



Quick-change pallet system VERO-S NSE-E mini 90 Assembly and Operating Manual

Translation of Original Operating
Manual

Imprint

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Dear Customer,

Thank you for trusting our products and our family-owned company, the leading technology supplier of robots and production machines.

Our team is always available to answer any questions on this product and other solutions. Ask us questions and challenge us. We will find a solution!

Best regards,

Your SCHUNK team

Customer Management

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Please read the operating manual in full and keep it close to the product.

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1 General

1.1 About this manual

This manual contains important information for the safe, correct use of the product.

It is an integral part of the product and must be kept accessible for personnel at all times.

Personnel must have read and understood this manual before beginning any work. The observance of all safety notes in this manual is a prerequisite to ensure safe work processes.

The illustrations are intended to provide a basic understanding and may deviate from the actual version.

Besides this manual, other documents which apply are those listed under ▶ 1.1.2 [6]

1.1.1 Illustration of safety notes

To make risks clear, the following signal words and symbols are used for safety notes.



⚠ DANGER

Denotes a hazard with a high degree of risk that, if not avoided, will result in death or serious injury.



⚠ WARNING

Denotes a hazard with a medium degree of risk that, if not avoided, could result in death or serious injury.



⚠ CAUTION

Denotes a hazard with a low degree of risk that, if not avoided, could result in a minor or moderate injury.

CAUTION

Information about avoiding material damage.

1.1.2 Applicable documents

- General terms of business *
- Catalog data sheet of the purchased product *
- Assembly and operating manuals of the accessories *

The documents labeled with an asterisk (*) can be downloaded from [schunk.com/downloads](https://www.schunk.com/downloads).

1.1.3 Design

This manual applies to the following sizes in all variants ▶ 3 [📄 19]

Quick-Change Pallet System

- Size NSE-E mini 90

1.2 Warranty

If the product is used as intended, the warranty is valid for 24 months from the date of delivery from the production facility or 1 000 000 cycles* under the following conditions:

- Observe the applicable documents, ▶ 1.1.2 [📄 6]
- Observe the ambient conditions and operating conditions, ▶ 2.5 [📄 9]
- Observance of the specified care and maintenance instructions ▶ 9 [📄 39]

Parts touching the workpiece and wear parts are not included in the warranty.

* A cycle consists of a complete clamping process ("Open" and "Close").

1.3 Scope of delivery

The scope of delivery includes

- Quick-change pallet system in the variant ordered
- Accessory kit

1.4 Accessories

The following accessories, which must be ordered separately, are required for the product:

- Connection cable 4-pole, M8 socket
 - angular with 180° rotated pole diagram, 5 m
 - straight, 5 m
 - straight, 10 m**NOTE:** When using customer-supplied cable:
min. 4 x 0.25 mm²

A wide range of accessories are available for this product

For information regarding which accessory articles can be used with the corresponding product variants, see catalog.

- PAL mini clamping pallets
- SPA mini, SPB mini, SPC mini clamping pins
- SDE mini protective cover
- Connection cable 3-pole, M8 socket on open wire strand (only for NSE-E mini 90-IN, NSE-E mini 90-IN-V1 variant)
 - angular, 3 m
 - angular, 5 m
 - straight, 3 m
 - straight, 5 m**NOTE:** When using customer-supplied cable:
min. 3 x 0.14 mm²
- Cable extension 3-pole, M8 socket on M8 connector (only for NSE-E mini 90-IN, NSE-E mini 90-IN-V1 variant)
 - straight, 0.3 m
 - straight, 1 m
 - straight, 2 m**NOTE:** When using customer-supplied cable:
min. 3 x 0.14 mm²

2 Basic safety notes

2.1 Intended use

This product is intended solely for positioning and clamping workpieces or clamping pallets on machine tools or other suitable technical devices.

- The product may only be used within the scope of its technical data, ▶ 3 [19].
- The product is intended for industrial and industry-oriented use.
- Appropriate use of the product includes compliance with all instructions in this manual.

2.2 Not intended use

The product is not being used as intended if, for example:

- It is used as a pressing tool, a toolholder, a load-handling device or as lifting equipment.
- It is used for turning applications over 100 rpm without consulting SCHUNK.
- It is used in working environments that are not permissible.
- People work on machines or technical equipment that do not comply with the EC Machinery Directive 2006/42/EC, disregarding the applicable safety regulations.
- The technical data specified by the manufacturer are exceeded during usage.

2.3 Constructional changes

Implementation of structural changes

Modifications, changes or reworking, e.g. additional threads, holes, or safety devices, can damage the product or impair its functionality or safety.

- Structural changes should only be made with the written approval of SCHUNK.

2.4 Spare parts

Use of unauthorized spare parts

Using unauthorized spare parts can endanger personnel and damage the product or cause it to malfunction.

- Use only original spare parts or spares authorized by SCHUNK.

2.5 Environmental and operating conditions

Required ambient conditions and operating conditions

Incorrect ambient and operating conditions can make the product unsafe, leading to the risk of serious injuries, considerable material damage and/or a significant reduction to the product's life span.

- Make sure that the product is used only in the context of its defined application parameters, ▶ 3 [📄 19].
- Make sure that the product is a sufficient size for the application.
- Make sure that the contact surfaces of the interface are always clean.
- Make absolutely sure that no chips of any kind can enter the interface and that the interface does not fill with cooling emulsion, which is particularly possible with vertical alignment of the clamping pin axis. The best way to ensure both of these requirements is to use the SDE protection covers. If the interface fills with cooling emulsion, clean the interface. Remove any impurities from the interface. If necessary, dry out the interface in the closed state (digital input PIN 2 (open) and digital input PIN 4 (close) not connected).
- Only use high-quality cooling emulsions with anti-corrosive additives during processing.

2.5.1 Environmental conditions

The product may only be used in the following locations if additional measures are taken:

- In locations with a high level of ionizing radiation
- In locations with difficult operating conditions, e.g., due to caustic fumes, gases, oils or chemicals
- In facilities requiring special monitoring, e.g., in particularly at-risk areas

The product must also not be used in potentially explosive zones. If the product is subjected to unacceptably large impacts or vibrations, suitable measures must be taken to reduce the amplitude or acceleration of such disturbances. Vibration-damping or vibration-absorbing systems are to be used in such cases.

2.6 Personnel qualification

Inadequate qualifications of the personnel

If the personnel working with the product is not sufficiently qualified, the result may be serious injuries and significant property damage.

- All work may only be performed by qualified personnel.
- Before working with the product, the personnel must have read and understood the complete assembly and operating manual.
- Observe the national safety regulations and rules and general safety instructions.

The following personal qualifications are necessary for the various activities related to the product:

Trained electrician

Due to their technical training, knowledge and experience, trained electricians are able to work on electrical systems, recognize and avoid possible dangers and know the relevant standards and regulations.

Qualified personnel

Due to its technical training, knowledge and experience, qualified personnel is able to perform the delegated tasks, recognize and avoid possible dangers and knows the relevant standards and regulations.

Instructed person

Instructed persons were instructed by the operator about the delegated tasks and possible dangers due to improper behaviour.

Service personnel of the manufacturer

Due to its technical training, knowledge and experience, service personnel of the manufacturer is able to perform the delegated tasks and to recognize and avoid possible dangers.

2.7 Personal protective equipment

Use of personal protective equipment

Personal protective equipment serves to protect staff against danger which may interfere with their health or safety at work.

- When working on and with the product, observe the occupational health and safety regulations and wear the required personal protective equipment.
- Observe the valid safety and accident prevention regulations.
- Wear protective gloves to guard against sharp edges and corners or rough surfaces.
- Wear heat-resistant protective gloves when handling hot surfaces.
- Wear protective gloves and safety goggles when handling hazardous substances.
- Wear close-fitting protective clothing and also wear long hair in a hairnet when dealing with moving components.

2.8 Notes on safe operation

Incorrect handling of the personnel

Incorrect handling and assembly may impair the product's safety and cause serious injuries and considerable material damage.

- Avoid any manner of working that may interfere with the function and operational safety of the product.
- Use the product as intended.
- Observe the safety notes and assembly instructions.
- Do not expose the product to any corrosive media. This does not apply to products that are designed for special environments.
- Eliminate any malfunction immediately.
- Observe the care and maintenance instructions.
- Observe the current safety, accident prevention and environmental protection regulations regarding the product's application field.

2.9 Transport

Handling during transport

Incorrect handling during transport may impair the product's safety and cause serious injuries and considerable material damage.

- When handling heavy weights, use lifting equipment to lift the product and transport it by appropriate means.
- Secure the product against falling during transportation and handling.
- Stand clear of suspended loads.

2.10 Malfunctions

Behavior in case of malfunctions

- Immediately remove the product from operation and report the malfunction to the responsible departments/persons.
- Order appropriately trained personnel to rectify the malfunction.
- Do not recommission the product until the malfunction has been rectified.
- Test the product after a malfunction to establish whether it still functions properly and no increased risks have arisen.

2.11 Disposal

Handling of disposal

The incorrect handling of disposal may impair the product's safety and cause serious injuries as well as considerable material and environmental harm.

- Follow local regulations on dispatching product components for recycling or proper disposal.

2.12 Fundamental dangers

General

- Observe safety distances.
- Never deactivate safety devices.
- Before commissioning the product, take appropriate protective measures to secure the danger zone.
- Disconnect power sources before installation, modification, maintenance, or calibration. Ensure that no residual energy remains in the system.
- If the energy supply is connected, do not move any parts by hand.
- Do not reach into the open mechanism or movement area of the product during operation.

2.12.1 Protection during handling and assembly

Incorrect handling and assembly

Incorrect handling and assembly may impair the product's safety and cause serious injuries and considerable material damage.

- Have all work carried out by appropriately qualified personnel.
- For all work, secure the product against accidental operation.
- Observe the relevant accident prevention rules.
- Use suitable assembly and transport equipment and take precautions to prevent jamming and crushing.

Incorrect lifting of loads

Falling loads may cause serious injuries and even death.

- Stand clear of suspended loads and do not step into their swiveling range.
- Never move loads without supervision.
- Do not leave suspended loads unattended.

2.12.2 Protection during commissioning and operation

Falling or violently ejected components

Falling and violently ejected components can cause serious injuries and even death.

- Take appropriate protective measures to secure the danger zone.
- Never step into the danger zone during operation.

2.12.3 Protection against dangerous movements

Unexpected movements

Residual energy in the system may cause serious injuries while working with the product.

- Switch off the energy supply and ensure that no residual energy remains.
- The faulty actuation of connected drives may cause dangerous movements.
- Operating mistakes, faulty parameterization during commissioning or software errors may trigger dangerous movements.
- Never rely solely on the response of the monitoring function to avert danger. Until the installed monitors become effective, it must be assumed that the drive movement is faulty, with its action being dependent on the control unit and the current operating condition of the drive. Perform maintenance work, modifications, and attachments outside the danger zone defined by the movement range.
- To avoid accidents and/or material damage, human access to the movement range of the machine must be restricted. Limit/prevent accidental access for people in this area due through technical safety measures. The protective cover and protective fence must be rigid enough to withstand the maximum possible movement energy. EMERGENCY STOP switches must be easily and quickly accessible. Before starting up the machine or automated system, check that the EMERGENCY STOP system is working. Prevent operation of the machine if this protective equipment does not function correctly.

2.12.4 Protection against electric shock

Work on electrical equipment

Touching live parts may result in death.

- Work on the electrical equipment may only be carried out by qualified electricians in accordance with the electrical engineering regulations.
- Lay electrical cables properly, e. g. in a cable duct or a cable bridge. Observe standards.
- Before connecting or disconnecting electrical cables, switch off the power supply and check that the cables are free of voltage. Secure the power supply against being switched on again.
- Before switching on the product, check that the protective earth conductor is correctly attached to all electrical components according to the wiring diagram.
- Check whether covers and protective devices are fitted to prevent contact with live components.
- Do not touch the product's terminals when the power supply is switched on.

Possible electrostatic energy

Components or assembly groups may become electrostatically charged. When the electrostatic charge is touched, the discharge may trigger a shock reaction leading to injuries.

- The operator must ensure that all components and assembly groups are included in the local potential equalisation in accordance with the applicable regulations.
- While paying attention to the actual conditions of the working environment, the potential equalisation must be implemented by a specialist electrician according to the applicable regulations.
- The effectiveness of the potential equalisation must be verified by executing regular safety measurements.

2.12.5 Protection against magnetic and electromagnetic fields

Work in areas with magnetic and electromagnetic fields

Magnetic and electromagnetic fields can lead to serious injuries.

- Persons with pace-makers, metal implants, metal shards, or hearing aids require the consent of a physician before entering areas in which components of the electric drive and control systems are mounted, started up, and operated.
- Persons with pace-makers, metal implants, metal shards, or hearing aids require the consent of a physician before entering areas in which magnetic grippers or motor parts with permanent magnets are stored, repaired, or assembled.
- Do not operate high-frequency or radio devices in the proximity of electric components of the drive system and their feed lines.

