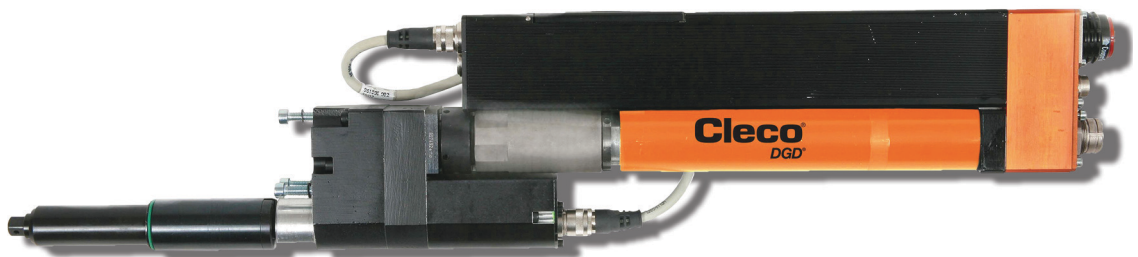




Assembly Instructions  
P1916E  
2019-09

## Intelligent Spindle

Series BTS



For additional product information visit our website at [www.ClecoTools.com](http://www.ClecoTools.com)

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# 1 About this document

The original language of this description is German.

This document provides important information on safe and correct installation.

## Secondary information

Order no.	Sort
P1917E	System handbook Intelligent Spindle
P1921E	Service Manual
P2102JH	Installation Instructions Cable Management
P3217H	Declaration of Incorporation for Incomplete Machines
P2446HW	Hardware Manual mPro400GCD-P-BTS

## Symbols in the text

<i>italic</i>	Menu options (e.g., <i>Diagnostics</i> ) input fields, check boxes, radio buttons or drop-down menus.
>	Indicates selection of a menu option from a menu, e.g., <i>File &gt; Print</i>
<...>	Specifies switches, pushbuttons or the keys of an external keyboard, e.g., <F5>
Courier	Filenames and paths, e.g., <code>setup.exe</code>
•	List
-	List, level 2
a)	Options
b)	
→	Result
1. (...)	Action steps
2. (...)	
▶	Single action step
Sales & Service Centers	Cleco Production Tools Sales & Service Center, see last page.
Spindle	Stands for all versions of the <i>Intelligent Spindle</i> described here.

# 2 Safety

## 2.1 General Requirements

- ▶ Only operate the system after reading and fully understanding this document. Failure to follow the directions and safety instructions could result in electric shocks, burns and/or serious injuries.
- ▶ Keep this document in a safe place for future reference! Provide this documentation to the designer, installer and commissioning personnel of the machine or equipment on which this product is used.
- ▶ Read and observe all applicable, universal and local safety and accident regulations. These safety statements do not raise any right to completeness

## 2.2 Intended Use

The owner is responsible for using the machine according to its designated use. The fastening system may be used only under the following conditions:

- The Spindle is designed for stationary operation only and is intended exclusively for fastening and loosening thread connections. Do not use as a hand-held tool.
- Use the Spindle only in combination with these controller from Cleco Production Tools.
  - mPro400SG-CPM(...)
  - mPro400GCD-P-BTS
- The Spindle must be fully assembled. Insert and lock all connecting cables.
- Only cable types and accessory parts approved by Apex Tool Group may be used.
- Unauthorized alterations, repairs and modifications are prohibited.
- A repair is only permitted by Apex Tool Group authorized personnel. If repair is required, send the complete component to *Sales & Service Centers*.
- Always remove the complete Spindle from a unit.
- The service panel may be opened to set the ARCNET address.

## 2.3 Predictable Misuse

Do not use the Spindle:

- In potentially explosive areas.
- In damp locations or outdoors.
- In non-industrial applications (eg residential area).

## 2.4 Operator Training

- The fastening system may only be put into operation, adjusted, tested, maintained and serviced by qualified<sup>1)</sup> and trained personnel.
- Personnel must be instructed by qualified employees of Apex Tool Group.
- The operator must make sure that all new operating and maintenance personnel are instructed in the operation and maintenance of the fastening system to the same extent and with the same care and attention.
- Personnel who are being trained may work on the fastening system only under the supervision of an experienced operator.

<sup>1</sup> Due to their training, knowledge, experience and understanding of the circumstances involved in this kind of work, suitably qualified personnel are able to identify potential hazards and to initiate appropriate safety measures. Qualified personnel are obliged to comply with regulations.

## 2.5 Personal Protective Equipment

The motor may heat up and cause burns during removal. (max. engine temperature 90 °C).

- ▶ Wear gloves, if you need to touch the motor.
- ▶ When working with rotating parts, it is not permitted to wear gloves.  
Recommendation: Freely rotating *u-GUARD* protected fastening tools are available from APEX.
- ▶ Wear close-fitting clothing.
- ▶ Wear safety shoes.
- ▶ If necessary, wear a hairnet.
- ▶ Wear protective goggles, if there is a risk of flying debris or parts being ejected.

