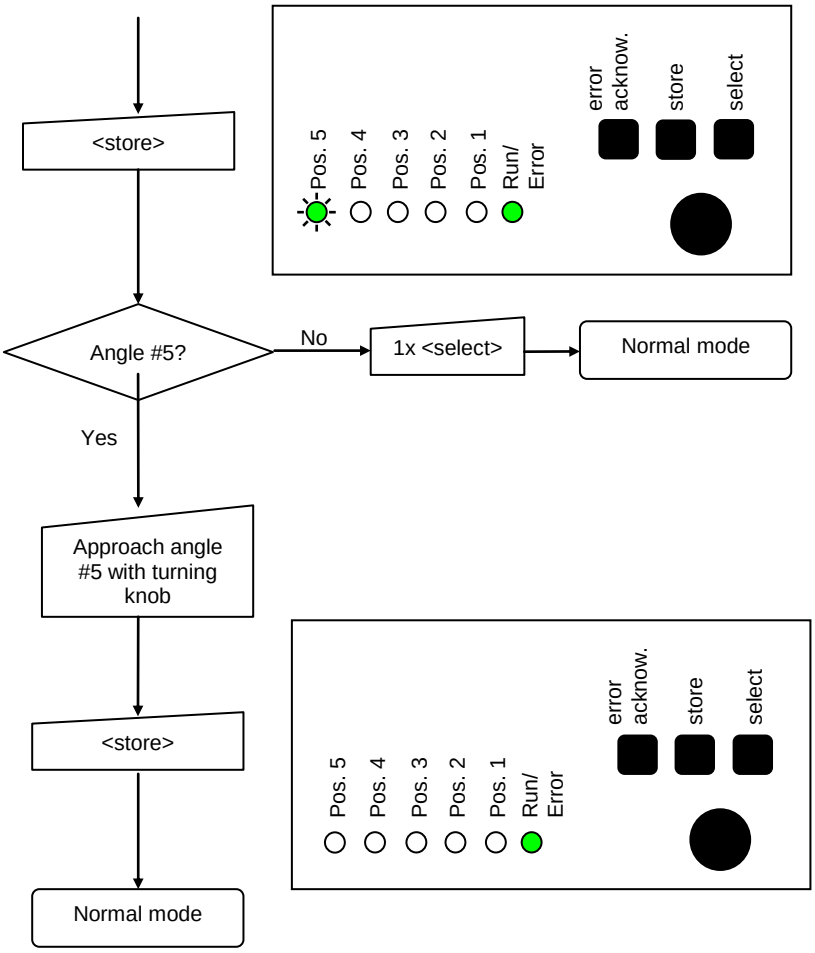
Do you want the system to learn more angles?

Yes: Approach fifth angle with turning knob

No: Press “select” key once to exit potentiometer/learn mode.

With the turning knob, approach the fifth angle to be taught.

By pressing the “store” key, you can save the fifth angle at Pos. #5.
The unit exits the potentiometer/ learn mode and is operational.



7.2 Manual/learn mode

For the manual/learn mode, you set the angles to be learned by manually turning the output shaft (pinion) on the SRU-MD.

During the entire learning process, the operating pressure of 6 bar is applied to SRU-MD.

By pressing the **<store>** key for **3 sec**. on the MD-SE control unit, the unit is set into the manual/-learn mode. After 1 sec., the"**Pos. #1**" **LED** starts to flash once per second; after 3 seconds, it flashes 10 times per second(10 Hz), and the unit is in the manual/learn mode.

After the unit has been set to the manual/learn mode, a reference movement to -6° is automatically carried out (if the unit was not
previously referenced). The reference movement is signaled by a running light on the MD-SE control unit. After the -6° position has been reached, the unit
moves to the 0° position and the leaning process may be started. Ensure that the -6° position can be approached.

Press the “store key” for 3 sec.: After 1 second, the Pos. #1-LED starts to flash slowly; after 3 seconds, it flashes quickly.

Important! The unit automatically carries out one reference movement to -6°. The reference movement is signaled by a running light at the LEDs of the MD-SE control unit

Move unit on the output shaft to the first angle to be taught.