If the use of such devices is necessary:

When starting up the electric drive and control system, check the machine or automated system for possible failures when such systems are used at different intervals and in different states of the control system. A special additional EMC test may be necessary if the system has a high risk potential.

2.13 Notes on particular risks



⚠ DANGER

Danger from electric voltage!

Touching live parts may result in death.

- Switch off the power supply before any assembly, adjustment or maintenance work and secure against being switched on again.
- Only qualified electricians may perform electrical installations.
- Check if de-energized, ground it and hot-wire.
- Cover live parts.



⚠ DANGER

Risk of fatal injury from suspended loads!

Falling loads can cause serious injuries and even death.

- Stand clear of suspended loads and do not step within their swiveling range.
- Never move loads without supervision.
- Do not leave suspended loads unattended.
- Wear suitable protective equipment.



⚠ WARNING

Risk of injury from objects falling and being ejected!

Falling and ejected objects during operation can lead to serious injury or death.

- Take appropriate protective measures to secure the danger zone.



⚠ WARNING

Risk of injury due to unexpected movements!

If the power supply is switched on or residual energy remains in the system, components can move unexpectedly and cause serious injuries.

- Before starting any work on the product: Switch off the power supply and secure against restarting.
- Make sure, that no residual energy remains in the system.



⚠ WARNING

There is a risk of injury due to crushing or striking by moving parts during manual loading and unloading and the clamping procedure.

Operating the clamping slides could lead to serious injuries.

- Do not reach into the clamping pin holder of the product.
- Use loading devices.
- Wear protective gloves.



⚠ WARNING

Risk of injury from sharp edges and corners!

Sharp edges and corners can cause cuts.

- Use suitable protective equipment.



⚠ WARNING

Risk of injury from objects falling in the event of a energy supply failure

Electrical devices are not generally protected against failure. In case of a energy supply failure, the pull-in force may decrease and a secure hold on the tensioned workpiece cannot be guaranteed.

- The operator is responsible for ensuring that the drive is in safe condition in the event of a power failure.



⚠ WARNING

Risk of injury due to falling device, pallet or workpiece if the clamping pin is loosened erroneously or as a result of negligence.

- During operation, erroneous or negligent loosening of the clamping pin must be prevented by using suitable countermeasures (using safety switches, locking the digital inputs during operations).
- The machines and equipment must fulfill the minimum requirements of the EC Machinery Directive 2006/42/EC; specifically, they must have effective technical measures to protect against potential mechanical hazards.
- Wear personal protective equipment.



⚠ WARNING

Risk of injury when the clamping pin axis is in a horizontal position or during overhead application, as a result of the device or pallet falling down.

- Use a crane or a transport truck when transporting.
- During horizontal or overhead applications, the device or pallet must be secured before loosening to prevent it from falling.



⚠ WARNING

The system is supported by spring force when clamping and releasing. Risk of injury due to parts automatically moving to their end positions following actuation of an "emergency stop" or after switching off the power supply.

- Wait for the system to shut down completely.
- Do not reach into the clamping modules (clamping pin holder).



⚠ CAUTION

Risk of slipping or falling if the quick-change pallet system's operational environment is not clean (e.g. contaminated with cooling lubricants or oil).

- Ensure that the working environment is clean before starting assembly and installation work.
- Wear suitable safety boots.
- Follow the safety and accident-prevention regulations when operating the quick-change pallet system, especially when working with machine tools and other technical equipment.



⚠ CAUTION

Risk of burns due to workpieces with high temperatures.

During operation, the product and the workpieces may heat up. Touching hot surfaces can cause burns.

- Do not touch hot surfaces.
- Let them cool down before working on the product.
- Wear protective gloves when removing the workpieces.
- Automatic loading is preferred.



⚠ CAUTION

Danger of injury due to sharp edges and rough or slippery surfaces

- Wear personal protective equipment, particularly protective gloves.

3 Product description

3.1 Description of design and variant

Variant	Torque pin V1	Sensor-based monitoring of the clamping slide position
NSE-E mini 90	-	-
NSE-E mini 90-IN	-	X
NSE-E mini 90-V1	X	-
NSE-E mini 90-IN-V1	X	X

3.2 Technical data

Supply voltage [VDC]	24
Min.	21.6
Max.	26.4
Min. supply current supply power unit [A] *	1.0
Power consumption max. [A] **	2.0
Power consumption in blocked state [A] ***	1.30
Opening time [s]	1.3
Closing time [s]	1.0
Repeat accuracy [mm]	< 0.005
Installation position	any
Operating temperature [°C]	+5 to +55
Storage temperature [°C]	-20 to +80
Required level of cleanliness	dry cleaned interfaces, not permanently exposed to humidity, use with coolant with corrosion protection additive
Noise emission [dB(A)]	≤ 70
Protection class	IP 67

Designation Variant	ID	Holding force**** (M6 / M8) [kN]	Pull down force [kN]
NSE-E mini 90	0435180	15 / 25	1.5
NSE-E mini 90-IN	1313264	15 / 25	1.5
NSE-E mini 90-V1	1324403	15 / 25	1.5
NSE-E mini 90-IN-V1	1324404	15 / 25	1.5

* Minimum supply current for reliable operation of clamping module

** Maximum current input in the acceleration phase (max. t = 50 ms)

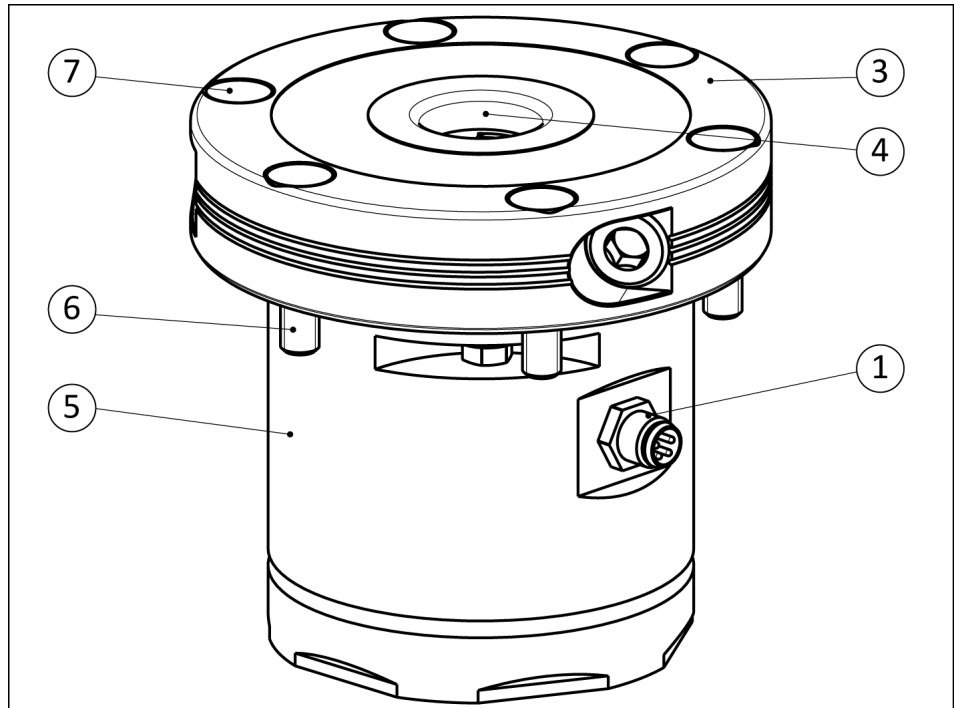
*** Current input in a blocked state (clamping slides in end position or using a clamping pin) with active command "open clamping module" or "close clamping module"

**** Holding force when fastening the clamping pin with cylindrical screw – DIN EN ISO 4762/12.9

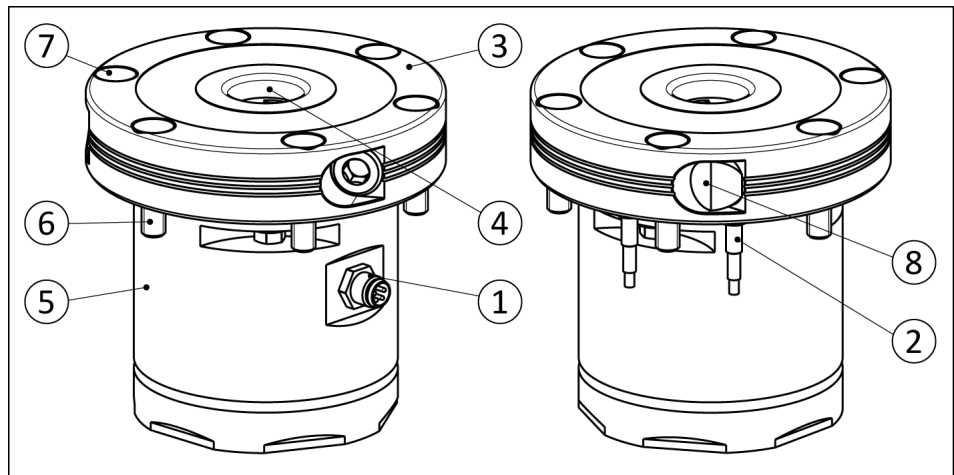
4 Design and description

4.1 Design

NSE-E mini 90 / NSE-E mini 90-V1



NSE-E mini 90-IN / NSE-E mini 90-IN-V1



1 Connection plug Voltage supply and actuation

2 Sensor *

3 Clamping module body

4 Interface clamping pins

5 Housing

6 M6 mounting screw

7 Cover cap

8 Plug *

* for NSE-E mini 90-IN and NSE-E mini 90-IN-V1

4.2 Description

The product is an electromagnetic quick-change pallet system with integrated electronics.

4.3 Actuation

Truth table

The truth table shows the actuation of the digital inputs during possible commands by the superordinated control unit.

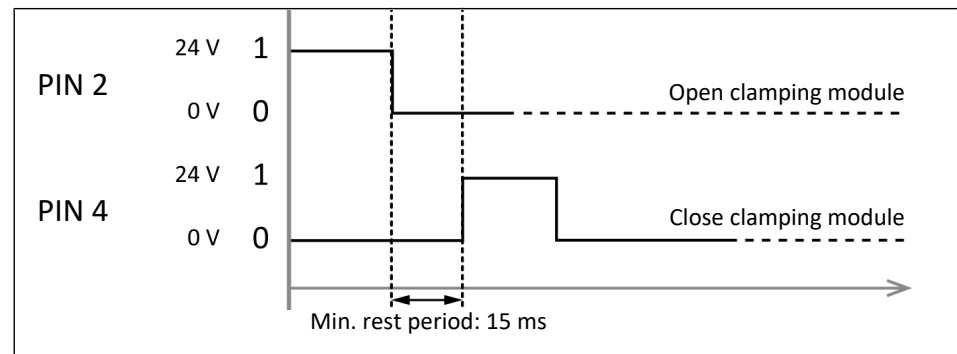
Power consumption per digital inputs amounts to max. I=10 mA.

Function	PIN 2 (open)	PIN 4 (close)
De-energized clamping module (shutdown, motor is short-circuited)	0	0
Open clamping module	1	0
Close clamping module	0	1
Rectify error (shutdown, motor is short-circuited)	1	1

Tab.: Open/close digital inlets

Rest period between two commands

The following graph shows the minimum rest period that must be kept between two commands. The minimum rest period is 15 ms.