## 2.6 Warnings and Notes

Warning notes are identified by a signal word and pictogram:

- Signal word: describes the severity and the probability of the impending danger.
- Pictogram: describes the type of danger.



### Danger

Symbol combined with the word **Danger** indicates a hazard with a **high level of risk** which, if not avoided, will result in death or serious injury.



### Warning

Symbol combined with the word **Warning** indicates a hazard with a **medium level of risk** which, if not avoided, could result in death or serious injury.



### Caution

Symbol combined with the word **Caution** indicates a hazard with a **low level of risk** which, if not avoided, could result in minor or moderate injuries or environmental damage.



### Note

An symbol combined with the word **Note** indicates a potentially harmful situation which, if not avoided, could result in damage to property or the environment.



General notes includes application tips and useful information, but no hazard warnings.

## Structure Of Warnings



### Caution

**Type and source of danger.**

- Possible consequences of non-observance.
- ▶ Measures to avoid danger.

## 2.7 Symbols on the Product

Be sure to understand the meaning of each symbol below prior to installation, operation or maintenance service.



Electrical voltage



Hot surface



Read all instructions.



Observe the local disposal guidelines for all components of this device and its packaging.

## 2.8 Principles of safe working

### Work area

- ▶ Close all safety devices.
- ▶ Ensure that there is enough space in the work area.
- ▶ Keep the work area clean.

### Electric security

High leakage current – Fatal electric shock could occur.

- ▶ Always disconnect the power supply before unplugging the connectors.
- ▶ Always disconnect the cable from the controller or Spindle before making throughput, resistance and short circuit measurements.
- ▶ Do not attempt to repair possible faults on the fastening system by yourself if you do not have the required knowledge! Inform the local repair center or your *Sales & Service Centers*.

### Hazards from ejected parts

Components of the spindle may rotate, come loose and cause injury.

- ▶ Avoid speed increases of over 328 ft/s<sup>2</sup> (100 m/s<sup>2</sup>) on all axes.
- ▶ Observe the tightening torque of the union nut.

### Careful handling and use of tools

- ▶ Always disconnect the power supply before changing screw bits.
- ▶ Inspect screw bits and retaining ring for visible damage and cracks.
- ▶ Replace damaged parts immediately.
- ▶ Only use screw bits for machine-controlled fastening tools.
- ▶ Make sure that the screw bits are retained securely.

### Danger due to incorrect TQ measurement.

An undetected NOK tightening could have life-threatening consequences.

- ▶ Recalibration (or capability analysis) is essential following incorrect use (crash, mechanical overload...).
- ▶ For category A tightenings (VDI 2862) which are critical for safety, activate a redundancy measurement (e.g. current redundancy).
- ▶ Introduce regular monitoring of measuring equipment on the machines.
- ▶ Do not use defective systems. If in doubt, contact *Sales & Service Centers*.

## 3 Transport

- ▶ Transport only in the original packing.

If the package is damaged, check the part for visible damage.