By pressing the “store” key, you can save the fourth angle at Pos. #1. The LED at Pos. #2 flashes, and the unit is ready to have Pos #2 be taught.

Move unit on the output shaft to the second angle to be taught.

By pressing the “store” key, you can save the fourth angle at Pos. #2. The LED at Pos. #3 flashes, and the unit is ready to have Pos #3 be taught.

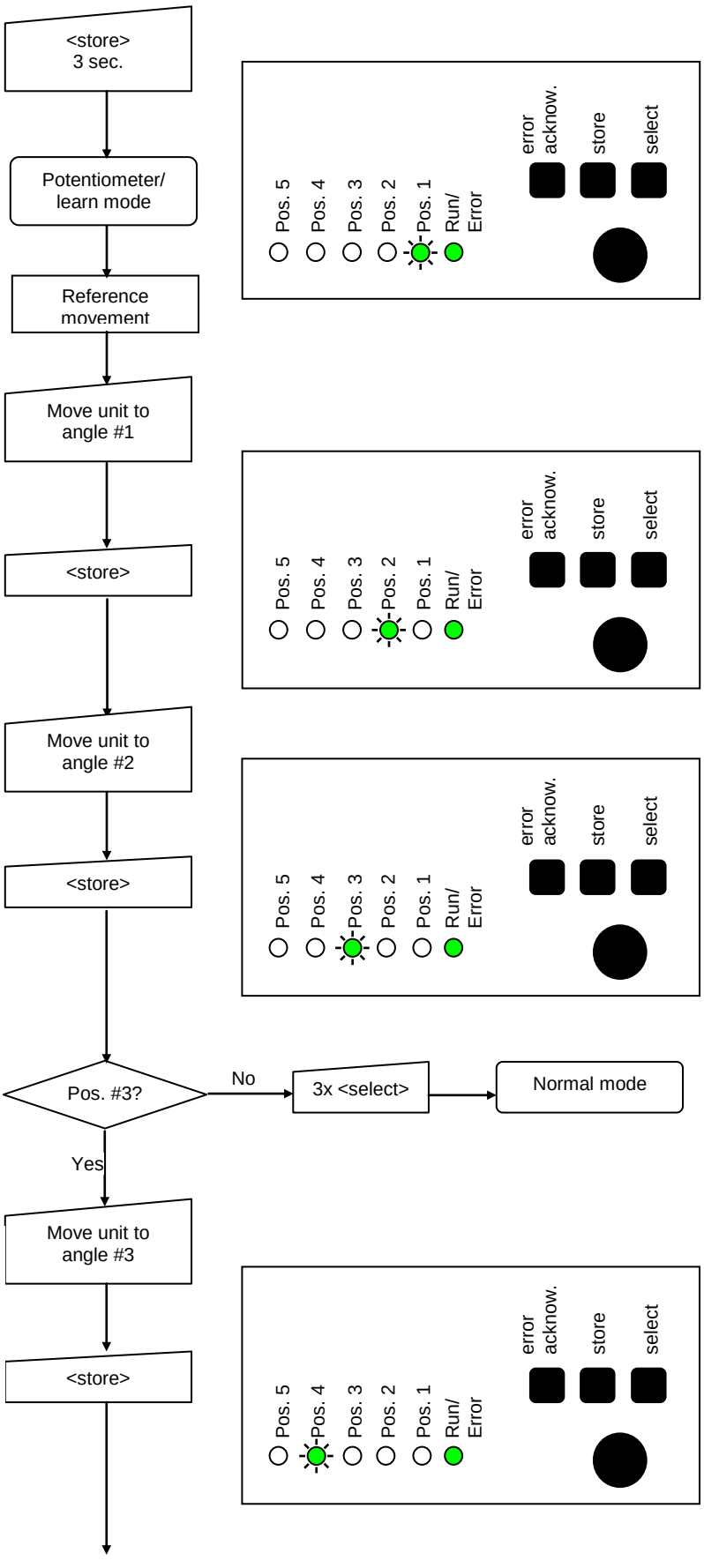
Do you want the system to learn more angles?

Yes: Move unit on the output shaft to the third angle to be taught.

No: Press “select” key 3 times to exit potentiometer/ learn mode.

