PRODUCT INFORMATION

OTT
Spanntechnik
JAKOB

JAKOB
GRUPPE

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PULL-FORCE MEASUREMENT SYSTEM

POWER
CHECK 2

LONG-LIFE
CLAMPING
TECHNOLOGY
INSIDE

JAKOB
GRUPPE

TABLE OF CONTENTS

symbol explanation:

keep attention - dangerous!

keep attention - malfunction!

Case contents:

- Pull-force measurement system (Base unit)
- tool
- USB connection cable
- Product Information Pull-force measurement system   **POWER-CHECK 2**
- Quick guide

Approvals

We hereby declare that the device, both in its basic design and construction and in the version marked by us, conforms to the relevant requirements of the R&TTE directive 1995/5/EG (Europe) and of the
ARIB-STD-T66 directive (Japan)

Norms applied:

DIN EN 61000-6-2
DIN EN 61000-6-4
ETSI EN 301 489-3
ETSI EN 300 440-2
DIN EN 60950-1
ARIB-STD-T66

WEEE Notice

The Directive on Waste Electrical and Electronic Equipment (WEEE), which entered into force as European law on 13th February 2003, resulted in a major change in the treatment of electrical equipment at end-of-life.

To dispose the device, please return to OTT-JAKOB Spanntechnik GmbH. The OTT-JAKOB company will dispose of the device professionally with regard to all laws and conditions (ElektroG § 10.2). The user is NOT allowed to dispose of the POWER-CHECK 2 himself or to put it into normal dustbins or collection points.

WEEE-Reg.-Nr. DE 93666638

RoHS Compliance

This product is in compliance with Directive 2011/65/EU of the European Parliament and of the Council of 08. June 2011, on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) and its amendments.

Li-Ion
5V DC 500mA
Made in Germany

204-360001

1   SAFETY NOTES

Consider always the following points:

- Follow the operating instructions
- Avoid impacts and vibrations to the system
- The system may be operated only within the specified technical values and limits.
- Commissioning, adjustments and operation is allowed only by qualified personnel.
- In the cases of improper system adjustment or use, the OTT-JAKOB company will not accept any liability.

1.1 INTENDED USE

The pull-force measurement system has been designed for an industrial environment. It measures the pull-force in the power drawbar.

The measured pull-force can be read from the display during manual operation. In addition, the measured value will be stored.

During automatic operation, the measured value is stored internally for use during the automatic tool change.

The **wireless** version sends the measuring value to the receiving device.

The measured value can be logged using the **POWER-CHECK 2 -** PC-Software (USB interface)
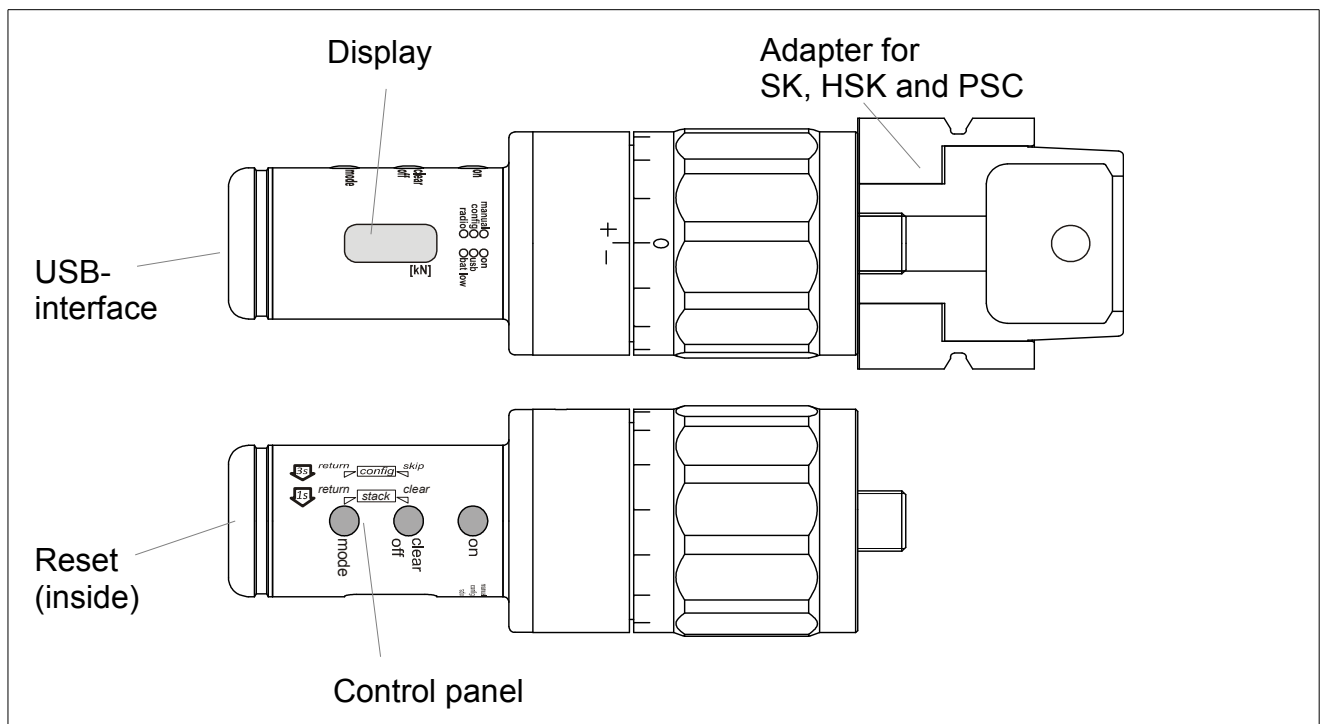
2   PRODUCT DESCRIPTION

2.1 FUNCTION

The pull-force measurement system **POWER-CHECK 2** measures the pull-force in power drawbars.
The exchangeable adapter allows the use with steep taper and HSK systems.
The pull-force measurement system is embedded in the tool holder. The force occurring after the clamping process is logged by the measurement system.