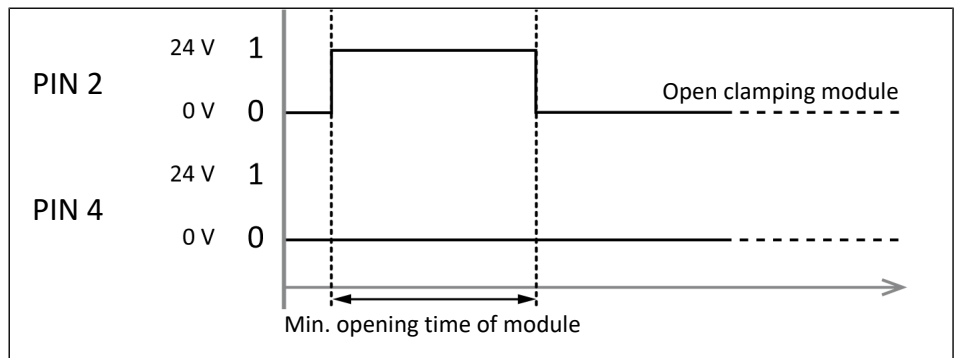
Example open clamping module / close clamping module

Open clamping module, connected by PIN 2 (open)

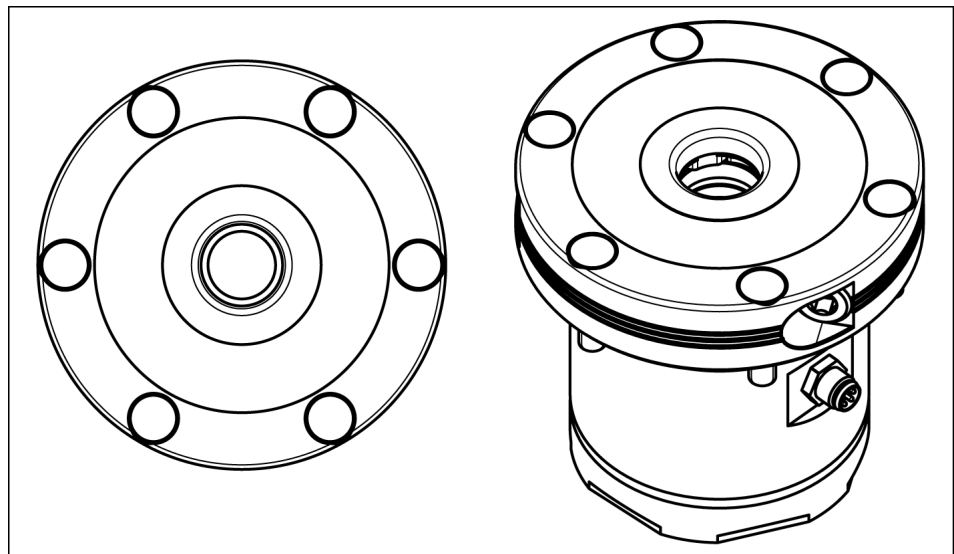
After the clamping module has been opened, further connection of the digital input PIN 2 (open) is required. Otherwise, the clamping slides will move into an undefined intermediate position (due to the installed springs), in which a clamping pin can neither be removed nor inserted. The clamping module should not be left open for a long period of time as this would cause it to heat up. This process of heating up may be accompanied by a worsening of repeat accuracy.

Under unfavorable conditions (e.g., high ambient temperatures, insufficient heat dissipation) a permanently connected digital input could lead to an "excessive temperature" error for the internal electronics ▶ 11 [41].

After opening the clamping module and removing the clamping pin, the digital input PIN 2 (open) can be switched off. The clamping slides then move to the undefined intermediate position described above. The clamping module must be opened in order to then insert a clamping pin. To do this, digital input PIN 2 (open) must be connected. The connection should be maintained as long as the clamping module is to remain open. The indicated opening time is to be observed ▶ 3 [19]. The connection duration of digital input PIN 2 (open) must be at least equal to the opening time.



Example open clamping module



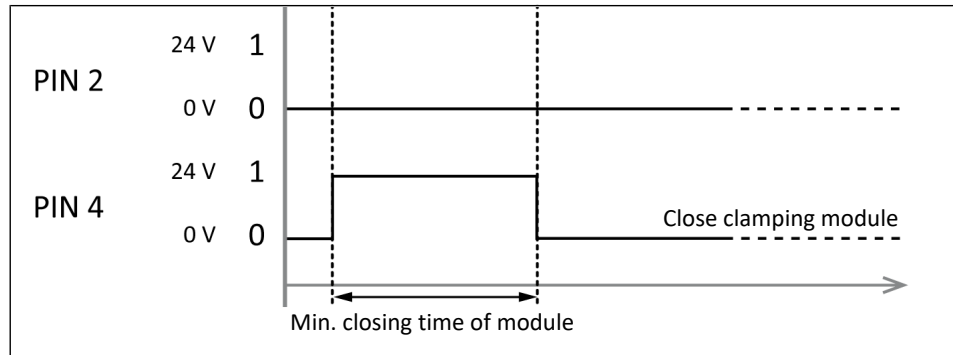
Open clamping module

Close clamping module, connection of PIN 4 (close)

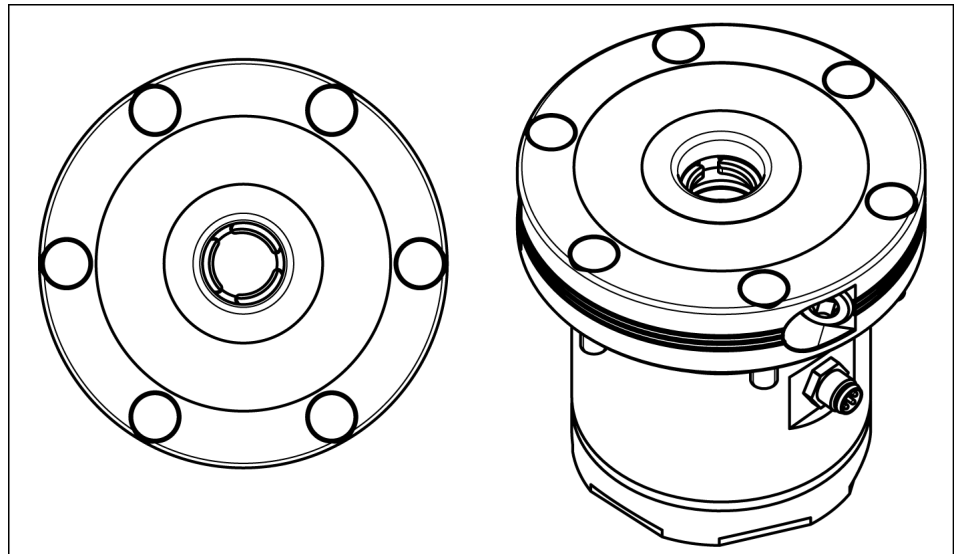
After the clamping module has been closed, it is not necessary to keep digital input PIN 4 (close) connected. Clamping force retention is provided by the installed springs and the drive kinematics.

Due to the heating of the clamping module, any further connection should not be made permanent with a closed clamping module. This process of heating up may be accompanied by a worsening of repeat accuracy.

Under unfavorable conditions (e.g., high ambient temperatures, insufficient heat dissipation) a permanently connected digital input could lead to an "excess temperature" error for the internal electronics ▶ 11 [41]. The indicated closing time is to be observed ▶ 3 [19]. The connection duration of digital input PIN 4 (close) must be at least equal to the closing time.



Example close clamping module



Closed clamping module

5 Assembly and settings

5.1 General Installation Notes

Ensure sufficient heat dissipation using the customer's mounting surface.

Mount the product so that sufficient cooling is guaranteed. The size of the cooling surface depends on the application. Avoid exposure to additional heat e.g. caused by attachments or peripheral equipment.

The "excessive temperature" error may occur if the product reaches excessively high temperatures ▶ 11 [41].

In temperature-sensitive applications, the connection of the digital inputs PIN 2 (open) or PIN 4 (close) can be reduced to a minimum in order to lessen the product temperature. The indicated opening time or closing time is to be observed ▶ 3 [19]. Deviation is not permitted.

In order to ensure flawless operation, the product must be grounded using the conductive clamping module body (functional grounding).

For this reason, mount the product on a conductive earthed surface (functional grounding).

5.2 Installing and connecting

Request our installation drawings if installing the module in the customer's clamping stations yourself.

The NSE-E mini 90 / NSE-E mini 90-IN is mounted in the installation space by 6 M6 screws.

The assembly module is positioned using the centering diameter of the installation space: **Ø90 H6**.

The NSE-E mini 90-V1 / NSE-E mini 90-IN-V1 is mounted in the installation space by 5 M6 screws and an M6 fitting screw. The exact position orientation is done with a fitting screw with a diameter of **Ø6 g6 x 3 mm**.

Precise alignment and positioning of the quick-change pallet system requires that the fitting bore **Ø6 H7** on the opposite side is precisely positioned in the mounting position.

The IP67 protection class can only be achieved with the connection cable installed. The use of a connection cable with the IP67 protection class is required.

Assembly steps

1. Check the flatness of the mounting surface ▶ 5.3.1 [25].
2. Screw the product to the machine/system ▶ 5.3.1 [25].
 - ⇒ Use suitable connecting elements (adapter plates) if necessary.
 - ⇒ Observe permissible tightening torques for the mounting screws and the strength class (see ▶ 5.3.1 [25]).
3. Place the voltage supply and control cable on the M8 connector and screw it tight ▶ 5.3.2 [31].
4. For NSE-E mini 90-IN / NSE-E mini 90-IN-V1:
Connect cables for sensors ▶ 5.4 [31].

5.3 Connections**5.3.1 Mechanical connection****Flatness**

If several linked clamping units are mounted, make sure that the flatness and height deviation of the locating surface from module to module (based on a gauge of 100 mm) lies within 0.01 mm. The interface position deviation should not exceed ± 0.015 mm.

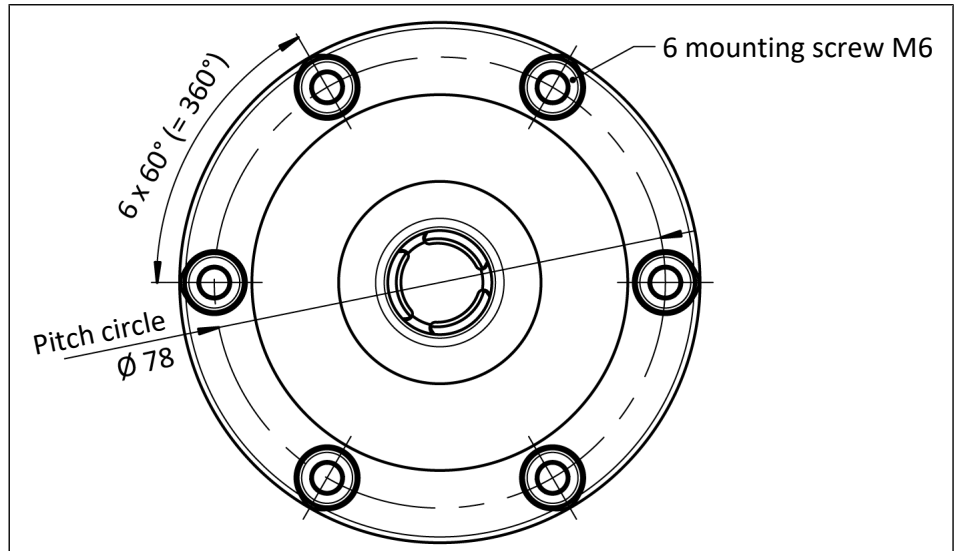
Redundancy

Due to redundancy, the clamping pins with positioning accuracy in one direction (SPB mini 20) should be used for clamping systems that are more than 100 mm apart or that do not show a positioning tolerance of ± 0.01 mm. For the clamping areas that are not intended for alignment of the device or pallet, clamping pins with centering clearance (SPC mini 20) can be used (see ▶ 6 [33]).

Connection to the base body

The NSE-E mini 90 / NSE-E mini 90-IN is mounted in the installation space by 6 M6 screws.

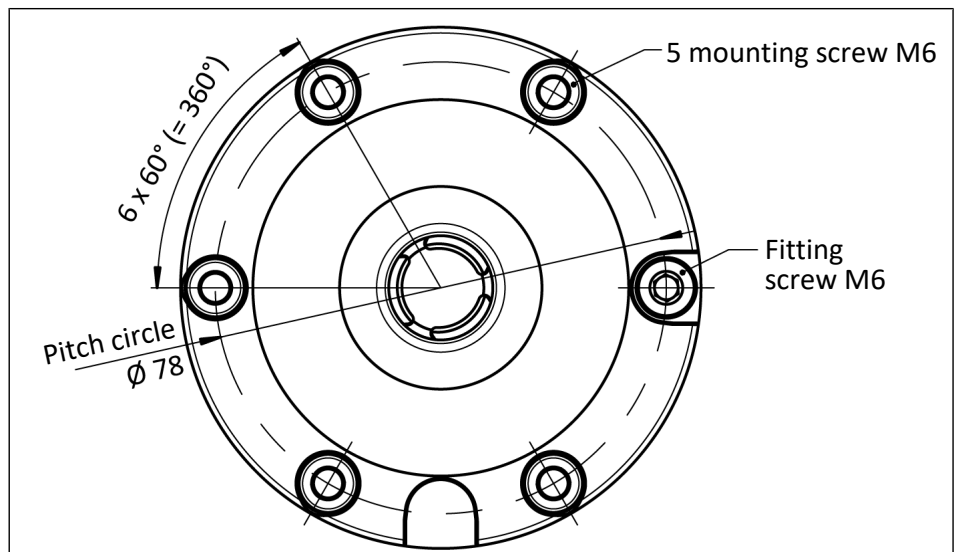
The assembly module is positioned using the centering diameter of the installation space: **Ø90 H6**.



Connection to the base body with 6 M6 screws

The NSE-E mini 90-V1 / NSE-E mini 90-IN-V1 is mounted in the installation space by 5 M6 screws and an M6 fitting screw. The exact position orientation is done with a fitting screw with a diameter of Ø6 g6 x 3 mm.