Move unit on the output shaft to the third angle to be taught.

By pressing the “store” key, you can save the fourth angle at Pos. #3. The LED at Pos. #4 flashes, and the unit is ready to have Pos #4 be taught.



Do you want the system to learn more angles?

Yes: Move unit on the pinion to the fourth angle to be taught.

No: Press “select” key 2 times to exit potentiometer/ learn mode.

Move unit on the output shaft to the fourth angle to be taught.

By pressing the “store” key, you can save the fourth angle at Pos. #4. The LED at Pos. #5 flashes, and the unit is ready to have Pos #5 be taught.

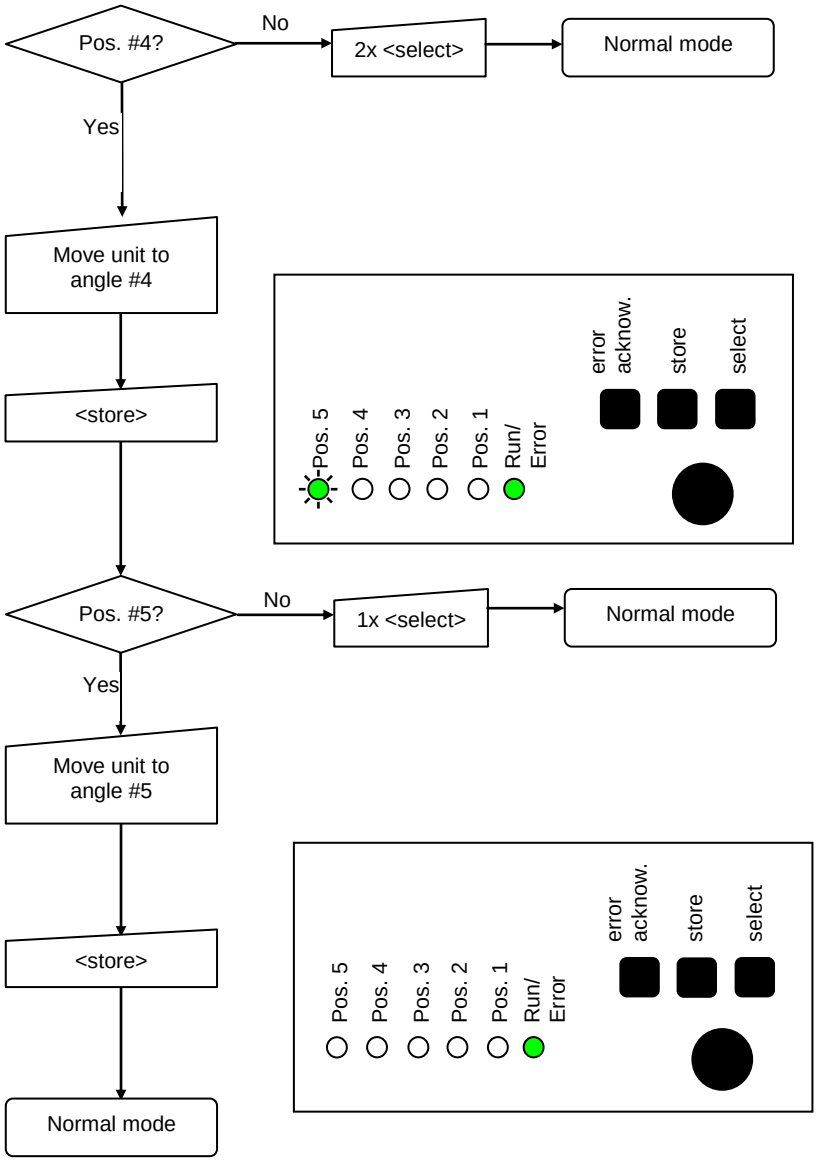
Do you want the system to learn more angles?

Yes: Move unit on the pinion to the fifth angle to be taught.

No: Press “select” key once to exit potentiometer/learn mode.

Move unit on the output shaft to the fifth angle to be taught.

By pressing the “store” key, you can save the angle at Pos. #5.
The unit exits the potentiometer/ learn mode and is operational.