The measured pull-force is read from the display during manual operation. In addition, the measured value is stored internally and may be logged by an adequate reading device (USB interface).

During automatic operation, the use from a tool magazine is possible. If the measurement device is automatically transported into the clamping unit, the internal motion detector switches the device from the standby into the operational mode. This ensures a long battery life. The measured pull-force is stored internally and can be logged with an adequate reading device (USB interface).

The **wireless**   version sends the measuring value to the receiving device.

2.2 DIMENSIONS

**Basic units
5, 20, 75 kN**

70   87   20

M16x1,5

ø40   ø31   ø59   8

**Basic unit
200 kN**

70   100   24,5

4,6

ø40   M35 x 1,5   ø72   ø94
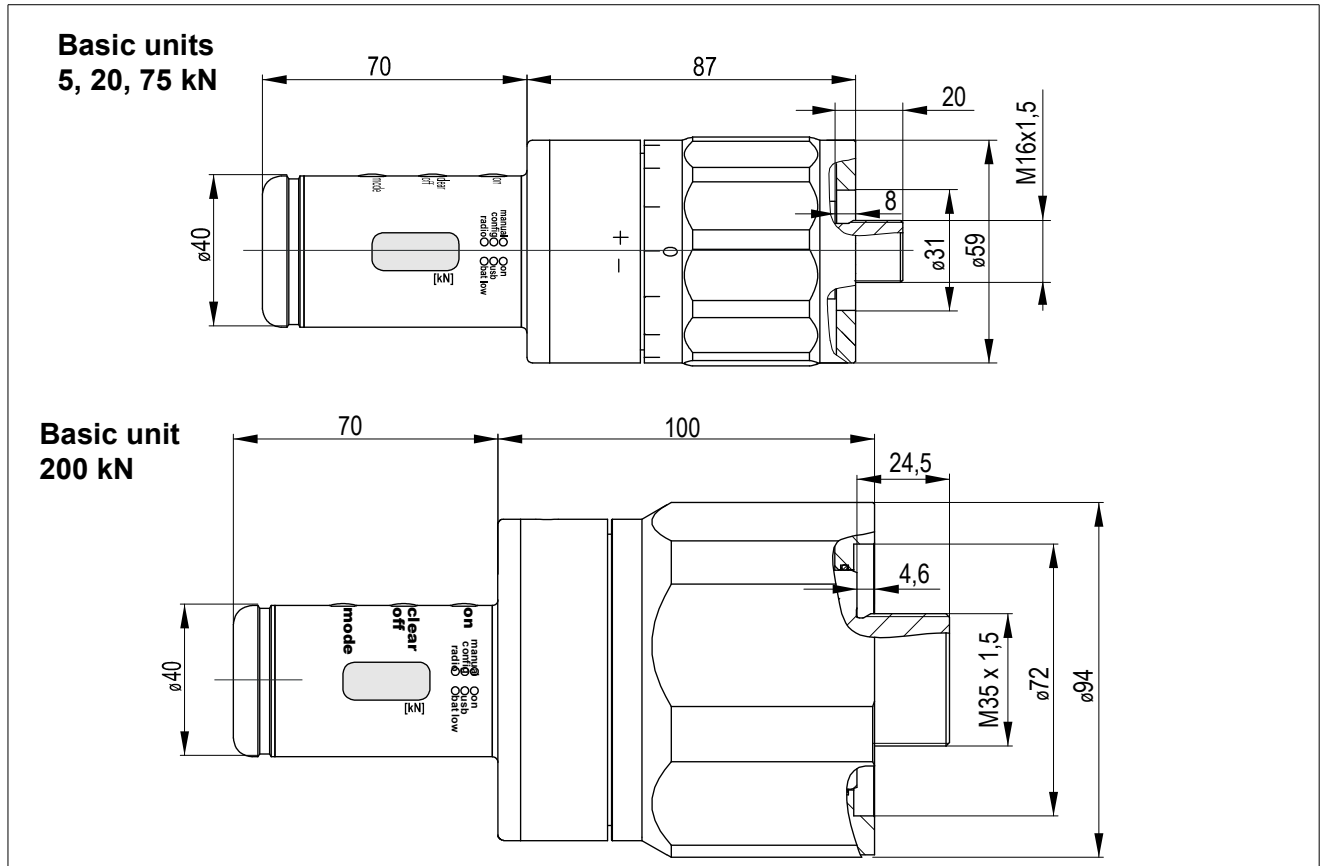
2.3 FEATURES
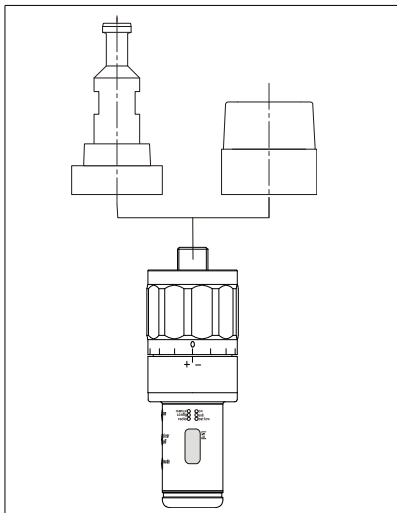
- Exchangeable adapter ensures the universal use for all steep taper and HSK standards.
- pull force measuring mechanism integrated in base unit
- no power connection required
- auto power off
- display in kilo newton
- internal data memory for a large number of measured values
- tool magazine storage ensures applicability at any time
- Standby mode for reduced power consumption and extended battery life

Wireless version:
- Wireless transmission of the measuring values in automatic mode and therefore always up-to-date status control

2.3.1 Force measuring

Force measuring within the tolerancefield of spindle and tool possible
Common powercheck gages measure only the nominal dimensions of the taper.