Precise alignment and positioning of the quick-change pallet system requires that the fitting bore Ø6 H7 on the opposite side is precisely positioned in the mounting position.



Connection to the base body with 5 M6 screws and an M6 fitting screw

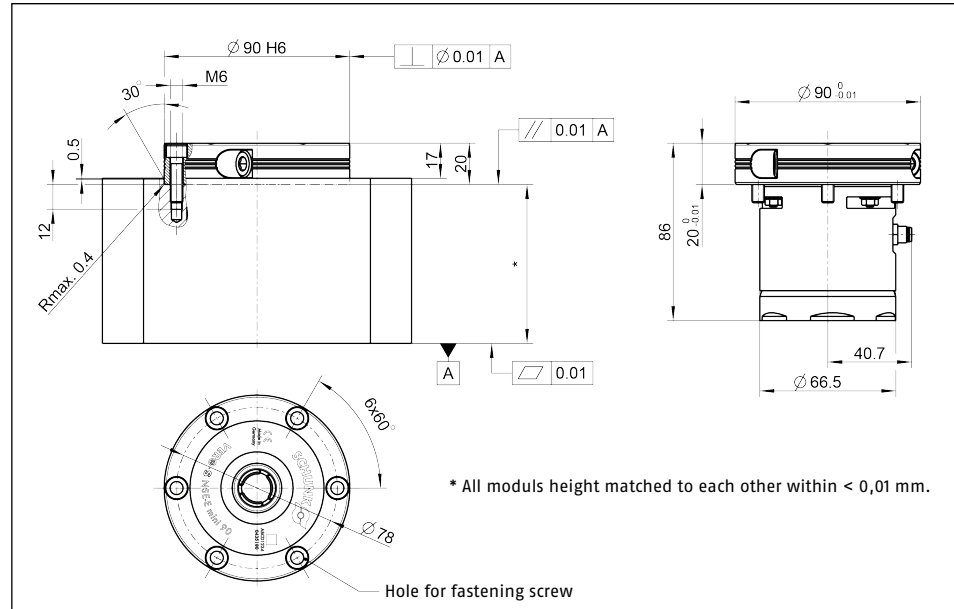
The installation of the clamping module is possible as a partial or full installation. A recess for the electrical connection (M8 connector) of the clamping module must be provided in the installation space.

For the NSE-E mini 90-IN / NSE-E mini 90-IN-V1, two additional recesses must be provided in the installation space for the sensors.

Partial installation

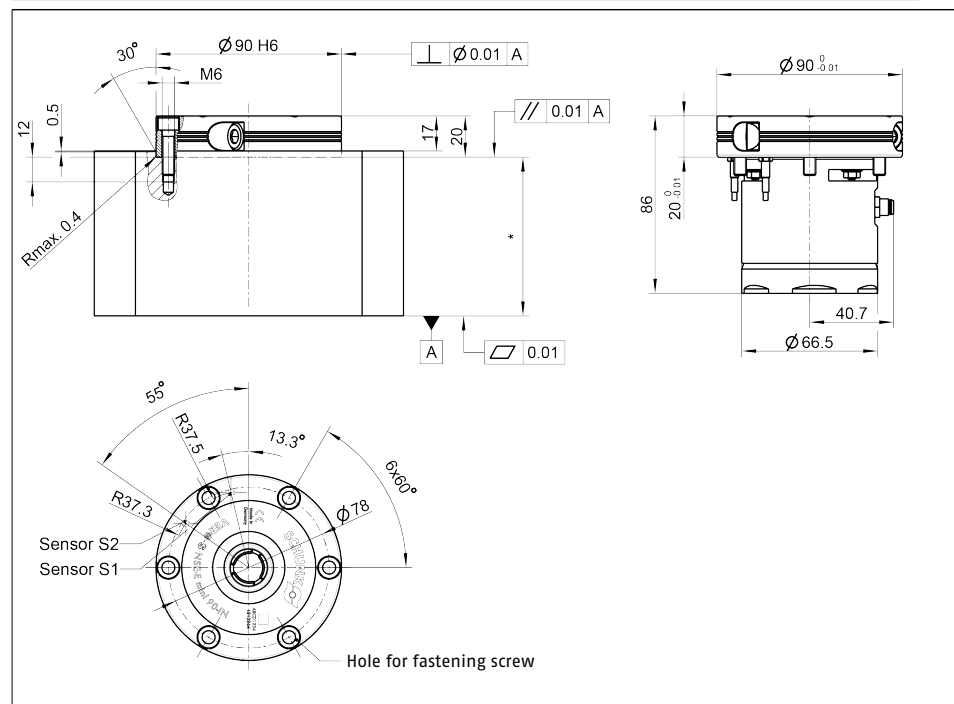
Manual emergency lock release is possible in a partial installation. For this, at least one of the piston bore holes in the base body (closed with a set-screw) must be accessible at all times ▶ 8 [38].

Partial installation NSE-E mini 90



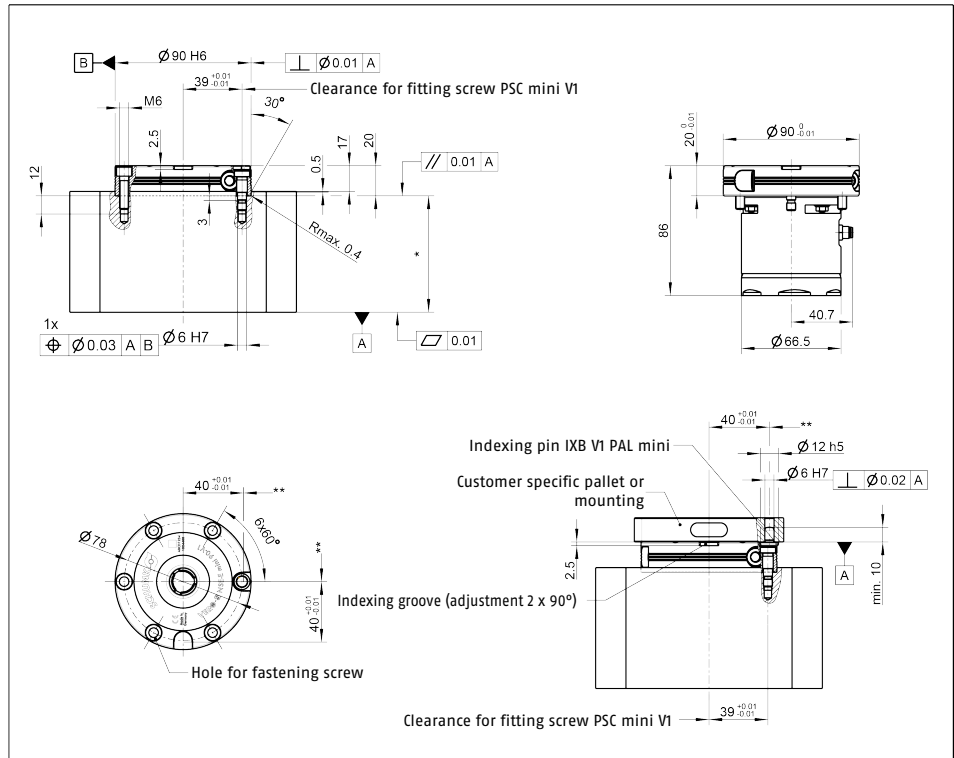
* All moduls height matched to each other within < 0,01 mm.

Partial installation NSE-E mini 90-IN



* All moduls height matched to each other within < 0,01 mm.

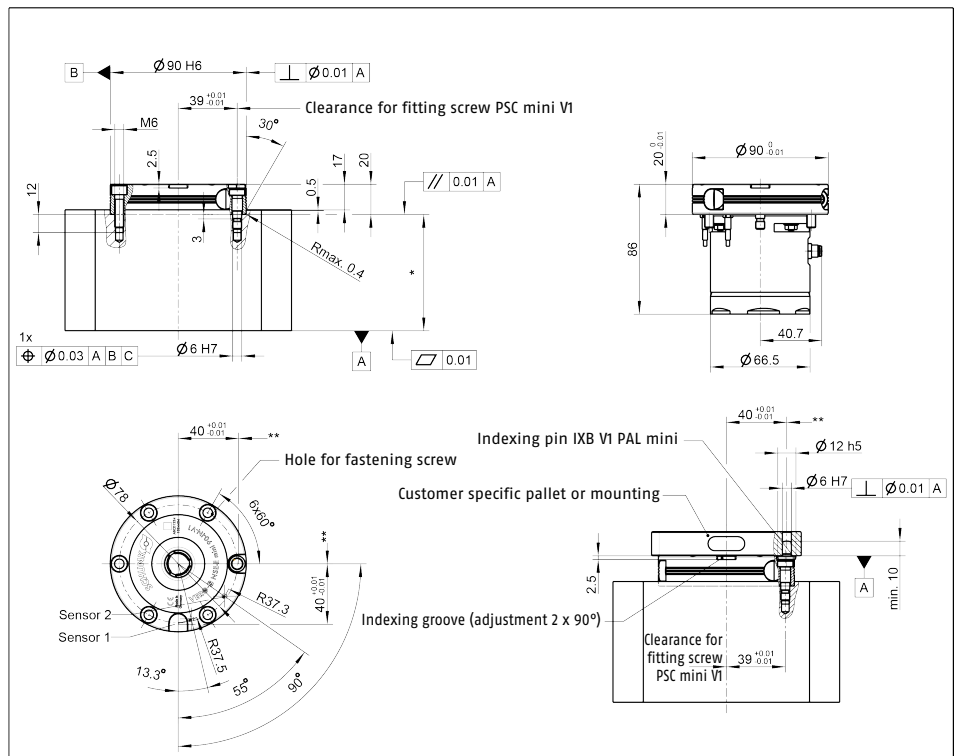
Partial installation NSE-E mini 90-V1



* All moduls height matched to each other within < 0,01 mm.

** Clearance for IXB V1 PAL mini in the clamping pallet.

Partial installation NSE-E mini 90-IN-V1



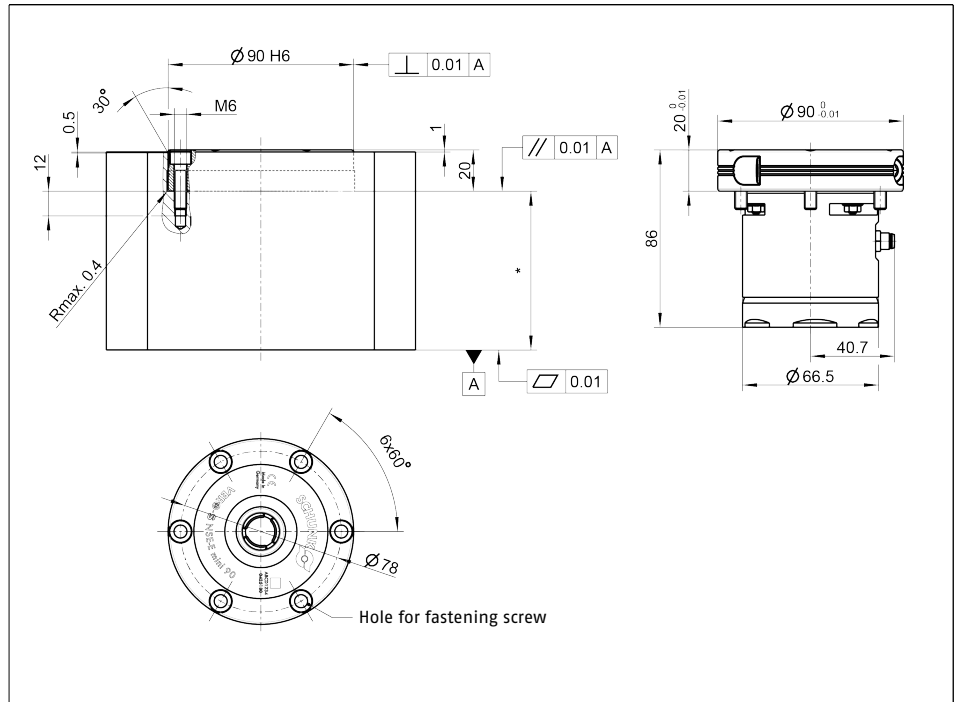
* All moduls height matched to each other within < 0,01 mm.