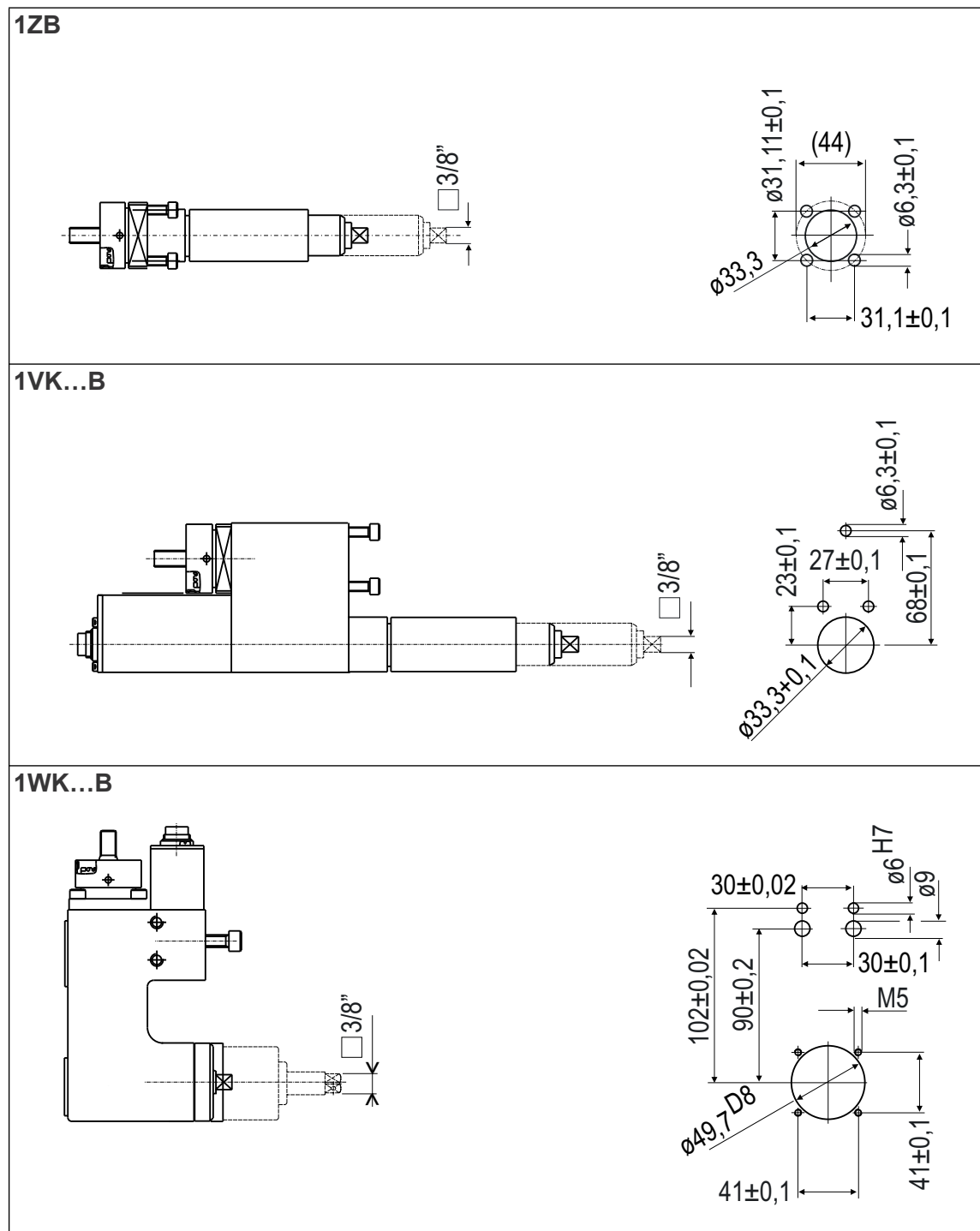
- ▶ Inform the carrier or *Sales & Service Centers*, if necessary

## 4 Installation

- The Spindle can be mounted in any direction.
- Observe the following points during installation:
  - the service panel is accessible for one-off setting of the ARCNET address.
  - warm air must not be produced under the Spindle, also from other components.
  - there are no objects obstructing the air flow at the top or bottom.
  - the housing is not exposed to direct sunlight.

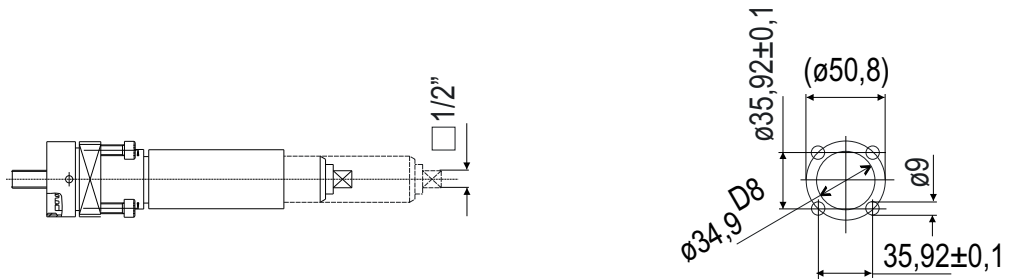
### 4.1 Drilling templates in mounting plate