actual dimension =
nominal dimension
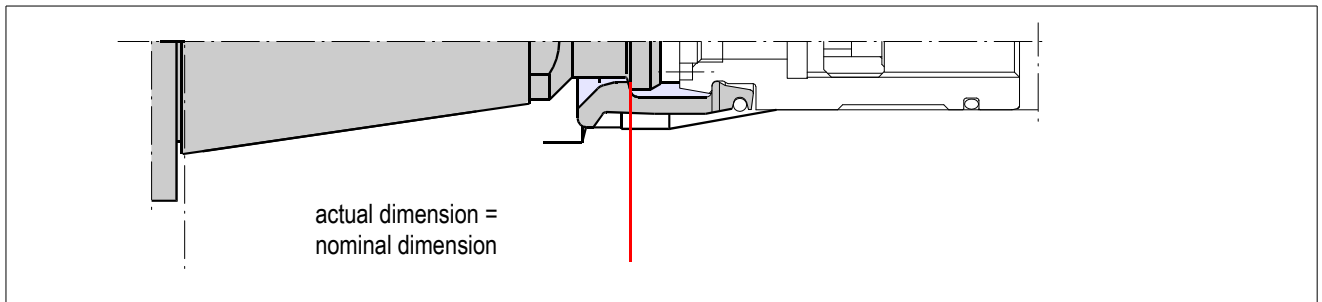
If the part dimensions deviate, the measured value would be wrong.

actual dimension >
nominal dimension

actual dimension <
nominal dimension
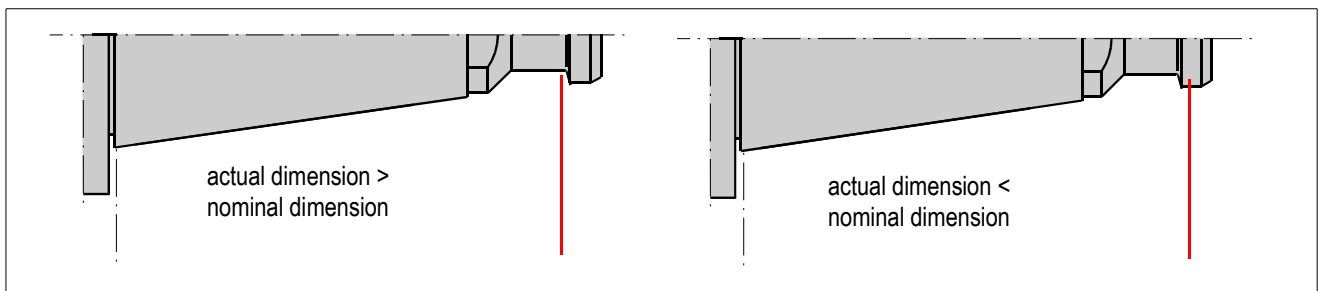
The **POWER-CHECK 2**   offers the possibility to take those tolerances in its consideration.

Tolerance field of tool
and spindle

adjustable range of Power-Check

0 - line
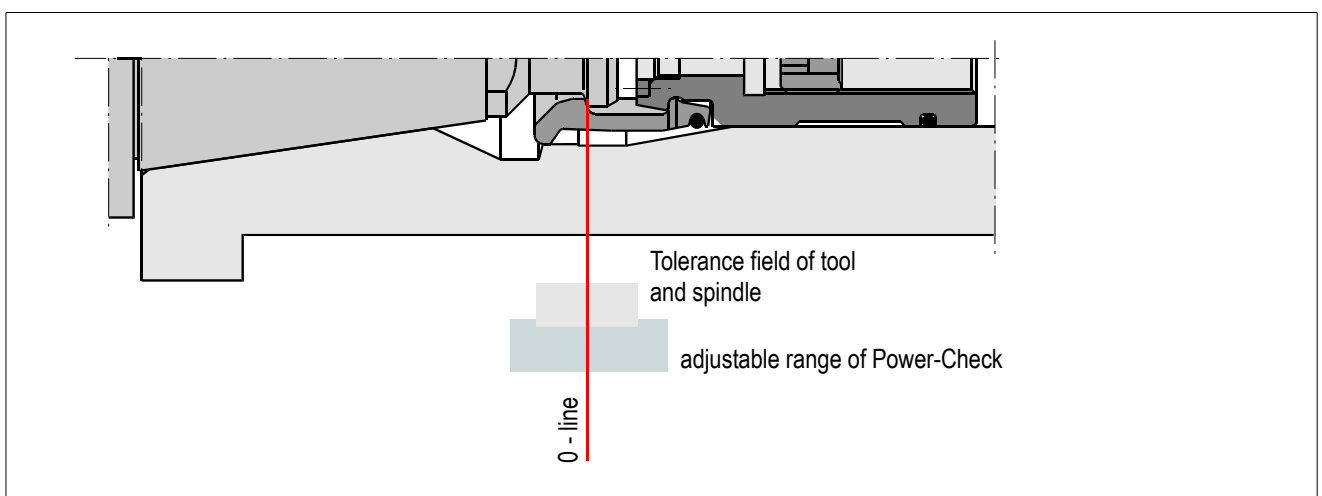
2.4 TECHNICAL DATA

Measuring range	see order numbers → 2.5)
Accuracy class (basic unit)	1 % of maximal value
Temperature range	+15 °C to + 35 °C
Force limit:	130 % of maximal value
Break force	200 % of maximal value
Measuring system	Straingage
Charging process	via USB interface
Weight	max. 1,5 kg
Battery lifetime	Automatic mode: 2 months / 600 measurings Permanent measuring mode: 1 week (measuring interval: 5 seconds)