** Clearance for IXB V1 PAL mini in the clamping pallet.

Full installation

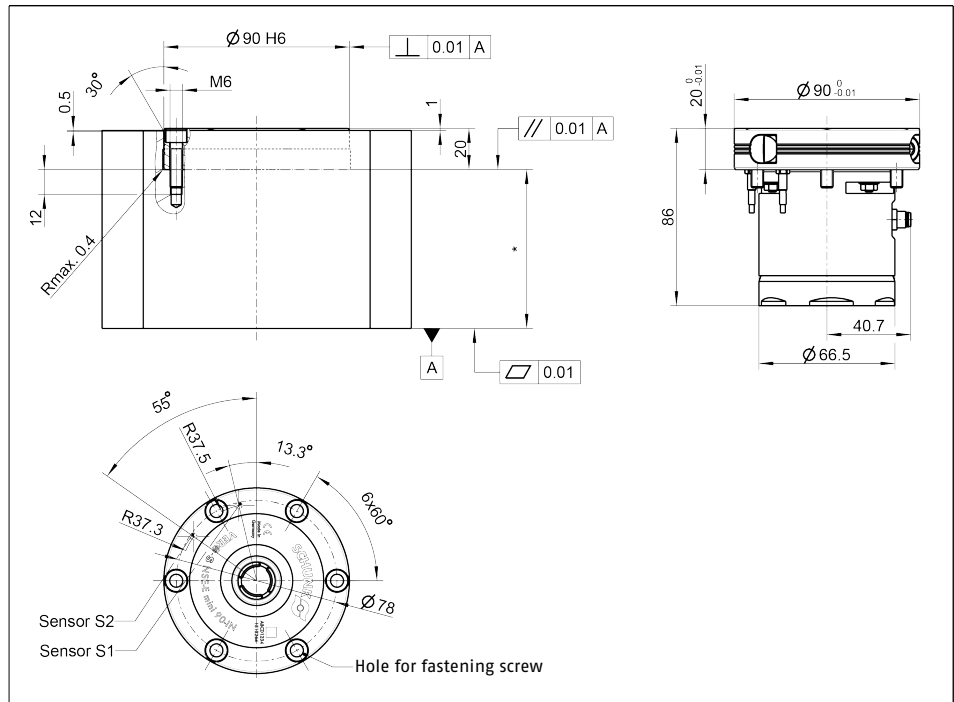
Manual emergency lock release is not possible in a full installation.

Full installation NSE-E mini 90



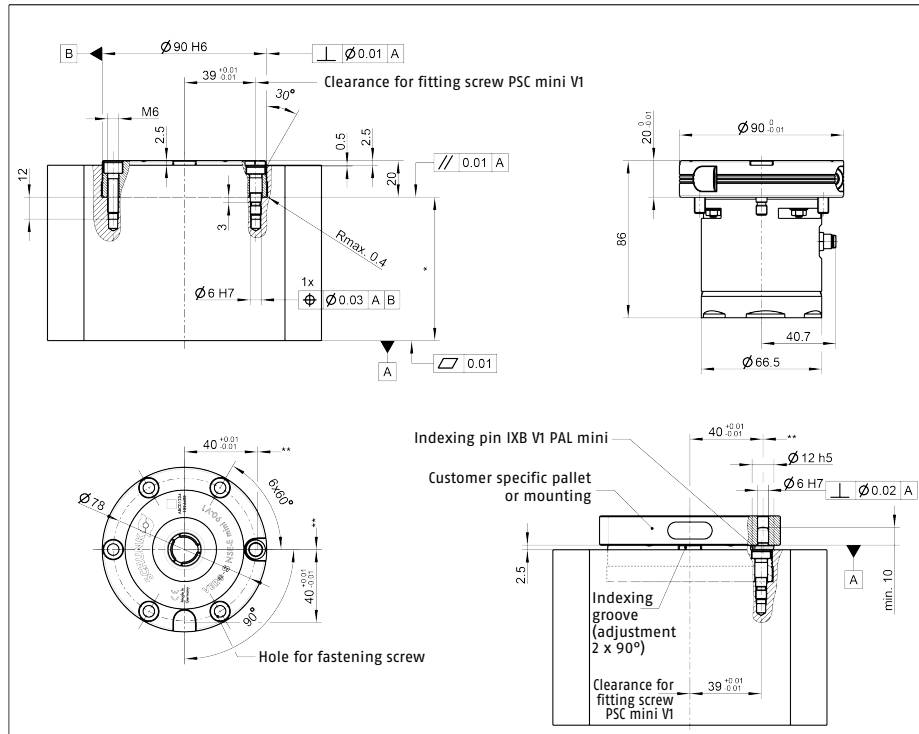
* All moduls height matched to each other within < 0,01 mm.

Full installation NSE-E mini 90-IN



* All moduls height matched to each other within < 0,01 mm.

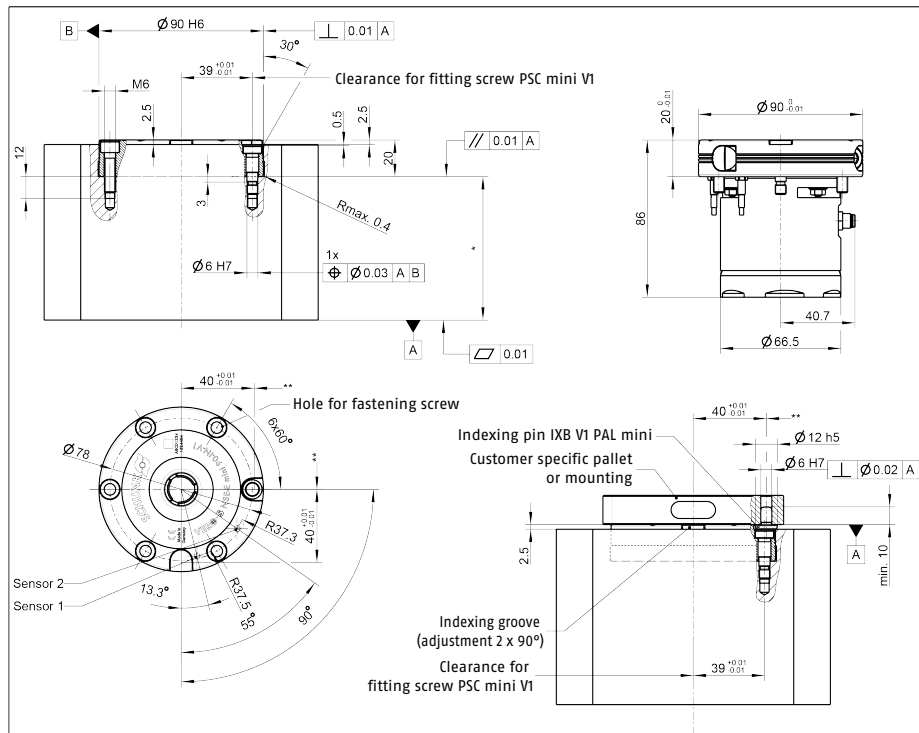
Full installation NSE-E mini 90-V1



* All moduls height matched to each other within < 0,01 mm.

** Clearance for IXB V1 PAL mini in the clamping pallet.

Full installation NSE-E mini 90-IN-V1



* All moduls height matched to each other within < 0,01 mm.

** Clearance for IXB V1 PAL mini in the clamping pallet.

Tightening torque for the mounting screws

Tightening torque for the clamping module mounting screws (Screw quality 10.9)

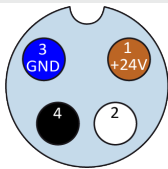
Screw size	M6
Tightening torque [Nm]	13

5.3.2 Electrical connection

NOTE

When using customer-supplied cable: at least 4 x 0.25 mm²

Voltage supply and control

Connection assignment	PIN	Wire strand	Signal
	1	Brown	+ 24 V
	2	White	Open clamping module
	3	Blue	GND
	4	Black	Close clamping module

Connection	Clamping module plug connector	Plug connector provided by the customer
Clamping module	Plug connector 4-pole, M8	Connection cable 4-pole, socket M8

Tab.: Components of the electrical connection

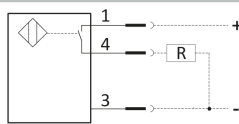
5.4 Sensor

When connecting the sensors, observe the Sensor Assembly and Operating Manual.

- Information on handling sensors is available at schunk.com or from SCHUNK contact persons.

NOTE

- Do not use the sensor as a safety component.
- Do not pull on the cable of the sensor.
- Secure the cable and connection plug so that they are not taugt and cannot move during operation.
- Do not exceed the permitted bending radius of the cable.
- Do not allow the sensor to come into contact with hard objects and chemicals (e. g., nitric acid, chromic acid and sulfuric acid).

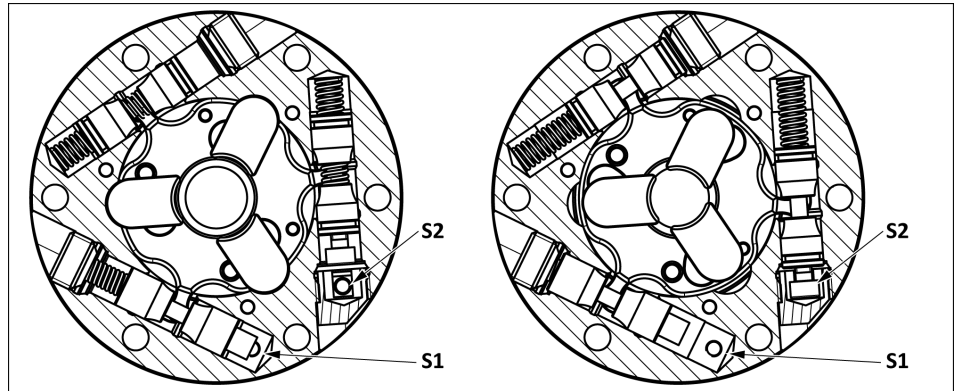
Type	Inductive proximity sensor IN 41-S-M8 (ID 1325755)		
Connection	M4 x 0.5		
Type of switching	PNP		
Switching function	Closer		
	1	Brown	+10 to +30 VDC
	3	Blue	GND
	4	Black	Output

Connection	Sensor plug connector	Plug connector provided by the customer
Sensor	Connector 3-pole, M8	Connection cable 3-pole, socket M8

Tab.: Components of the electrical connection

5.4.1 Monitoring clamping slide position

Monitoring the clamping slide position of the clamping module is possible with the NSE-E mini 90-IN and NSE-E mini 90-IN-V1 variants with two inductive proximity switches.



Monitoring clamping slide position, clamping module open (left), clamping module closed (right)

Logic table

The assignment of the S1 and S2 sensors to the clamping slide positions are shown in the logic table.

	Open clamping module	Closed clamping module
S1	X	S1
S2		S2 X

The **X** in the table represents each dampened sensor (logic high).

6 SPA mini 20, SPB mini 20, SPC mini 20 clamping pins

CAUTION

Notes on clamping pins and mounting screws

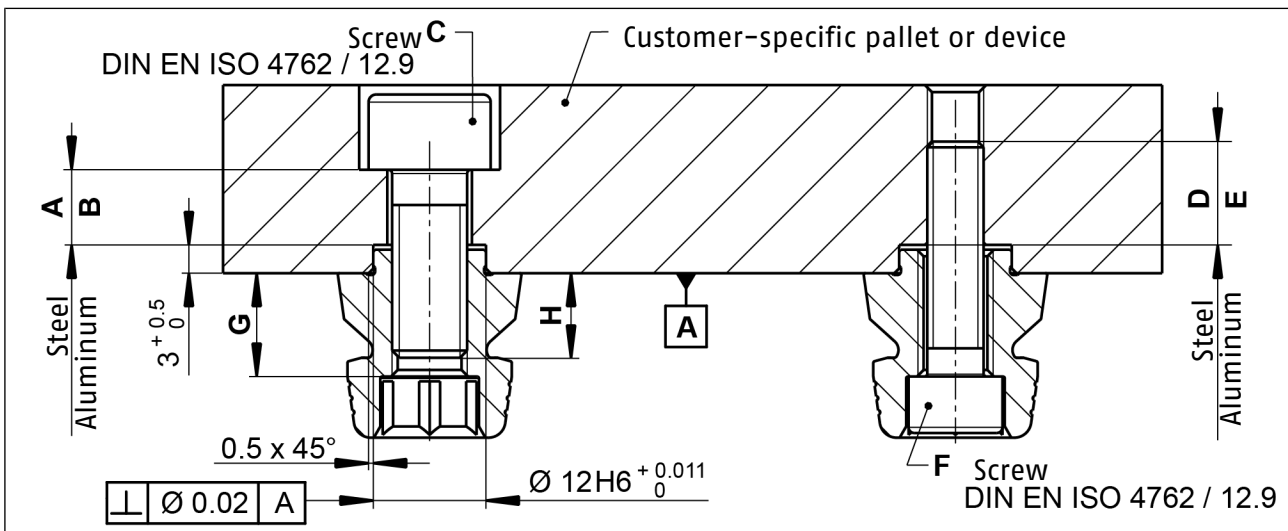
The holding force of the quick-change pallet system is limited essentially by the tightness of the screw connection which connects the clamping pin to the pallet or the device. This is why only screws of strength class 12.9 may be used.

Only original SCHUNK clamping pins may be used.