#### 4.1.1 Size 1

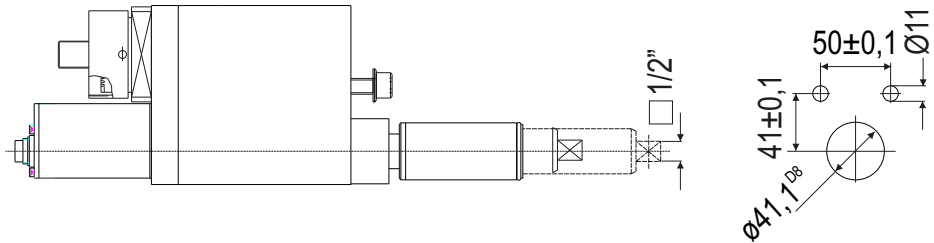




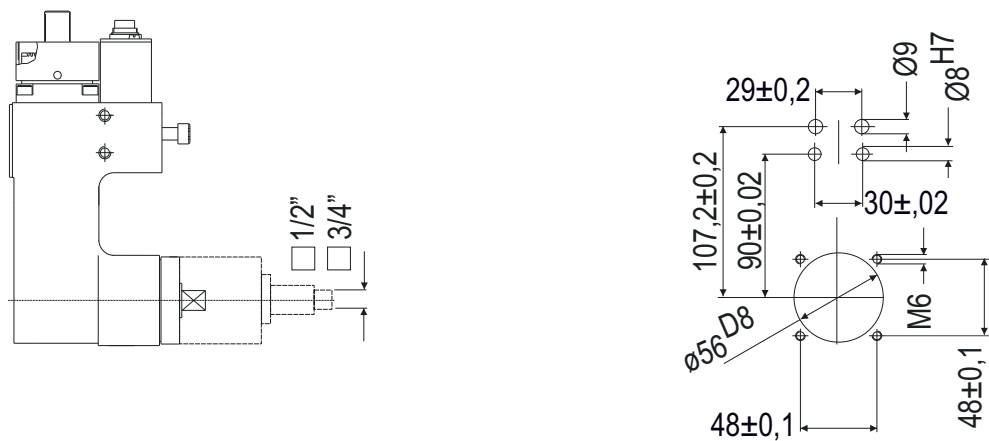
**2ZB**

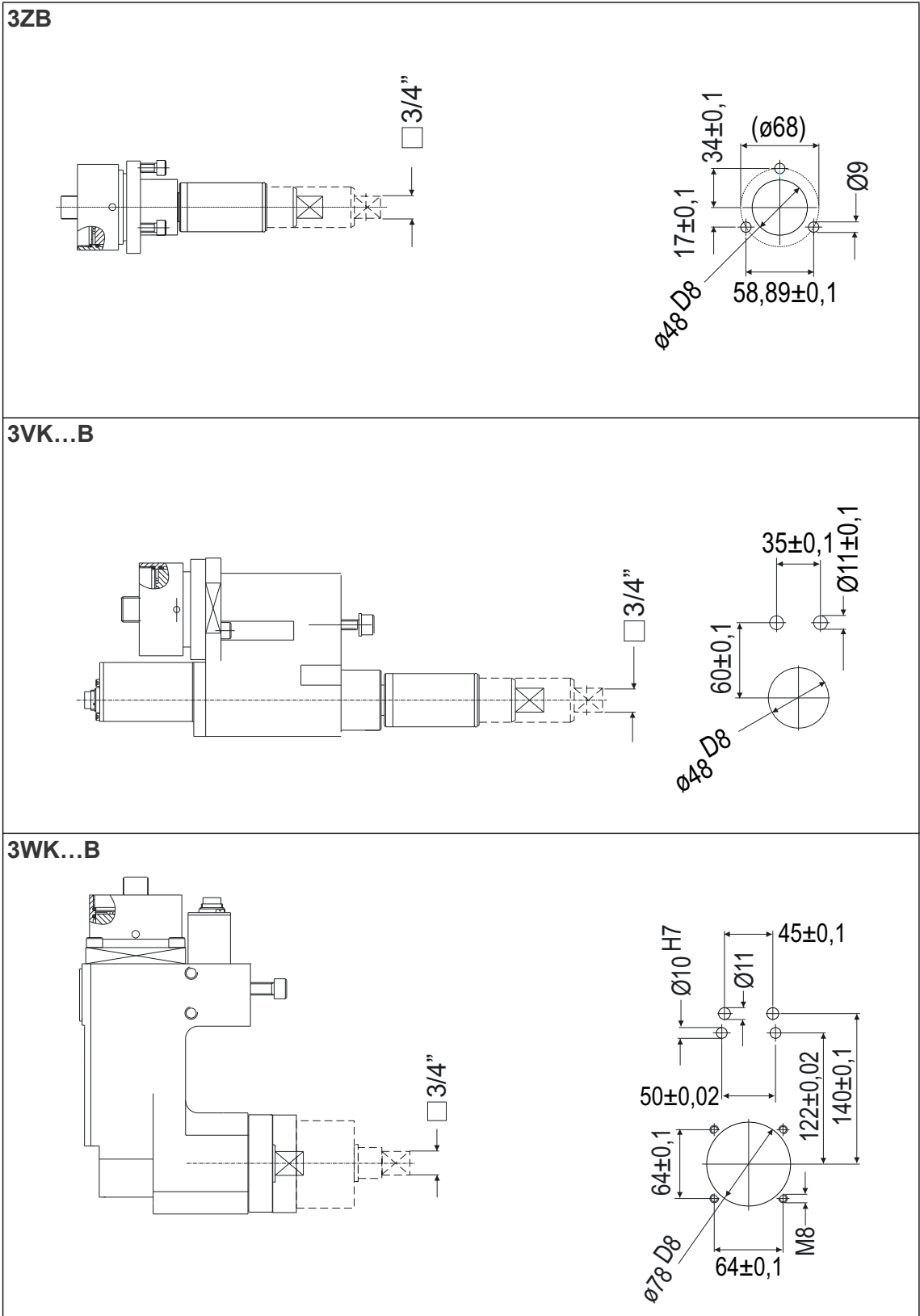


**2VK...B**

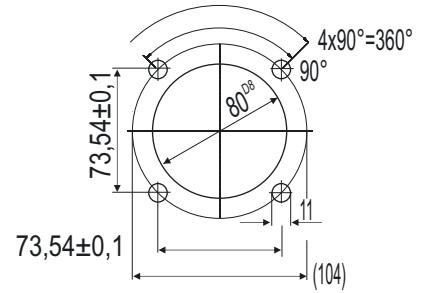
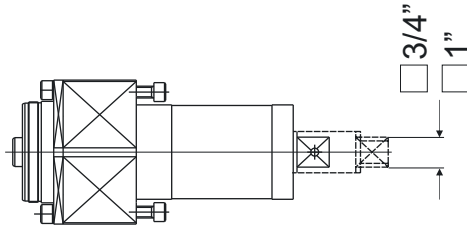


**2WK...B**

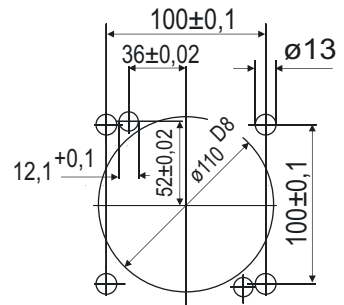
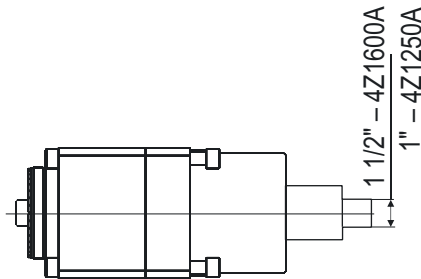




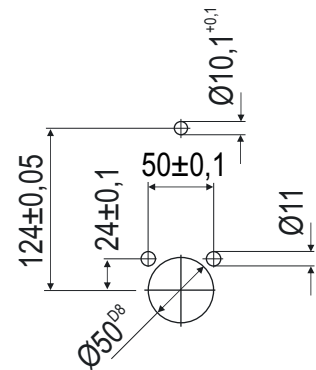