* Deviation of adapter is not included

2.5 ORDER NUMBERS

2.5.1 Measurement system without transmitter function

Size	Indicating range [kN]	Measuring range [kN] → # 5.5 🗎 22	possible Interface	AVersion without transmitter function set * order-no.	item no. of the basic unit; not separately orderable
- 5 kN	0,1 - 5	0,5 - 5	SK 10 ....25 HSK E20, E25	95.103.134.9.2	95.103.082.2.2
- 20 kN	0,5 - 20	2,5 - 20	SK 30, SK 40 HSK A32, A40, A50	95.103.135.9.2	95.103.083.2.2
- 75 kN	2 - 75	10 - 75	SK 50 HSK A63, A80, A100	95.103.136.9.2	95.103.084.2.2
- 200 kN **	5 - 200	25 - 200	SK 60 HSK A125, A160	95.103.137.9.2	95.103.085.2.2

*   the set consists of:
Pull-force measurement system (Base unit), tool, USB connection cable, Product Information, Quick guide

2.5.2 Measurement system   wireless   with transmitter function

Size	Version with transmitter and Interface USB-Radio-Stick set order-no.	Version with transmitter and Power-Monitor set order-no.	item no. of the basic unit; not separately orderable
- 5 kN	95.103.134.9.2 V01	95.103.134.9.2 V02	95.103.082.2.2 V01
- 20 kN	95.103.135.9.2 V01	95.103.135.9.2 V02	95.103.083.2.2 V01
- 75 kN	95.103.136.9.2 V01	95.103.136.9.2 V02	95.103.084.2.2 V01
- 200 kN *	95.103.137.9.2 V01	95.103.137.9.2 V02	95.103.085.2.2 V01

Set:
just as measurement system without transmitter function + USB-Radio-Stick

Set:
just as measurement system without transmitter function + Power-Monitor

**   therefore adapter with aligned dimensiones needed → # 2.5.4 / 🖹 10

2.5.3 Adapter for HSK / manual operation

Nominal size	Order number
E 25 / F 32	95.600.069.9.2
A 32 / B 40	95.600.070.9.2
A 40 / B 50	95.600.071.9.2
A 50 / B 63	95.600.072.9.2
A 63 / B 80	95.600.073.9.2
A 80 / B 100	95.600.074.9.2
A 100 / B 125	95.600.075.9.2

2.5.4 Adapter for HSK / manual operation / only for basic unit 200 kN

Nominal size	Order number
A 100 / B 125	95.602.327.3.2
A 125 / B 160	95.602.328.3.2
A 160	95.602.731.3.2

2.5.5 Adapter for KM / manual operation

Nominal size	Order number
KM 32 ISO 26622-1	95.603.179.3.2
KM 40 ISO 26622-1	95.602.191.9.2
KM 50 ISO 26622-1	95.601.741.9.2
KM 63 ISO 26622-1	95.601.724.9.2
KM 80 ISO 26622-1	95.601.742.9.2
KM 100 ISO 26622-1	95.602.477.9.2 *

* only for basic unit 200 kN

2.5.6 Adapter for KM4X / manual operation

Nominal size	Order number
KM4X63	95.603.005.3.2
KM4X100	95.602.573.3.2 *
KM4X125	95.603.151.3.2 *

* only for basic unit 200 kN

2.5.7 Adapter for PSC / manual operation

Nominal size	Order number
PSC 40 ISO 26623-1	95.601.481.9.2
PSC 50 ISO 26623-1	95.601.482.9.2
PSC 63 ISO 26623-1	95.601.266.9.2
PSC 80 ISO 26623-1	95.601.483.9.2

2.5.8 Adapter for steep taper / manual operation

Nominal size	DIN 69871 / 69872 ISO 7388 / 1 / 2 Typ A	ANSI B 5.50-78 ISO 7388 / 1 / 2 Typ B	MAS 403-1982 BT / PT-I (45°)	MAS 403-1982 BT / PT-II (30°)
SK 30	95.101.582.9.2	95.101.583.9.2	95.101.584.9.2	95.101.585.9.2
SK 40	95.101.586.9.2	95.101.587.9.2	95.101.588.9.2	95.101.589.9.2
SK 45	95.101.590.9.2	95.101.591.9.2	95.101.592.9.2	95.101.593.9.2
SK 50	95.101.594.9.2	95.101.595.9.2	95.101.596.9.2	95.101.597.9.2
SK 60	95.101.598.9.2	95.101.599.9.2	95.101.601.9.2	95.101.602.9.2

2.5.9 Adapter for hollow shaft with gripper groove for automatic tool change

Nominal size	Order number
A 40 / B 50	95.602.120.3.2
A 50 / B 63	95.602.046.3.2
A 63 / B 80	95.601.851.9.2
A 80 / B 100	95.602.140.3.2
A 100 / B 125	95.602.047.3.2
A 125 / B 160	95.602.048.3.2 *

Adjustment of the adjustable range (→ # 4.1 / 🗎 16) not possible!

* only for basic unit 200 kN

2.5.10 Adapter for KM with gripper groove for automatic tool change

Nominal size	Order number
KM 50 ISO 26622-1	95.602.863.3.2
KM 63 ISO 26622-1	95.602.711.3.2
KM 80 ISO 26622-1	95.602.974.3.2

Adjustment of the adjustable range (→ # 4.1 / 🗎 16) not possible!

2.5.11 Adapter for steep taper with gripper groove for automatic tool change

Nominal size	DIN 69871 / 69872 ISO 7388 / 1 / 2 Typ A	ANSI B 5.50-78 ISO 7388 / 1 / 2 Typ B	MAS 403-1982 BT / PT-I (45°)	MAS 403-1982 BT / PT-II (30°)
SK 30	95.103.310.3.2	95.103.311.3.2	95.103.312.3.2	95.103.313.3.2
SK 40	95.103.237.3.2	95.103.238.3.2	95.103.239.3.2	95.103.240.3.2
SK 50	95.103.097.9.2	95.103.241.3.2	95.103.242.3.2	95.103.243.3.2

Adjustment of the adjustable range (→ # 4.1 / 🗎 16) not possible!

Other adapters available on request!

3   ASSEMBLY OF ADAPTER

3.1   PREPARATION

(!) The contact surfaces of the basic unit and the adapter must be clean and undamaged!