If the clamping pins are to be used in customer-owned devices, the customer must provide sufficiently dimensioned threaded holes or a sufficiently thick mounting material.

The clamping pins can be attached to the device or pallet in two different ways.

The mounting variant on the left in the illustration, which is screwed from above, is the preferred variant. With this variant, if there is a module failure then the device or pallet can be removed after disassembling the clamping pins.

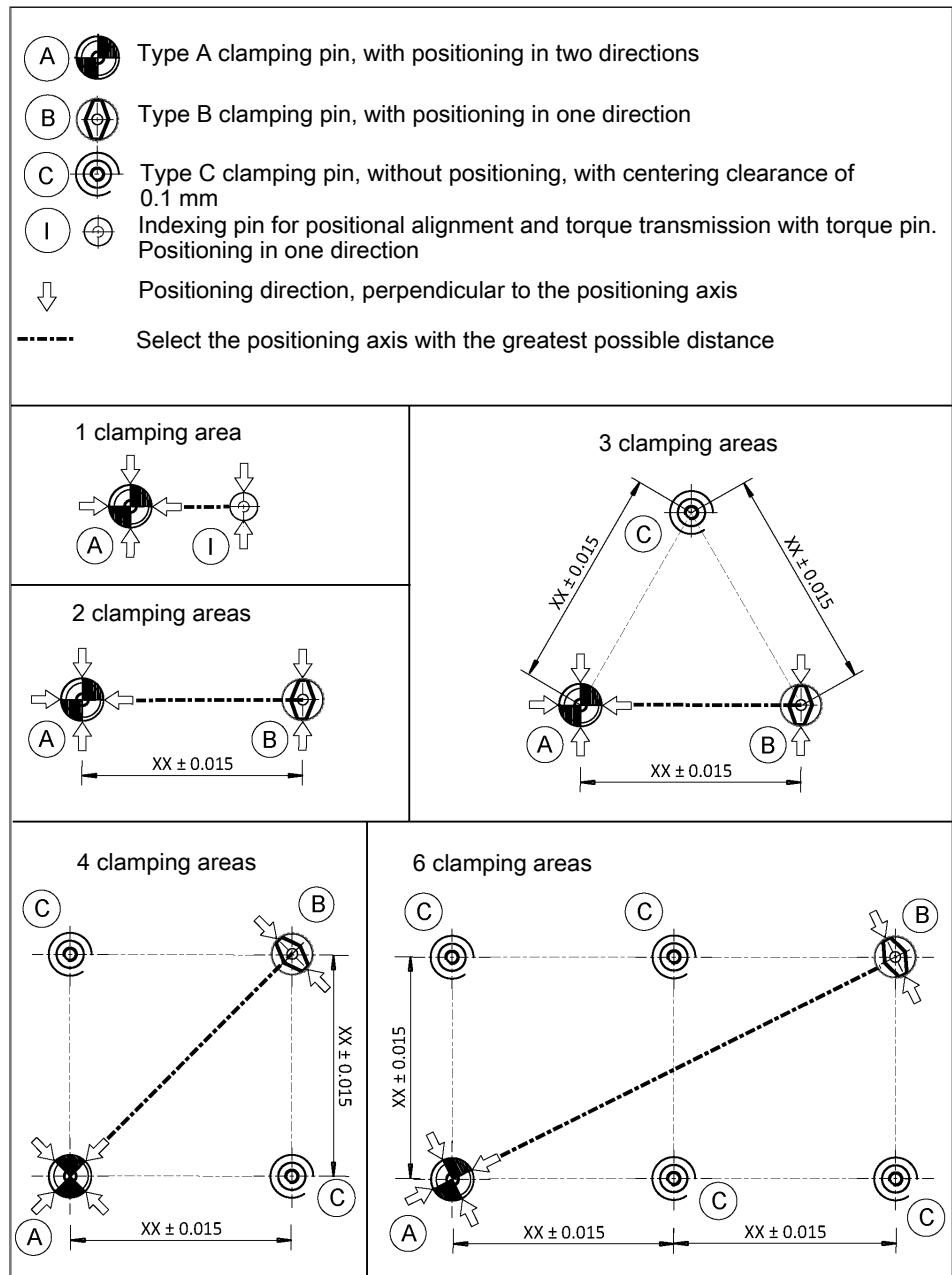


Mounting the clamping pins

Tolerances and installation conditions

Type	ID	A	B	C	D	E	F	G	H
SPA mini 20	0435610	> 8 mm	> 13 mm	M8	> 9 mm	> 11 mm	M6	11 mm	> 8 mm
SPB mini 20	0435620	> 8 mm	> 13 mm	M8	> 9 mm	> 11 mm	M6	11 mm	> 8 mm
SPC mini 20	0435630	> 8 mm	> 13 mm	M8	> 9 mm	> 11 mm	M6	11 mm	> 8 mm

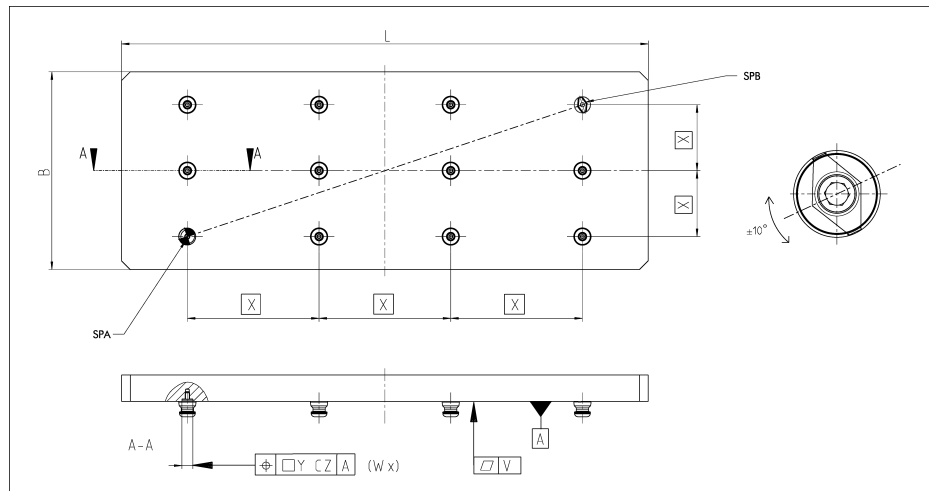
Usage/arrangement of the different types of clamping pins



When positioning the clamping pins, deviating from the previous arrangement examples, the position tolerances given in the following illustration must be observed.

Furthermore, the customer workpiece or the clamping pallet must always have the described flatness.

The clamping pin type B may deviate in its twisting position by max. +/-10°.



X = gauge of the clamping pins is variable

W = number of clamping pin interface

Plate size [mm]	Position when using clamping pin type A, B and C [mm]	Recommended flatness for optimal results [mm]	Prescribed flatness to ensure the function [mm]
L x B	Y	V	V
0 – 600	0.03	0.02	0.05
600 – 1200	0.04	0.04	0.08
1200 – 1800	0.05	0.05	0.10

7 Operation

Before loading or unloading the clamping pallet it must be ensured that all integrated clamping modules are unlocked.

- Before starting the machining process, the installed clamping modules must be locked!
- The clamping pallet must lie flat on the support surface!

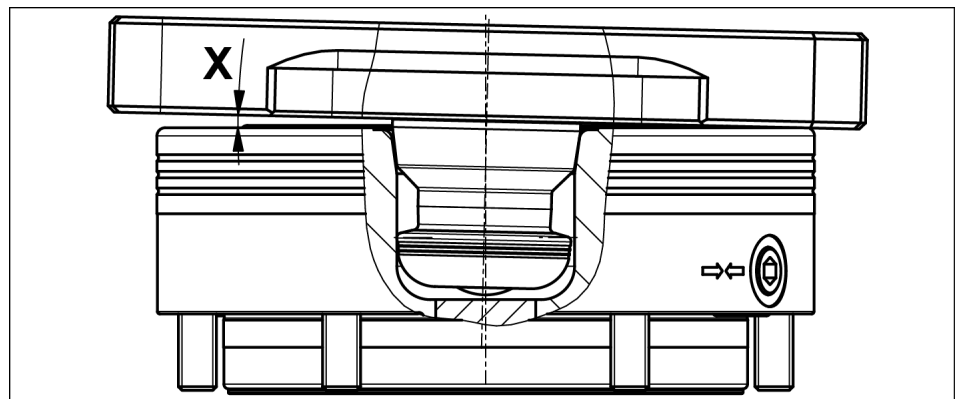
CAUTION

When changing the pallet using lifting equipment or a robot, ensure that the pallet is lifted exactly parallel to the modules.

The inclination (X) during lifting may not exceed 1.2° .

If the inclination is larger, the clamping pins can jam and the system components could be damaged or destroyed. In this case, the system must be inspected and damaged parts must be replaced immediately.

Only original SCHUNK spare parts may be used!



7.1 General operating conditions

Observe the chapter "Ambient conditions and operating conditions" ▶ 2.5 [9].

- Check the clamping module at regular intervals (at least every two weeks or after 1000 clampings) for perfect functionality.
- The clamping slides must be able to move smoothly.
- In case of visible damage or signs of malfunction, shut down the quick-change pallet system immediately. The system may only be started up again once the faults have been corrected (e.g., by replacement of a damaged clamping module).
- The operator must ensure that all components and assembly groups are included in the local equipotential bonding in line with the applicable regulations.

7.2 Open clamping module

To open the clamping module, PIN 2 (digital input – open) is switched ▶ 4.3 [□ 21]. By opening the clamping module, the clamping slides move outward in a radial direction, releasing the clamping pin.

To keep the clamping module in the open position, PIN 2 (digital input – open) must remain switched.

7.3 Close clamping module

To close the clamping module, PIN 4 (digital input – close) is switched ▶ 4.3 [□ 21]. By opening the clamping module, the clamping slides move inward in a radial direction.

The pallet/workpiece that the clamping pin is attached to is pulled onto the contact surface of the clamping module. Due to the installed springs and drive kinematics, the clamping pin is self-locking and uses form-fitting clamping in the clamping module.

After tensioning the clamping pin, the PIN 4 (digital input – close) may no longer be switched.

The switching duration for PIN 4 (digital input – close) must be at least equal to the closing time ▶ 3 [□ 19].

Due to the heating of the clamping module, PIN 4 (digital input – close) may not be used continuously.

Heating the clamping module may worsen the repeat accuracy.

9 Maintenance and care

The quick-change pallet system is designed for low-maintenance operation. It is not intended for customers to open and disassemble the clamping module.

- Check the units at regular intervals (at least every two weeks or after 1000 clampings).
Perfect functionality can be assumed if the clamping slides are able to move smoothly into their respective end positions.
- Carry out regular visual/functional checks. In case of visible damage or signs of malfunction, shut down the quick-change pallet system immediately.
The system may only be commissioned again once the faults have been corrected. For example, by replacing the damaged unit.

10 Storage

When storing the product for a longer period of time, observe the following points:

- Clean the product and lubricate it lightly.
- Store the product in a suitable transport container.
- Only store the product in dry rooms.
- Protect the product from major temperature fluctuations.

NOTE: Before recommissioning, clean the product and all attachments, check for damage, functionality and leaks.

11 Troubleshooting

11.1 The clamping area does not unlock

Possible cause	Corrective action
A component is broken (e.g., due to overloading).	Replace the module or send it to SCHUNK for repair.
Excess tensile load on clamping pins.	Reduce support weight.
Voltage supply and/or control connected incorrectly.	Check voltage supply and control ▶ 5.3.2 [31].

11.2 The quick-change pallet system no longer opens and closes quietly

Possible cause	Corrective action
The clamping faces on the clamping slides and on the clamping pin are dirty	Remove the clamping pin and clean the clamping faces on the clamping slides and on the clamping pin.

11.3 The clamping pins cannot be removed / exchanged

Possible cause	Corrective action
The clamping slides do not move into their respective end positions.	Remove the clamping pin and clean the clamping faces on the clamping slides and on the clamping pin. Replace the module or send it to SCHUNK for repair.
"Excessive temperature" error, module returns to idle mode.	Allow the module to cool down. Errors must be acknowledged.

Acknowledge error

1. Wait until the clamping module has cooled down.
2. Actuate both digital inlets, PIN 2 and PIN 4, with high.
3. OR: Disconnect voltage supply and reconnect.

⇒ Error acknowledged.

11.4 Electrical signals are not transmitted

Possible cause	Corrective action
Cable connected incorrectly.	Check that pin terminal is seated properly ▶ 5.3.2 [31].
Wire strands exchanged.	Check PIN assignment ▶ 5.3.2 [31].

11.5 Sensors do not switch correctly / do not switch at all

NSE-E mini 90-IN / NSE-E mini 90-IN-V1 variants Monitoring clamping slide position

Possible cause	Corrective action
Cable connected incorrectly.	Check that pin terminal is seated properly ▶ 5.4 [31]. Check the sensor cabling ▶ 5.4 [31].
Wire strands exchanged.	Check PIN assignment ▶ 5.4 [31].