7.3 Correcting positions learned

It is possible to change angles already taught. In this case, you do not need to teach the entire unit again. It is possible to correct individual angels both in the potentiometer/learn mode and in the manual/learn mode. To change an angle learned, it is not absolutely necessary for the unit to be at this angle.
You can teach the system additional angles as long as the maximum number of 5 has not yet been reached. If, for example, only two positions are learned, you can easily add 1 to 3 additional angles.

The following illustration is an example of how to teach a new angle to Position #3.

Press the “store” key,
- 1 sec. for potentiometer/learn mode
- 3 sec. for manual/learn mode

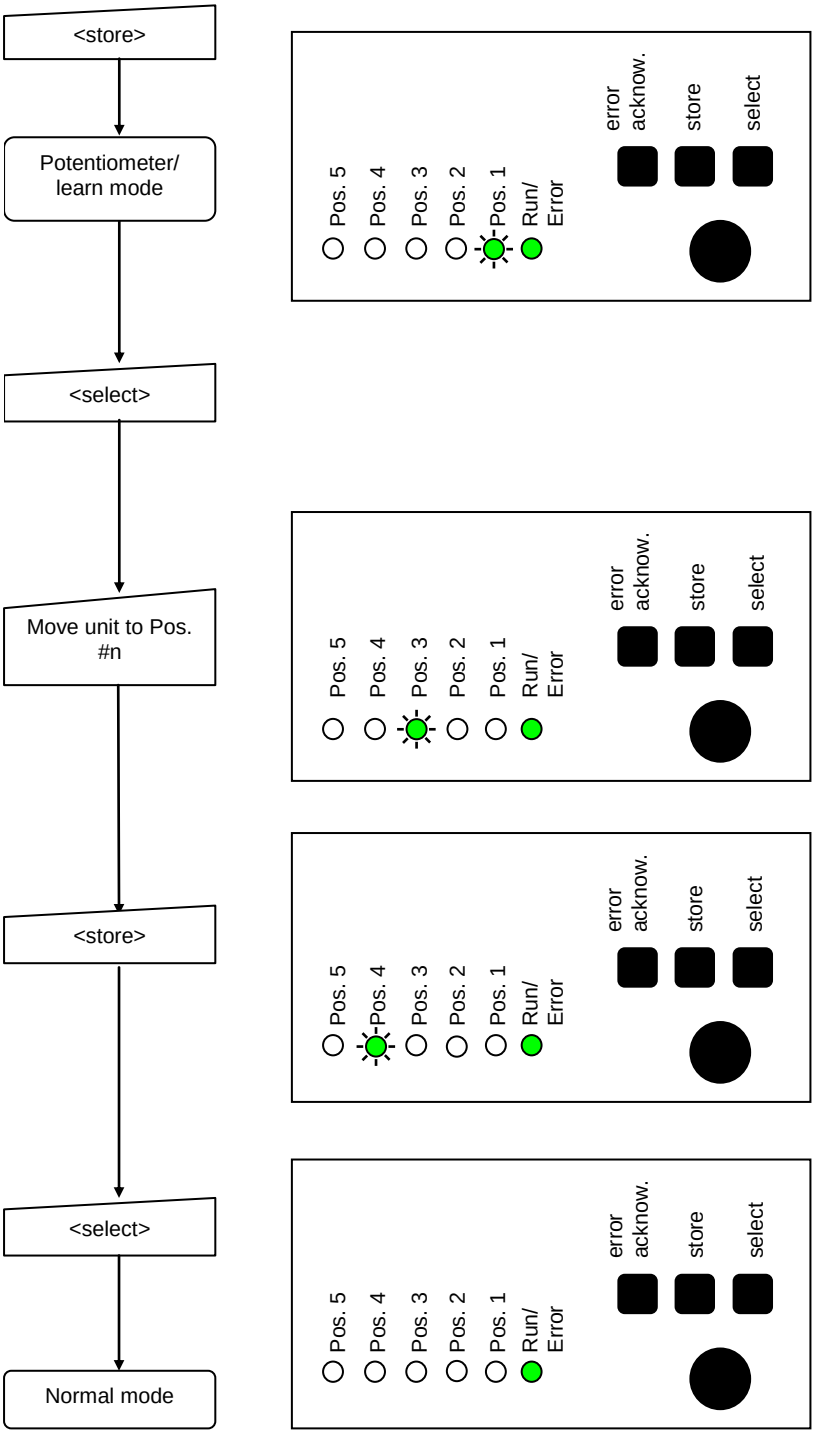
Unit is set to the respective learn mode.
The LED at Pos. #1 flashes and signals it is ready to be taught.