3.2   ASSEMBLY

HSK to nominal size A 63/B 80
and
PSC up to nominal size 63

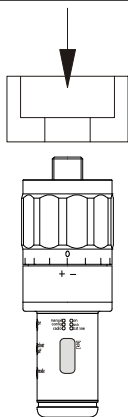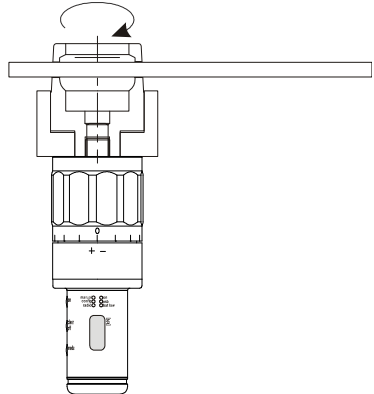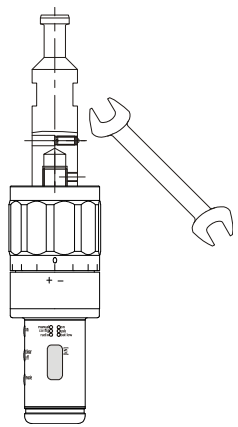| ◢ Screw on pull stud and tighten	◢ Secure pull stud	◢ Attach compression ring; secured by a spring loaded ball
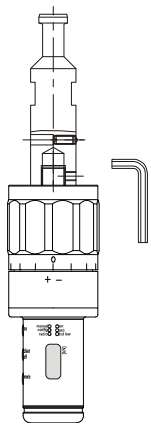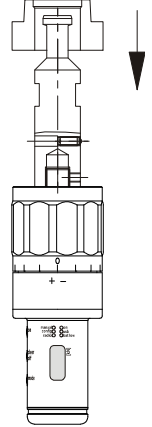
HSK over nominal size A 80 / B 100
and
PSC 80

◢ Attach compression ring	◢ Screw on pull stud and tighten

Steep taper

◢ Screw on pull stud and tighten	◢ Secure pull stud	◢ Attach compression ring; secured by a spring loaded ball

HSK with"V" groove
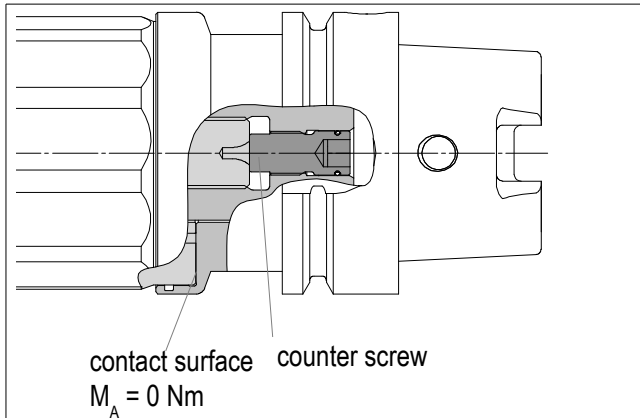
contact surface   counter screw
M_A = 0 Nm

◢ Adjust **POWER-CHECK 2** in 0-position and hold it continual
◢ Thread on adapter until in just bottoms out (zero torque); M_A = 0 Nm
(Counter screw must not come in contact with Power Check)
◢ tighten counter screw

SK with "V" groove
◢ Adjust **POWER-CHECK 2** in 0-position and hold it continual
◢ Thread on adapter until in just bottoms out (zero torque); M_A = 0 Nm
(Counter screw must not come in contact with Power Check)
◢ tighten counter screw

4   START-UP

The **POWER-CHECK 2** is a precision instrument ➜ Please handle with care!
Measuring conditions: the following requirements must definitely be fulfilled in order to get accurate measurements
● Measuring range (see technical data)
● Temperature range (see technical data)
● use suitable adapter, observe the proper steep taper standard!
● The pull force measurement system is not protected against spray water if the base unit is used in conjunction with a OTT-JAKOB adapter for manual operation. Measurements not allowed if overpressure from the spindel side accumulate (such as purge air)
● The pull force measurement system is protected against spray water if the base unit is used in conjunction with a OTT-JAKOB adapter with gripper groove.

4.1 ADJUSTMENT-OF THE ADJUSTABLE RANGE

(!) Adjusting the adjustable range (sleeve position) is possible in a released condition only!
Adjustment is not possible at adapter with gripper groove!
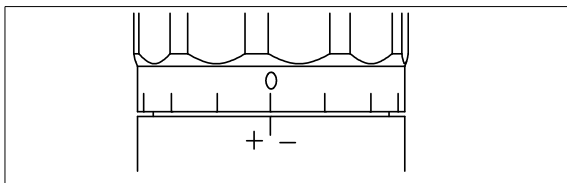
- ▲ Screw in adjustable sleeve delicately to the shoulder
- ▲ Turn back adjustable sleeve after it passed the 0-mark the first time

The **Power-Check** with the adapter now is set to the medium tolerance field of the corresponding tool standard.

Turning the adjustable sleeve toward "+" makes the adapter longer, turning it toward "-" makes the adapter shorter

Adjustment way:

POWER-CHECK 2 basic unit - size	Eine Rastung on the adjustable sleeve correlates
5	0,05 mm
20, 75, 200	0,1 mm

The **adjustable sleeve** must be always engaged!

Theoretical adjustment range per tool standard

basic unit - size	HSK according ISO 12164		KM according ISO 26622-1		PSC according ISO 26623-1		SK according • ISO 7388 Typ A and B • DIN 2080 • MAS 403	
	adjustment way [mm]	detent	adjustment way [mm]	detent	adjustment way [mm]	detent	adjustment way [mm]	detent
5	+/- 0,05	+/- 1	-	-	-	-	-	-
20 75 200	+/- 0,1	+/- 1	+/- 0,1	+/- 1	+/- 0,2	+/- 2	+/- 0,3	+/- 3

In addition regard the temperature and mechanical wear of the spindle.