12 Part lists

NSE-E mini 90 (ID no. 0435180)

NSE-E mini 90-IN (I.D. no. 1313264)

NSE-E mini 90-V1 (I.D. no. 1324403)

NSE-E mini 90-IN-V1 (I.D. no. 1324404)

Item	Designation	Quantity	Note
11	Base body	1	
12	Sphere	3	
13	Set-screw	3	
14	Cylindrical pin	2	
15	Set-screw	2	90 / 90-V1
21	Drive ring	1	
22	Ring gear	1	
23	Cylindrical pin	2	
24	Screw	2	
30	Clamping slides	3	
31	Bearing shell	3	
32	Piston	1	90-IN / 90-IN-V1
	Piston	3	90 / 90-V1
33	Piston	1	90-IN / 90-IN-V1
34	Screw	1	90-IN / 90-IN-V1
35	Piston	1	90-IN / 90-IN-V1
36	Compression spring	2	
37	Compression spring	1	
38	Set-screw	1	90-IN / 90-IN-V1
	Set-screw	2	90 / 90-V1
39	Set-screw	1	
40	Plug	1	90-IN / 90-IN-V1
41	Counter-support	1	
42	Housing	1	
43	Electronics	1	
44	Motor with gearbox	1	
45	Electronics housing	1	
46	O-ring	4	
47	Screw	4	
48	Installation space	1	
49	Seal	1	

Item	Designation	Quantity	Note
50	O-ring	1	
51	Pinion	1	
52	Safety washer	1	
53	Nut	3	
54	O-ring	1	
55	Housing cover	1	
60	Sensor	2	90-IN / 90-IN-V1
91	Screw	5	90-V1 / 90-IN-V1 / Z
	Screw	6	90 / 90-IN / Z
92	Cover cap	5	90-V1 / 90-IN-V1 / Z
	Cover cap	6	90 / 90-IN / Z
93	Fitting screw	1	90-V1 / 90-IN-V1 / Z
94	Cover cap	1	90-V1 / 90-IN-V1 / Z

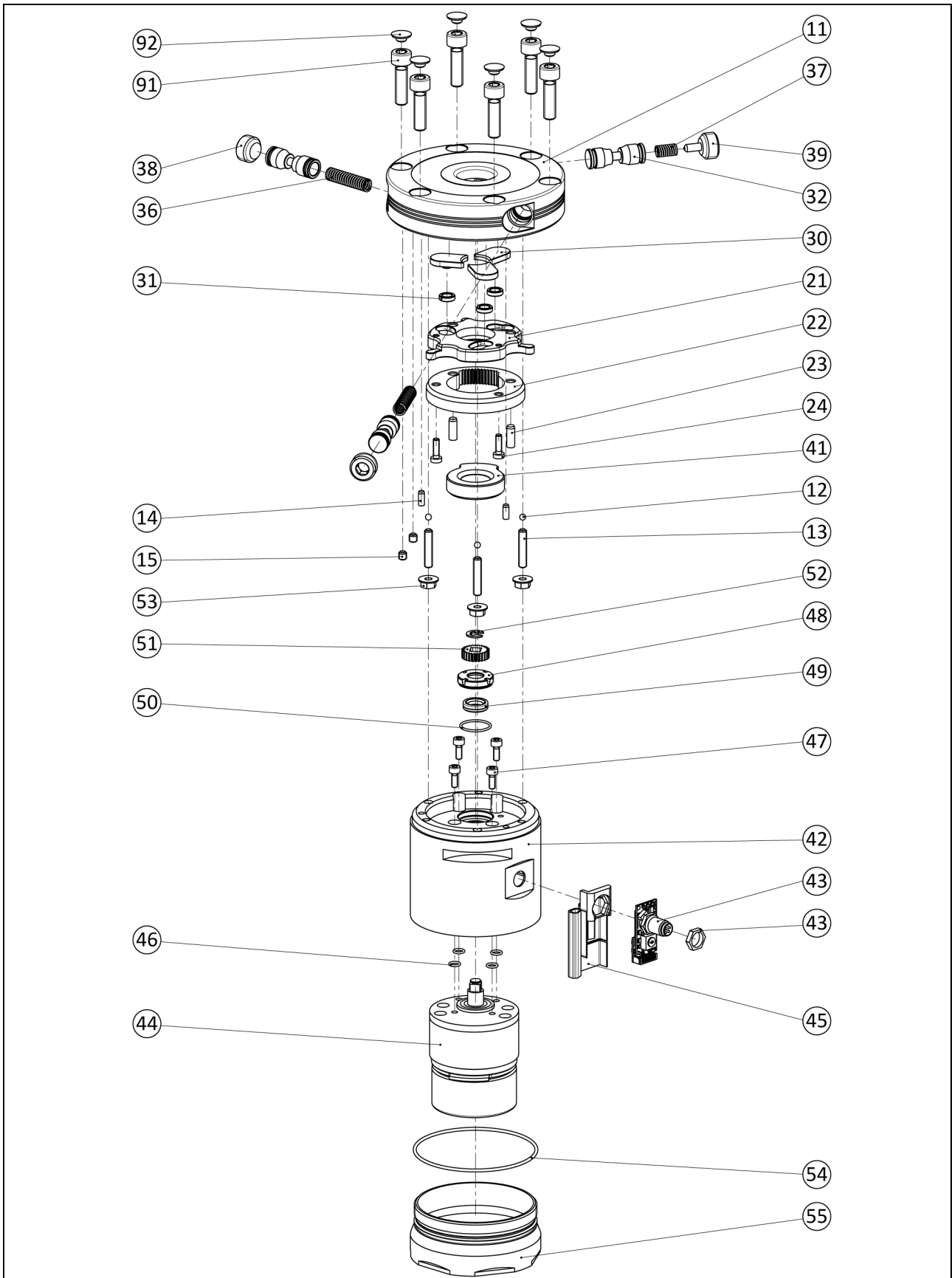
Parts list key

90	for NSE-E mini 90	90-IN-V1	for NSE-E mini 90-IN-V1
90-IN	for NSE-E mini 90-IN	Z	included in accessory kit
90-V1	for NSE-E mini 90-V1		

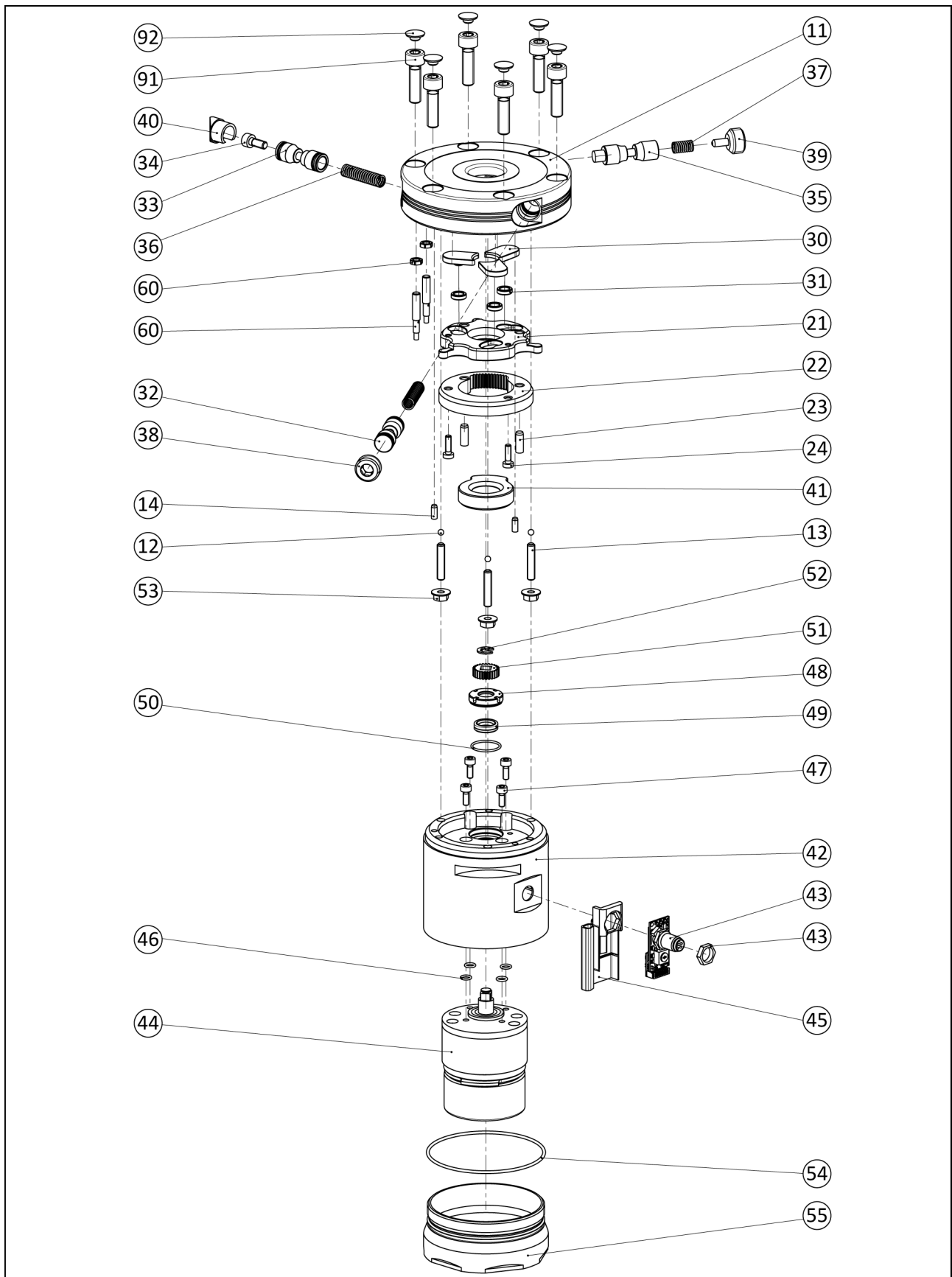
The product also complies with the regulations found in directive 2014/30/EU from the European Parliament and the Council on electromagnetic compatibility.