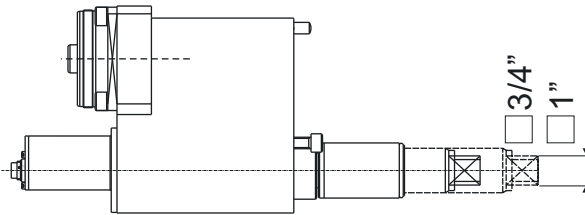
**4ZA**



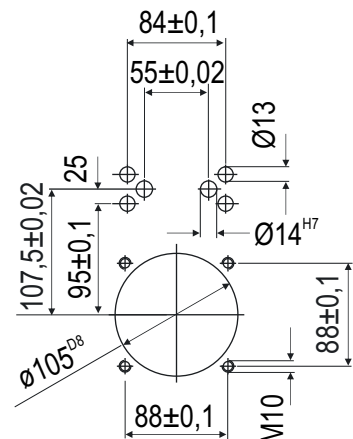
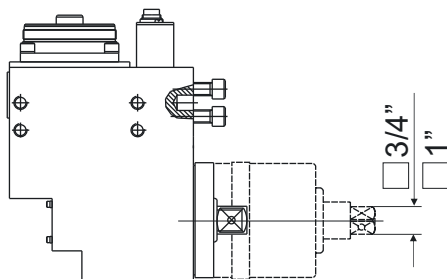
**4Z1250A, 4Z1600A**



**4VK...B**

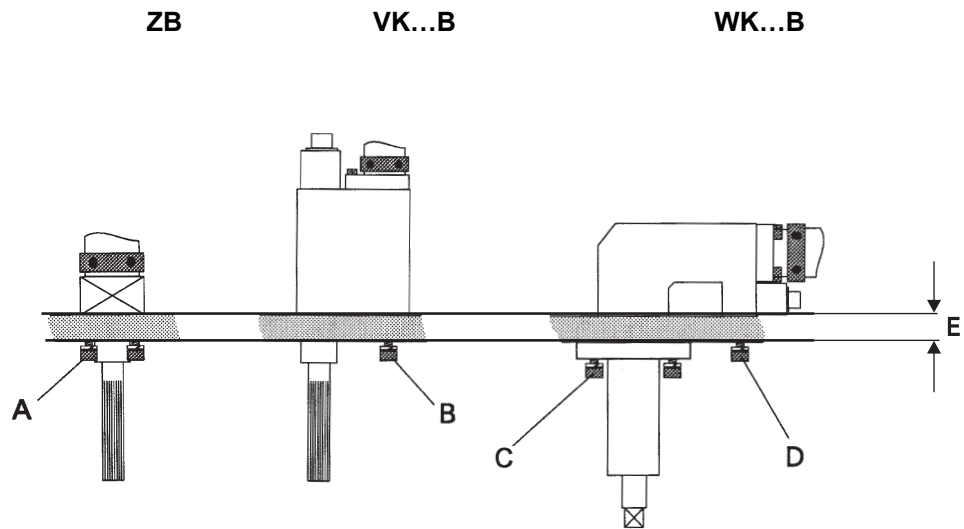


**4WK...B**



## 4.2

## Attaching the Spindle to the mounting plate



Size	Tightening torques [Nm] +10%				E [mm]
	A	B	C	D	
1	10	10	6	25	12 – 15
2	25	50	10	25	
3	25	50	25	50	
4	50	50	85	85	