Clamping stroke adjustment (position power drawbar)

> (!) The action by using the power check with adapter results in a clamp stroke which should come close to a nominal tool (tolerance of the important dimensions of the tool are in the middle) by a given pull in force (recommended by Norm standard) and should be close together. If you don't follow the standards or deviate from the given data, the clamp stroke will vary.
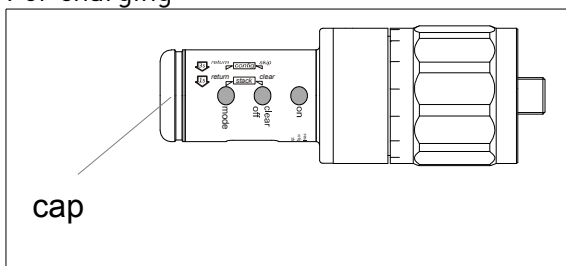
4.2 CHARGE BATTERY

The **POWER-CHECK 2** is powered via:

● a USB PC interface
Precondition: The Power-Check PC-software must be installed! → # 8.2 / 🗎 26

● a wall power supply   (as from modification index B;   not included in delivery volume)

The battery condition is briefly displayed during power on
(Bar display 0 - 100%).

For charging

cap

◢ Remove cap
◢ Connect USB connector with wall power supply or with PC

Charging process
● Charge 75 %: max. 4 h (the device's charge indicator already indicates this charge state at 100%)
● Charge 100 %: < 10 h
● Charging process may be interrupted at any time
● Charging switches off automatically

5   OPERATION

5.1 MANUAL OPERATION

The measured pull-force is read from the display during manual operation. In addition, the measured value is stored internally and may be logged by an adequate reading device (USB interface).
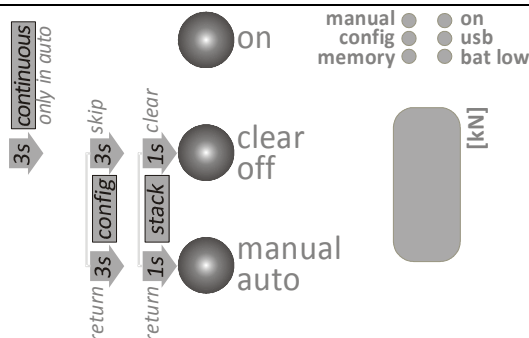
Activate	on press briefly	
	The battery charging condition is briefly display (bar display 0 - 100%); the device is operational thereafter	
Measuring	◢ Clamp tool	
	◢ Read pull-force	
	Pull-force is displayed Drag indicator display: only the maximum value is displayed and remains displayed until the clear button is pushed Adjusting the adjustable range (sleeve position) is possible in a released condition only → # 4.1 / ▤ 16	
Storing	clear off press briefly	
	The current data is stored every time *clear* is pushed. The LED *memory* lights up briefly	
	Many thousand measurements can be stored.	
	Stored data: consecutive number, ID, date, time, measured value [kN], sleeve position (adjustable range for tolerances)	
Deactivate	clear off push 1 second	
	Otherwise, the power-off function automatically deactivates the measurement tool after 4 minutes.	

5.2 AUTOMATIC OPERATION

In automatic operation, the measured pull-force is stored internally and can be logged with an adequate reading device (USB interface).

The **wireless** version sends the measuring value to the receiving device.

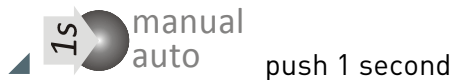During automatic operation, application from a tool magazine is possible.

Spindle rotation with the measuring device is not allowed!

Activate	on press briefly
	The battery charging condition is briefly display (bar display 0 - 100%); the device is operational thereafter
change to automatic operation	1s manual auto push 1 second
	LED flashes *on*

The measurement tool switches from standby to operation automatically as soon as it is moved. It checks for a measurable force and stores it if applicable. If there is no measurable force applied, the device switches back to standby after a pre-defined time.
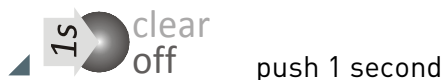
Many thousand measurements can be stored and logged with an adequate reading device (USB interface). |
change to manual mode	1s manual auto push 1 second
	LED *on* and *manual* light up
Ausschalten	1s clear off push 1 second
	Possible only in manual mode!

5.3 CONTINUOUS MEASURING MODE

In continuous measuring mode, it is possible to perform a defined number of measurements with a defined time interval.

Factory setup is 10 measurements with a 0.5 second time interval:

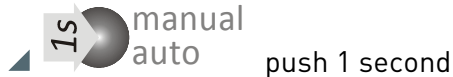The total measuring series lasts (10-1) x 0.5 = 4.5 seconds.

The number and time interval may be adjusted using the **POWER-CHECK 2** - PC software (USB interface).

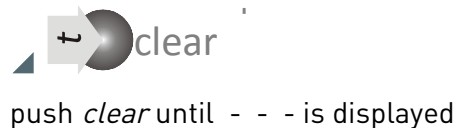The **wireless** version sends the measuring value to the receiving device.

|		
Activate	on	press briefly
change to automatic operation	1s manual auto	push 1 second
Continuous measuring mode	t clear	
	push *clear* until - - - is displayed	
	Recording of the measuring series starts immediately.	
	Manual operation is subsequently activated.	

5.4 MEASURED VALUES

5.4.1 Display measured values

It is possible to display the last measurements directly on the system. These measurements are compiled in a stack. In order to access this function on an activated device, do the following:

Stack mode	push 1 second
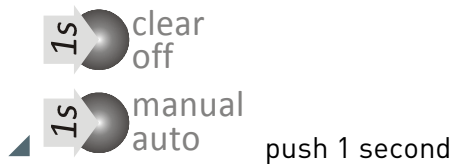
The following information is displayed: stack number (n01), ID (i05), measured value [kN] (18.6) in temporal sequence.

The stack number is not identical with the consecutive measured value number! Stack number one always represents the number of the last measurement.