Press the “select” key twice to select Position #3. The position to be taught is signaled by the Pos. LED #3 flashing accordingly.
Caution: In this process, the unit does not move to the position originally learned for Pos. 3.

Potentiometer/learn mode:
With the turning knob, approach the position to be newly learned.
Manual/learn mode:
Move the unit on the pinion the position to be newly learned.

By pressing the “store” key, you can save the position.
LED Pos. 4 flashes.

Press the “select” key twice to exit the learn mode.



If you want to teach additional angles, the procedure is the same. If, for example, Pos. #1 and Pos. #2 have each learned one angle, and you want to teach Pos. #3 an additional angle, the procedure is as follows:

- Set the rotary actuator to the learn mode required using the <store> key.
- Use the <select> key to select Pos. #3.
- Set the angle required at the unit.
- Save the angle with the <store> key.
- Use the <select> key to exit the learn mode again.

8 Operating the SRU 40 MD

After you teach the positions and end the teaching process, SRU-MD is automatically set into the operating mode. This is signaled by the operating LED lighting up green. The unit remains standing at the position last learned, and does not move when switched to the operating mode. By applying a high signal at the digital inputs of the MD-SE control unit, it is now possible to approach the various positions learned. Be aware that the first movement after the teaching process is carried out powered purely by the motor without any pressurized air support.

It is not necessary to adjust the SRU-MD to the loads to be swiveled. This is carried out automatically by the integrated control electronics. Since the switching points of the integrated valves are dependent upon the load to be moved and the rotating angle, the integrated brake point controller requires a few cycles after starting in order achieve an optimal swivel movement.

The optimal and thus shortest possible swiveling time is reached only after several swivel cycles where the SRU-MD has learned enough about the mass inertia to be swiveled.

The initial values for the brake points of the valves are selected such that overshooting beyond the target position is minimized, even with the maximum load.

	Digital inputs of the MD-SE control unit							
	Pos. #1	**Pos. #2**	**Pos. #3**	**Pos. #4**	**Pos. #5**	**Halt**	**Reset**	**Error ackn.**
Approach Position #1	H	L	L	L	L	H	L	X
Approach Position #2	L	H	L	L	L	H	L	X
Approach Position #3	L	L	H	L	L	H	L	X
Approach Position #4	L	L	L	H	L	H	L	X
Approach Position #5	L	L	L	L	H	H	L	X
MD-SE restart	L	L	L	L	L	H	H	X
Emergency stop	X	X	X	X	X	L	X	X
Error acknowledgement	X	X	X	X	X	X	X	H

9 Maintenance and care

9.1 Disassembly of rotary atuator

The rotary actuator may only be disassembled by Schunk, since otherwise the installed ball-and-screw spindle drive may be damaged.

9.2 Lubrication of the ball-and-screw spindle drive

The ball-and-screw spindle drive requires careful maintenance to ensure a long tool life for the rotary actuator and must be lubricated again every 500,000 cycles. For this, the rotary actuator need not be disassembled.