## 5 Initial operation

1. Position the Spindle components together via flat toothed interfaces, see Service manual.
  - Turn size 1 in 15° increments.
  - Turn sizes 4 to 2 in 10° increments.
2. Connect all components.
3. An additional earth connection to the tool plate to ensure function is not necessary. Protective earthing of the Spindle is guaranteed by conductor in the system cable.
4. However, protective earthing of moving parts has to be made acc. to EN 60204-1.



### Danger

- High leakage current –  
Fatal electric shock could occur.
- ▶ Establish a grounding connection (PE) to the controller before taking into operation!



### Caution

- Risk of tripping or falling over.  
Loose cables on the ground.
- ▶ Lay all connected cables safely.

5. Close all plug connectors and lock.  
The red ring around the outer diameter of plug connectors with a slide lock should not be visible.



- ▶ Always terminate the ARCNET with an ARCNET terminator (order no. 961127) at the bus end, i.e. at the last Spindle. The terminator is installed permanently in the controller (bus start).

6. Connect the mains cable to the controller.
7. Preset the ARCNET address on each Spindle under the service panel:

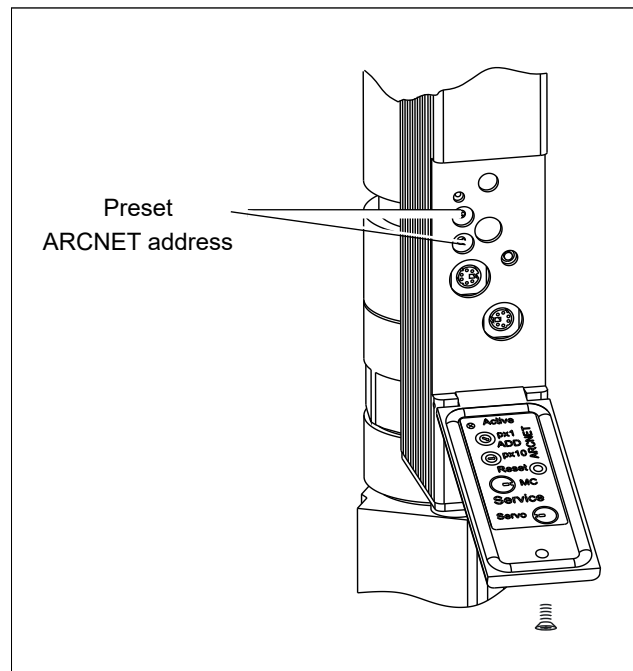
### Preset ARCNET address

The ARCNET address is preset via the two 10-stage decode switch.

- Permitted settings 01 to 32
- Switch (x1) for units (00-09)
- Switch (x10) for tens (00-30)

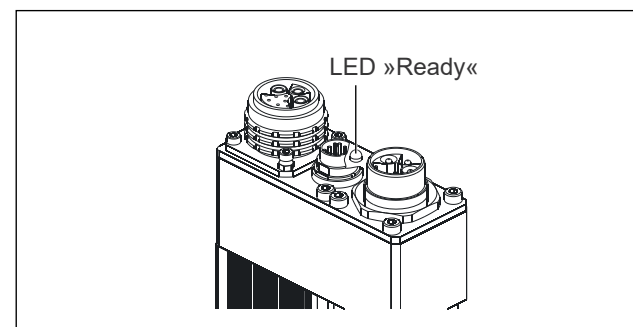


- ▶ Always switch off the controller before making adjustments.
- ▶ Each address can be used only once in the system. Otherwise an error is triggered on the controller.



8. Close the service panel.
9. Close the protective devices (e.g. safety grilles).
10. Switch on the machine control unit (PLC/SPS).
11. Switch on the controller.

If there are no faults pending after switching on the unit, the *Ready* LED on the Spindle lights up green. Otherwise see System Handbook for Trouble Shooting.