An example:

Stack number	Consecutive number
001	255
002	254
003	253
004	252
005	251

A maximum of 20 of the most recent measurements are displayed. Older measured values are deleted.

Leave stack mode	

push *mode* until the display changes to manual mode

Delete stack	◢ If the stack should be deleted completely: change into the stack mode, push *clear* until - - - appears

The stack has been deleted. No measured values can be accessed directly on the measuring device. But all measured values remains stored.

5.4.2 Measured value memory

The measured pull-force is stored internally and can be logged with an adequate reading device

(USB interface). Handling is described in a separate document.

Many thousand measurements can be stored.

The display message   *f u l*   indicates that the measured value memory is at 100% capacity.

Additional measured values will overwrite the first measured values!
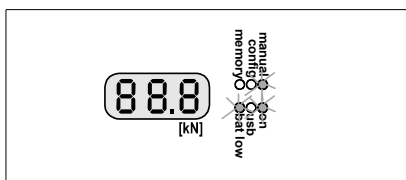
5.5 MEASURING RANGE

Do not exceed the maximum measuring range: damage of the measurement system!

Values above the maximum measuring range are indicated by flashing lights.
Only values within the measuring range can be stored.

5.6 BATTERY STATE OF CHARGE

The battery condition is briefly displayed during power on
(Bar display 0 - 100%).

If the LED **bat low** (battery low) lights up, the measurement system has to be recharged at the USB interface as soon as possible. → 4.2
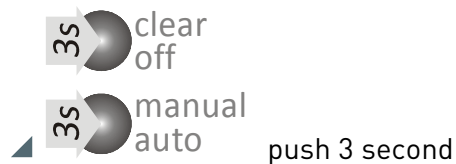
6   SYSTEM SETTINGS

The **POWER-CHECK 2** allows to change the following settings:
- Identification number ID
- Activation threshold value for the motion detector (in automatic operation)
- Measuring duration in automatic mode
- Display brightness

Follow the following steps for changing values:

Select configuration menu	3s clear off 3s manual auto	push 3 second
	StA and then *con*: release buttons LED *config* lights up	
	IIt is possible to adjust various values in the configuration menu. The same pattern applies to every setting:	
increase value	clear off	press briefly
decrease value	manual auto	press briefly
next setting in configuration menu	1s clear off	push 1 second

The following values can be adjusted:
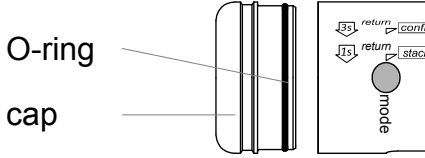
Identification number ID	**Id** and shortly thereafter the identification number are displayed [0 - 31]. An identification number may be entered here, e.g. when various clamping systems are measured.
Motion sensor threshold value	**Int** (for interrupt) is briefly displayed; shortly thereafter followed by a value between 0 and 255. This value indicates the motion sensor threshold value: small value indicates that low accelerations are needed to trigger; high value indicates that high accelerations are required; ; our recommendation: ~ 40. Change threshold values: see above
Measuring duration in automatic mode	**dur** (duration) is briefly display; shortly thereafter followed by a value. This value indicates the duration during which the measured values are recorded in automatic mode. The maximum value of these measured values will then be logged. Example: ~ 10 (approx. 5 seconds)
Display brightness	**bri** (for brightness) is briefly displayed; shortly thereafter followed by a value between 0 and 255. This value indicates the screen brightness. a small value indicates a dark screen (low power consumption); high value - bright (high power consumption); our recommendation: ~ 130 - 200

Press *clear* again to return to the *id* loop. (loop).

Exit configuration menu	manual auto For exiting the configuration menu: push mode until the display changes to manual mode

7   MAINTENANCE

7.1 SPARE PART

designation	order-no.
O-ring 35,5 x 1	0.926010.237
cap	95.106.132.3.1

7.2 DEACTIVATION IN THE EVENT OF FAILURES

The device can be forced to deactivate in the event of failures. For this: Dazu:

cap

Area deactivation contact
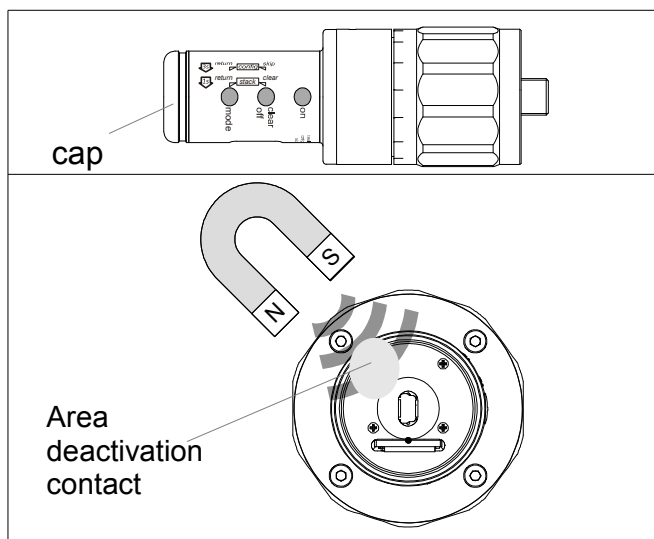
◢ Remove cap

◢ Touch the deactivation contact with a magnet

The system is now deactivated can be switched back on. The stored measured values remain preserved.

7.3 MAINTENANCE

Inspection by OTT-JAKOB
- yearly
- after a fall or a similar incident

7.4 DEACTIVATION

After deactivation, proper battery disposal requires the measuring unit to be shipped to OTT-JAKOB.

8   PC SOFTWARE

8.1 PRODUCT DESCRIPTION

The software allows adjusting system parameters and reading and exporting measured values stored in the system.
The software contains the driver for charging the pull force measurement system   **POWER-CHECK 2** battery.