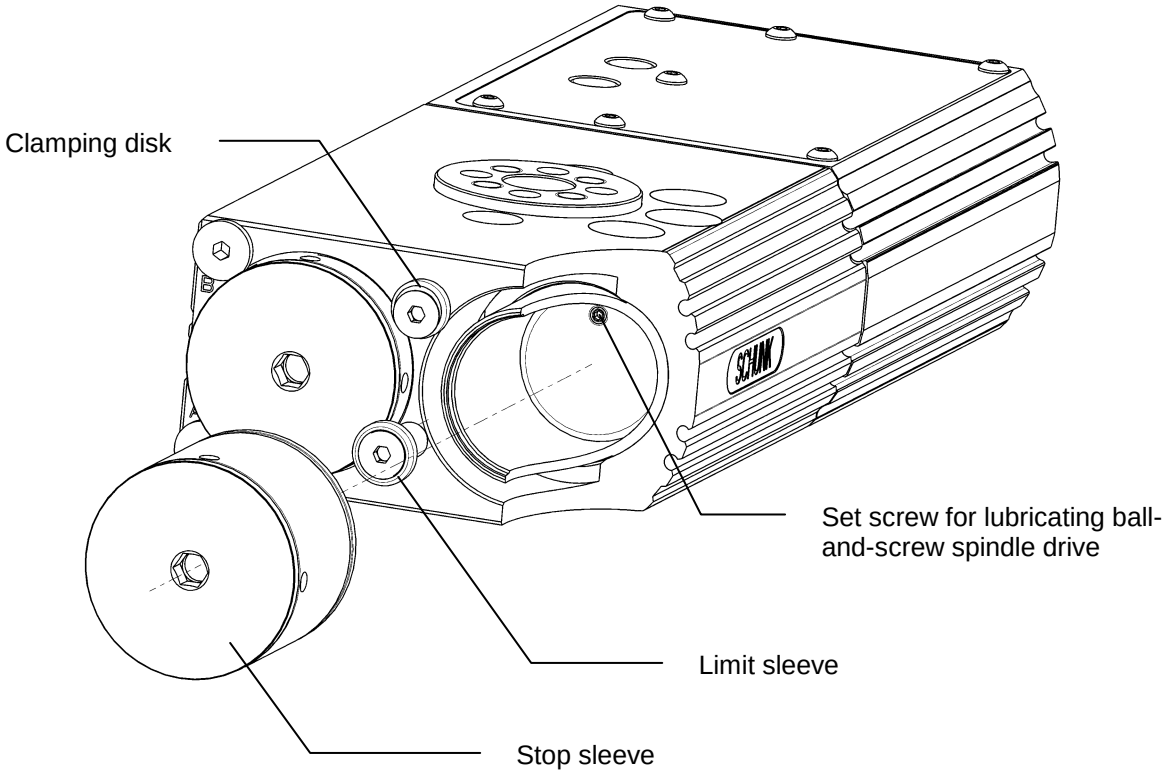
After the required number of cycles, the SRU-MD stops and the MD-SE control unit signals that the unit must be maintained by flashing all the LEDs of all the positions.

To maintain the ball-and-screw spindle drive, a stop sleeve must be removed as shown in the following illustration. Prior to removing the stop sleeve, it is recommended you mark its position with a permanent marker, so that it can be reattached at the exact position afterwards.

Be aware that only the stop sleeve shown is removed since the other is used as reference stop for the SRU-MD.

After you remove the limit sleeve and detach the clamping disk, you can remove the stop sleeve with an a/f 8 hexagon socket wrench.
Lubrication occurs via a set screw in the base of the piston where the ball-and-screw spindle drive is installed. By turning the set screw, a preset amount of grease is pressed from a reservoir into the ball-and-screw spindle drive.

For the lubrication of the spindle drive, you must turn the set screw in exactly 2.5 turns.



After lubricating the spindle drive, you must screw on the stop sleeve in exactly the same position.

Press the “Error acknowledge” key on the MD-SE control unit to set the unit back into the operating mode. Be aware that, after the error acknowledgement, a low level must be applied at all the MD-SE control unit inputs before any additional commands are accepted. If this is not the case, the control unit reports an error.

10 Warranty

The warranty period is 24 months after delivery date from the production facility, provided that the unit was used appropriately with one (1) shift operation and that the specified maintenance and lubrication intervals were observed. Components that come into contact with workpieces and wearing parts are never included in the warranty. In this context, please also see our General Terms and Conditions.

11 Error handling

When an error arises, the SRU-MD is immediately depressurized and the motor's phases are short circuited, so that an active movement of the unit via the MD-SE trigger box is no longer possible without an acknowledgment of the error.
The MD-SE control unit indicates the type of error via the status LED that flashes red and the LEDs of the 5 positions. The following table contains descriptions of the errors and their solutions.