12. Enter the parameters for the torque / angle setting via the controller.

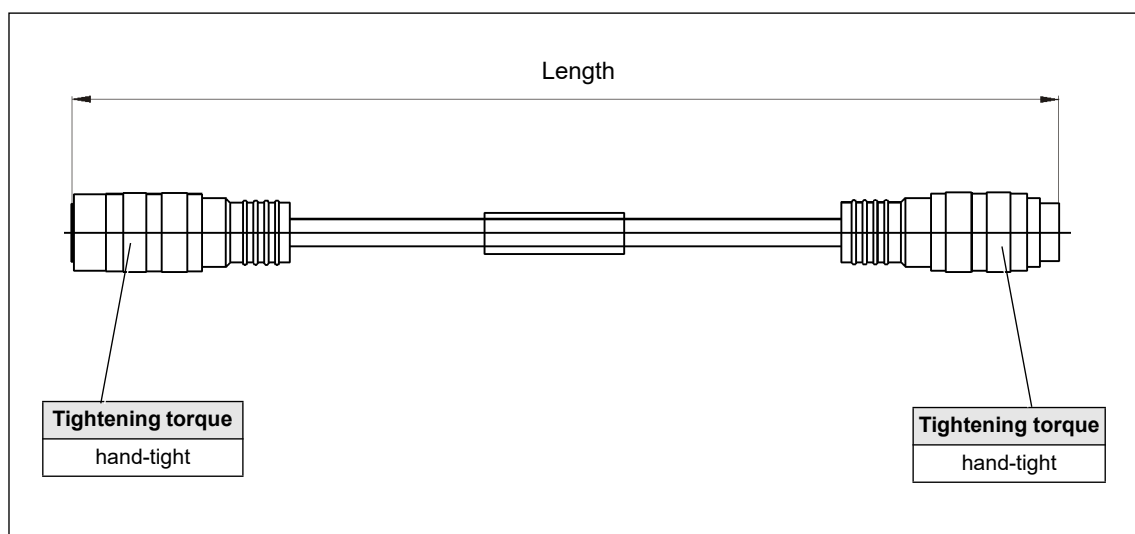
The controller is programmed prior to initial operation by Apex Tool Group. When switching on the controller for the first time, the parameters for controlling the fastening sequences must be read in via the keyboard or via a valid parameter file. Process programming of the controller see Programming Manual.

System Cables see *P2102JH Cable Management*.

### 6.1 KMAG type

Cable between transducers – tightening module TS/TUS/TSE

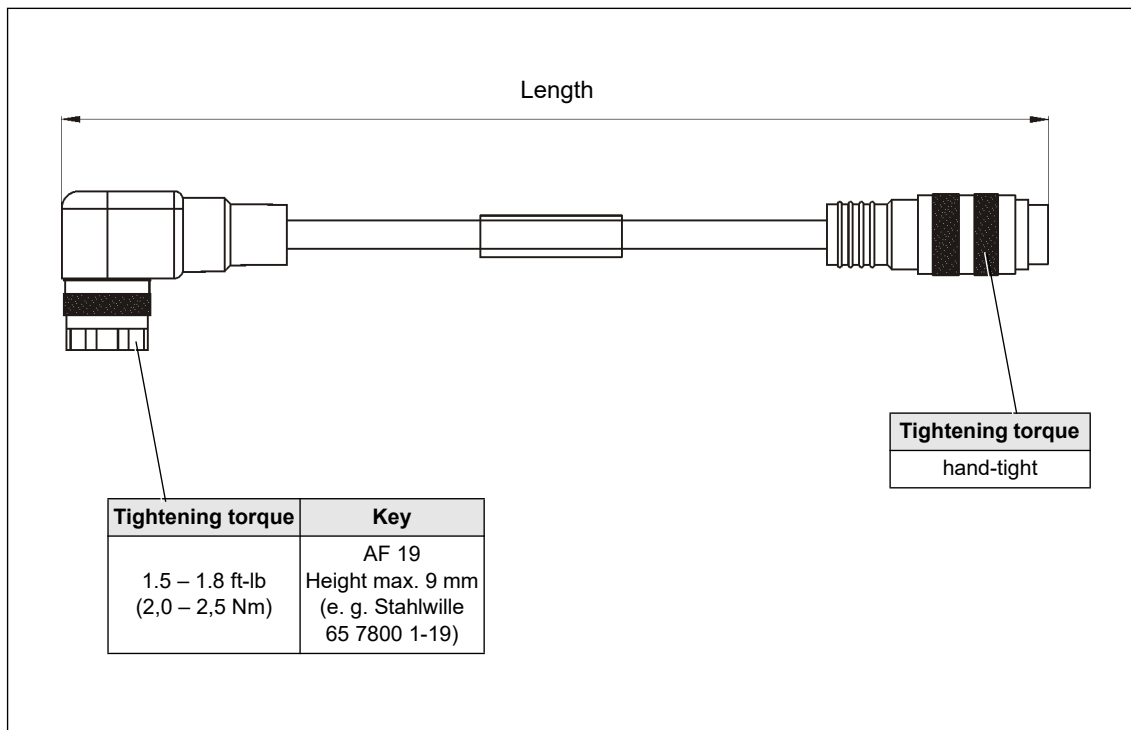
Order No.	
961088-002	Length 0.7 ft (0,2 m)
961088-003	Length 1.0 ft (0,3 m)
961088-004	Length 1.3 ft (0,4 m)
961088-005	Length 1.6 ft (0,5 m)
961088-006	Length 2.0 ft (0,6 m)
Thermal properties	
Ambient temperature	-58 ...+158 °F (-50 ...+70 °C) in fixed applications -40 ...+158 °F (-40 ...+70 °C) in flexible applications
Flammability	Flame-retardant and self-extinguishing in accordance with EN 50265-2-1, IEC 60332-1 and UL1581
Chemical properties of the coating	
Coating material	PUR, low-adhesion, resistant to hydrolysis and microbes, UV-resistant, abrasion-resistant, tear-resistant, cut-resistant, notch-resistant
Oil resistance	Oil-resistant in accordance with DIN VDE 0472, part 803 ASTM oil 1 to 3
Resistance to hydrolysis	In accordance with VDE 0283, part 10
Color	Gray RAL 7040
Mechanical properties	
Diameter	approx. 0.3 in (8 mm)
Bending radii: Single bends Multiple bends	1.2 in (30 mm) min. 3.1 in (80 mm) min. flexing action
Torsional length (±180 ° around separate central axis)	19.7 in (500 mm) min.
Max. acceleration	328 ft/s <sup>2</sup> (100 m/s <sup>2</sup> )