13 Assembly drawings

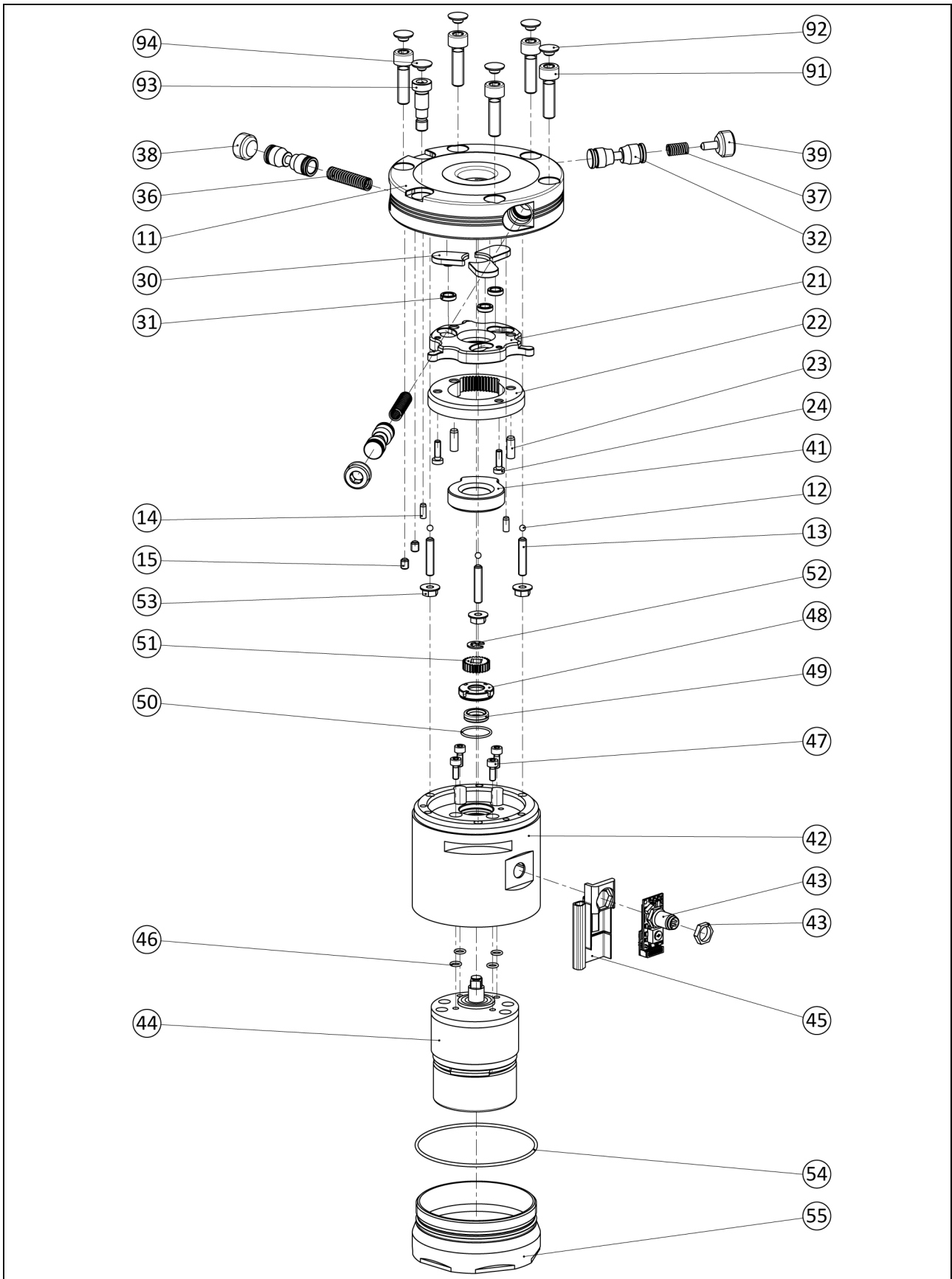
NSE-E mini 90



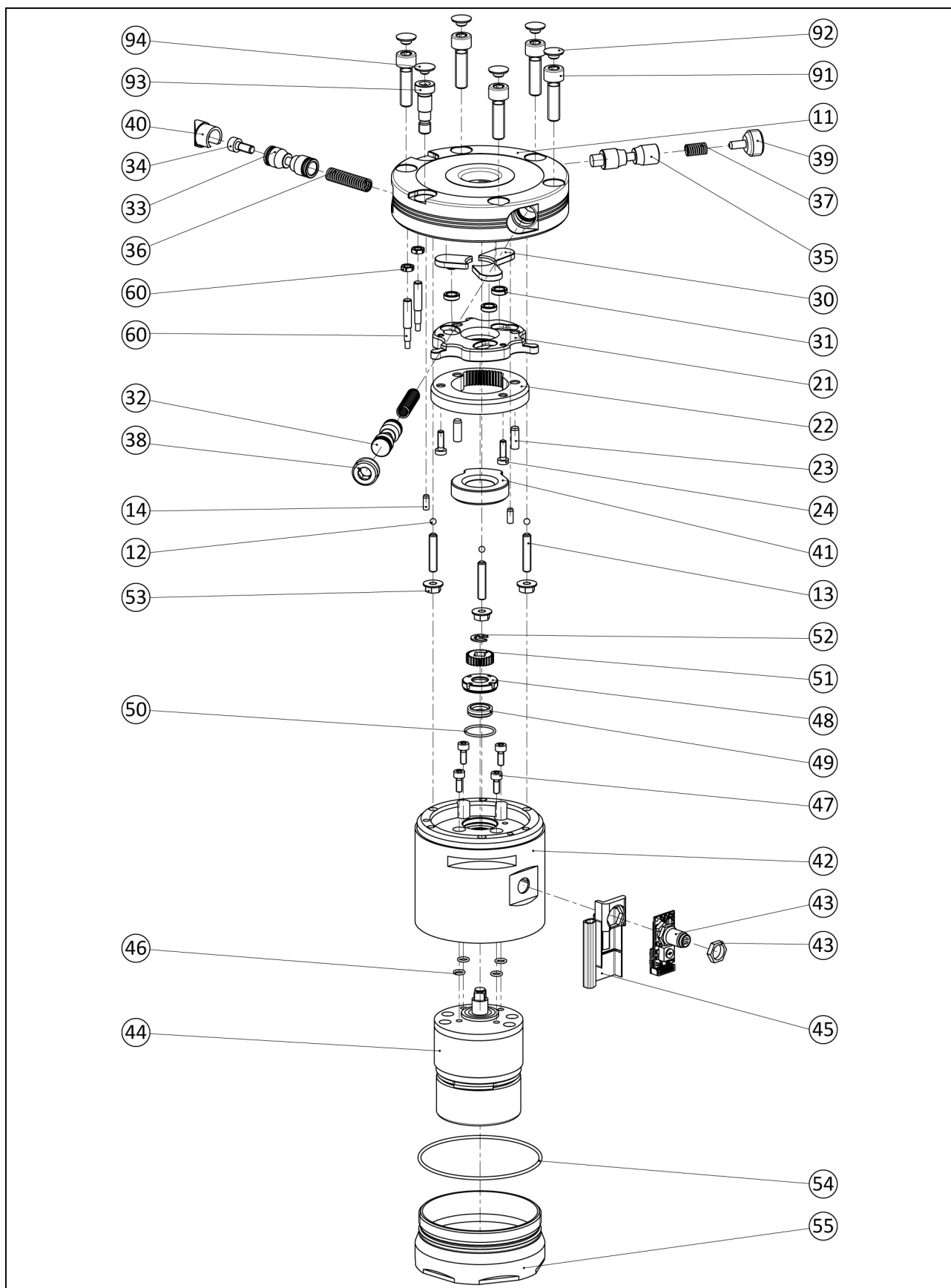
NSE-E mini 90-IN



NSE-E mini 90-V1



NSE-E mini 90-IN-V1



14 Manufacturer certificate

Manufacturer / Distributor:	H.-D. SCHUNK GmbH & Co. Spanntechnik KG Lothringer Str. 23 D-88512 Mengen
Product:	Electromechanical quick-change pallet system
Designation:	VERO-S
Type designation:	NSE-E mini 90, NSE-E mini 90-IN, NSE-E mini 90-V1, NSE-E mini 90-IN-V1

Heinz-Dieter SCHUNK GmbH & Co. Spanntechnik KG certifies that the above-mentioned products, when used as intended and in compliance with the operating manual and the warnings on the product, are safe according to the national regulations and:

- a **risk assessment** has been carried out in accordance with ISO 12100:2010.
- an **operating manual** for the assembly instructions has been created in accordance with the contents of the Machinery Directive 2006/42/EC Annex I No. 1.7.4.2. and the contents of the provisions of Annex VI of the Machinery Directive 2006/42/EC.
- **Markings** have been made in accordance with EN 1550:1997+A1:2008 Section 6.3.1, VDMA 34192:2019 Section 6.3 or ISO 16156:2004 Section 6.3. The requirements of Annex I No. 1.7.3. of the Machinery Directive 2006/42/EC have been complied with.
- the relevant basic and proven safety principles of the Annexes A to C of **ISO 13849-2:2012**, taking into account the requirements of the documentation have been observed for the component. The Parameters, limitations, ambient conditions, characteristic values, etc. for proper operation are defined in the operating manual.
- an $MTTF_D$ value of 150 years can be estimated for mechanical components using the informative procedure in Table C.1 of ISO 13849-1:2015.
- the **fault exclusion** against the fault "Breakage during operation" regarding Annex A to C in compliance with the parameters, limitations, ambient conditions, characteristic values and maintenance intervals, etc., specified in the operating manual.

Harmonized Standards applied:

- **ISO 12100:2010** Safety of machinery – General principles for design – Risk assessment and risk reduction

Other related technical Standards and specifications:

- **VDMA 34192:2019** Safety requirements for clamping devices for use on machines

Signature: see original declaration

Mengen, 05th of November 2024

p.p. Philipp Schröder; Head of Engineering Design

15 EU declaration of conformity

in accordance with Directive 2014/30/EU (electromagnetic compatibility), Annex IV of the European Parliament and Council of 26 February 2014.

The manufacturer bears sole responsibility for issuing this EU declaration of conformity.

Manufacturer/ Distributor H.-D. SCHUNK GmbH & Co.
Spanntechnik KG
Lothringer Str. 23
D-88512 Mengen

We hereby declare that the product described below is in conformity with the essential health and safety requirements of Directive 2014/30/EU in its design and construction and in the version placed on the market by us at the time of this declaration. The declaration is rendered invalid if modifications are made to the product.

Product designation: Electromechanical quick-change pallet system
Type designation: NSE-E mini 90, NSE-E mini 90-IN,
NSE-E mini 90-V1, NSE-E mini 90-IN-V1
ID number: 0435180, 1313264, 1324403, 1324404

The object of the declaration described above complies with the following harmonization legislation:

2011/65/EU RoHS Directive

European harmonized standards applied:

DIN EN ISO 12100:2011-03	Safety of machinery – General principles for design – Risk assessment and risk reduction
EN 55011:2016 Class B	Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement
EN 61000-6-2:2005	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments
EN 61000-6-3: 2007+ A1:2011	Electromagnetic compatibility (EMV) – Part 6-3: Generic standards – Interference emissions in residential, commercial, industrial and light industrial environments IEC 61000-6-3: 2006 + A1:2010

Related technical standards and specifications:

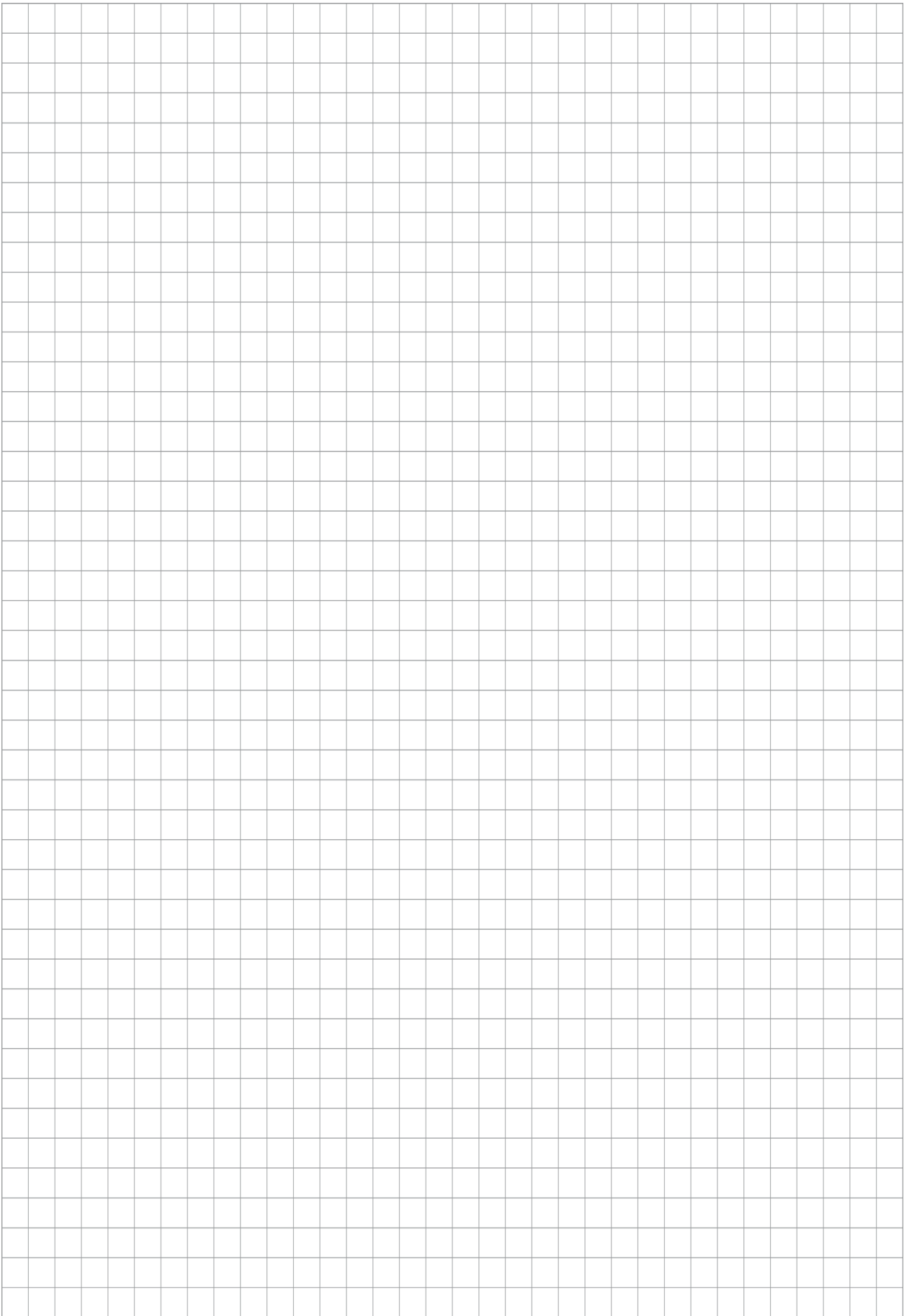
-

Person authorized to compile the technical documentation:
Philipp Schröder, Address: see manufacturer's address

i. V. Philipp Schröder

Mengen, 15th of November 2017

p.p. Philipp Schröder; Head of Engineering Design







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