8.2 INSTALLATION

System requirements:
- USB interface
- Windows operating system
  (tested with Windows 2000, Windows XP and Windows 7 32 bit-version)

The measuring system must not be connected during installation!
◢ Start .exe file

Installation begins, the following information is requested:
◢ Language
◢ Program storage location

Installation is closed after accepting the license agreement.
Note for uninstallation: Program may be uninstalled using the supplied program „Power-Check II_remove".

At the first connection of the measurement equipment with the Windows PC, the device detection is done by Windows.
◢ connect the **Power-Check II** via the supplied USB cable with the operating PC
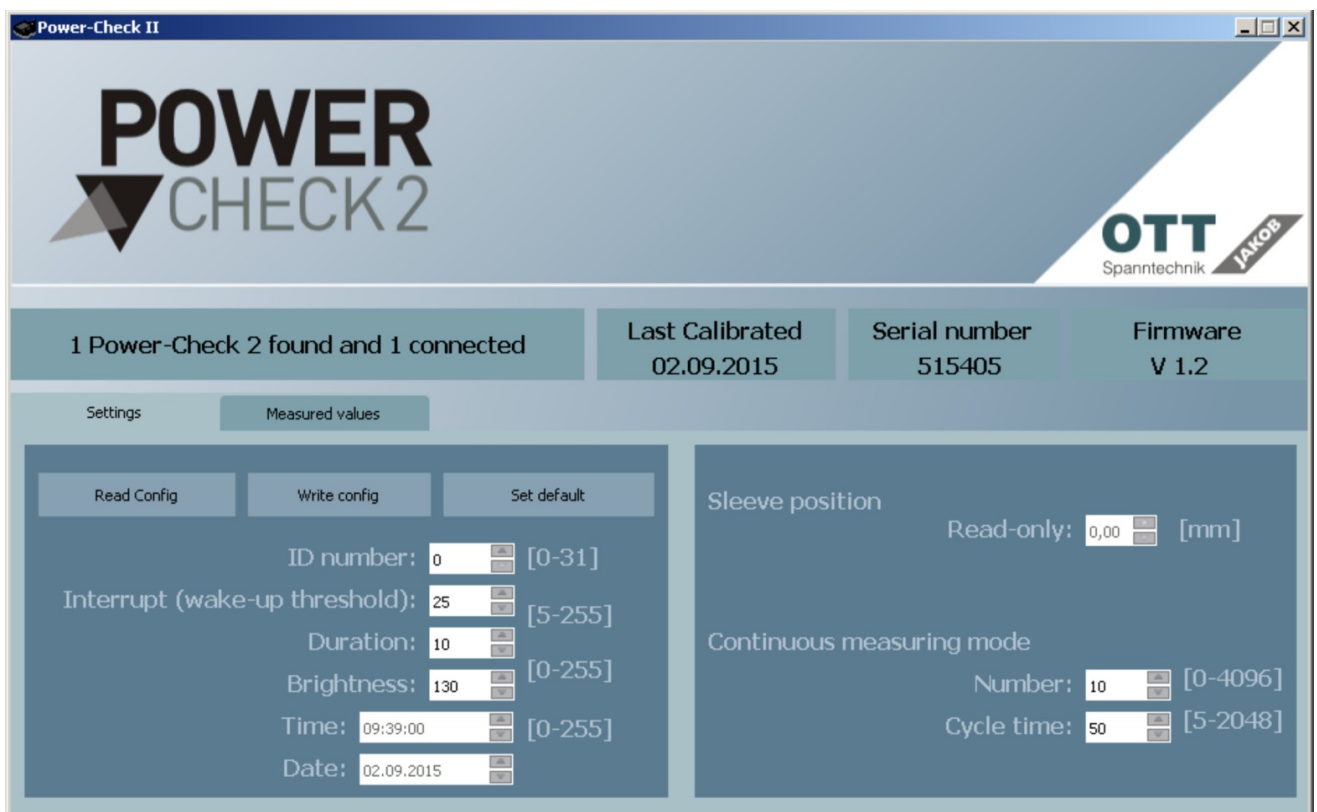
8.3 OPERATION

8.3.1 Start-up

▲ Connect **Power-Check II** to the active PC via the supplied USB connection cable.
▲ Wait for system recognition by the operating system
▲ Start program Power-Check II - PC software; the following should be displayed in the connection
   display: *1 device(s) found and 1 connected*

Observing the sequence is essential!

8.3.2 Display and operation

Display area

The green display area indicates displays the following information:
- Connection: successful when   *1 device(s) found and 1 connected*   appears
- Inspection date: date of OTT-JAKOB outgoing inspection (regular inspection)
- System serial number
- Firmware version number

Category settings:

- **Read Config**: Pressing this button reads the current measuring system settings; these settings are displayed during startup as described above

- **Write Config**: Pressing this button transfers the program field setting changes to the measuring system, overwriting the previous settings.

- **Set default**: Pressing this button resets all program values to factory default.

System setting for **ID, Interrupt, Duration and Brightness**: May be altered by pressing the arrow-up-button or arrow-down-button or by adding a value.   → 6 / 🗎 23

Settings for **time** and **date** are take over from the PC; no possibility to adjust from within the program.

Sleeve position is displayed only, no possibility to adjust from within the program.   → 4.1 / 🗎 16

Continuous measuring mode settings are altered via the same method as the system settings.
→ 5.3 / 🗎 20

Category measured values

The following measured values are displayed here:
- Measurement
- Date
- Time
- Measured value [kN]
- Sleeve position
- Device ID

The current storage space/memory use is displayed in percent next to it.

- **Read memory**: Pressing this button reads the measured values to the PC and displays them on the screen.
- **Export**: Pressing this button saves the current measured values to a folder (requiring selection). Two txt files are created: one file with comma and one ..dot.txt file with a point as decimal separator
  The txt files can be imported and analyzed via any standard spreadsheet program.
- **Clear Memory**: Pressing this button irretrievable deletes all measured values in the pull force measuring system!