## 6.2 KMAW type

Cable between transducers – tightening module TS/TUS/TSE

Order No.	
961089-002	Length 0.7 ft (0,2 m)
961089-003	Length 1.0 ft (0,3 m)
Thermal properties	
Ambient temperature	-58 ...+158 °F (-50 ...+70 °C) in fixed applications -40 ...+158 °F (-40 ...+70 °C) in flexible applications
Flammability	Flame-retardant and self-extinguishing in accordance with EN 50265-2-1, IEC 60332-1 and UL1581
Chemical properties of the coating	
Coating material	PUR, low-adhesion, resistant to hydrolysis and microbes, UV-resistant, abrasion-resistant, tear-resistant, cut-resistant, notch-resistant
Oil resistance	Oil-resistant in accordance with DIN VDE 0472, part 803 ASTM oil 1 to 3
Resistance to hydrolysis	In accordance with VDE 0283, part 10
Color	Gray RAL 7040
Mechanical properties	
Diameter	approx. 0.3 in (8 mm)
Bending radii: Single bends Multiple bends	1.2 in (30 mm) min. 3.1 in (80 mm) min. flexing action
Torsional length (±180 ° around separate central axis)	19.7 in (500 mm) min.
Max. acceleration	328 ft/s <sup>2</sup> (100 m/s <sup>2</sup> )



## 7 Ambient conditions

Industrial environment EMC limit class value A, DIN EN 55 0081-2.

Components	Enclosure type according to DIN 40050	Ambient temperature	Relative humidity	Working height	Storage temperature
Spindle cpl.	IP40	32 to 113 °F <sup>a</sup> (0...45 °C)	0 to 90 % no condensation	Up to 3000 m <sup>1</sup> ) above sea level	77 to 158 °F (25...70 °C)
TS/TUS	IP54 <sup>b</sup>				
Motor/Gear	IP54				
Transducer	IP40				
Attachment	IP40				

a Observe Derating, see System Handbook

b Is attained when all connectors are plugged in and the service panel is closed.

## 8 Noise

See P3217H Declaration of Incorporation for Incomplete Machines.

## 9 Maintenance

Regular maintenance reduces operating faults, repair costs and downtime. Implement a safety-related maintenance program that takes the local regulations for repair and maintenance for all operating phases of the tool into account.

Only trained personnel are permitted to perform maintenance. See P1921E Service Manual.

## 10 Disposal

Components of the Spindle pose risks to the health and the environment.

The Spindle contains components that can be reused as well as components that require special disposal.

- ▶ Separate the components and dispose of them by segregating them clearly.
- ▶ Catch auxiliary materials (oils, greases) when drained and dispose of them properly.
- ▶ Separate the components of the packing and dispose of them by segregating them clearly.
- ▶ Follow the locally applicable regulations.



- ▶ Observe generally valid disposal guidelines such as, in Germany, the Electrical and Electronic Equipment Act (ElektroG):
- ▶ Hand in the Spindle at your company collection point or return to *Sales & Service Centers*.






# POWER TOOLS SALES & SERVICE CENTERS

Please note that all locations may not service all products.

Contact the nearest Cleco® Sales & Service Center for the appropriate facility to handle your service requirements.

 Sales Center

 Service Center

## NORTH AMERICA | SOUTH AMERICA

### DETROIT, MICHIGAN

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