You can remedy the error by eliminating the cause of the error and by applying a high signal (24 V) at terminal 12 or by pressing the "error acknow" key on the MD-SE control unit.

11.1 Error codes

Error	S	#1	#2	#3	#4	#5	Explanation/Remedy
Software end stop - High	●	●					Unit was moved over the upper software end stop (184°). Move unit from software end stop and acknowledge error.
Software end stop - Low	●		●				Unit was moved over the lower software end stop (-4°). Move unit from software end stop and acknowledge error.
Emergency stop	●			●			An emergency stop was triggered. Reset the "Halt" input and acknowledge the error.
Operating pressure	●				●		The operating pressure is too low. Adjust the operating pressure to 6 bar ± 0.5 bar and acknowledge the error.
Power supply	●					●	The power supply is too low or too high. Adjust the power supply to 24 V ± 5% and acknowledge the error.
Service	●	●	●	●	●	●	The installed ball-and-screw spindle drive must be maintained. See Chapter 9 "Maintenance and care". Then acknowledge the error.
Position monitoring	●	●	●				The SRU-MD was pushed more than 1° beyond its position. Eliminate the malfunction and acknowledge the error.
Incorrect position input	●	●		●			A high signal was applied to a position input where no position has been learned.
EEPROM error	●	●			●		Contact SCHUNK service.
Data communication error.	●	●				●	Check cable.

Error	S	#1	#2	#3	#4	#5	Explanation/Remedy
Incorrect EEPROM entry	●	●	●	●			Contact SCHUNK service.
Internal error	●	●	●		●		Contact SCHUNK service.
Faulty connection	●	●	●			●	Check cable and acknowledge error.
SRU-MD not found	●		●	●			There is no SRU-MD connected to the MD-SE control unit.
Too many devices	●		●		●		There is more than one unit connected to the MD-SE control unit. Only one unit may be connected to the MD-SE control unit.
Incorrect device	●		●			●	An incorrect device was connected to the MD-SE control unit.
Error at Inputs of MD-SE	●		●	●	●	●	After you exit the learn mode or after you acknowledge an error, there is a high signal applied to least one input of the MD-SE. To remedy the problem, apply low signal to inputs and acknowledge the error.
Reset	●		●		●	●	After a reset is triggered, a high signal continues to be applied to the reset input. Apply low signal to reset input and acknowledge the error.

12 Translation of original EC declaration of incorporation

In terms of the EC Machinery Directive 2006/42/EC, annex II B

Manufacturer/ distributor	SCHUNK GmbH & Co. KG. Spann- und Greiftechnik Bahnhofstr. 106 – 134 74348 Lauffen/Neckar, Germany

We hereby declare that the following product:

Product designation	Electro-Pneumatic Rotary Module, Masterdrive
Type designation:	SRU-MD 40
ID number:	0357980…0357988

meets the applicable basic requirements of the Directive **Machinery (2006/42/EC)**.

The incomplete machine may not be put into operation until conformity of the machine into which the incomplete machine is to be installed with the provisions of the Machinery Directive (2006/42/EC) is confirmed.

Applied harmonized standards, especially:

EN ISO 12100-1	Safety of machines - Basic concepts, general principles for design -- Part 1: Basic terminology, methodology
EN ISO 12100-2	Safety of machines - Basic concepts, general principles for design -- Part 2: Technical principles

The manufacturer agrees to forward on demand the special technical documents for the incomplete machine to state offices.

The special technical documents according to Annex VII, Part B, belonging to the incomplete machine have been created.

Person responsible for documentation: Mr. Michael Eckert, Tel.: +49(0)7133/103-2204

Location, date/signature: Lauffen, Germany, January 2010 p.p.

Title of the signatory Director for Development/Design

13 Contact

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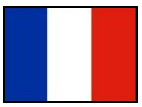

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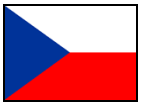

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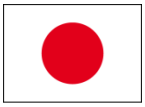

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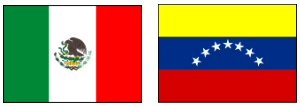

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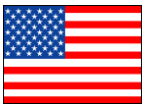

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