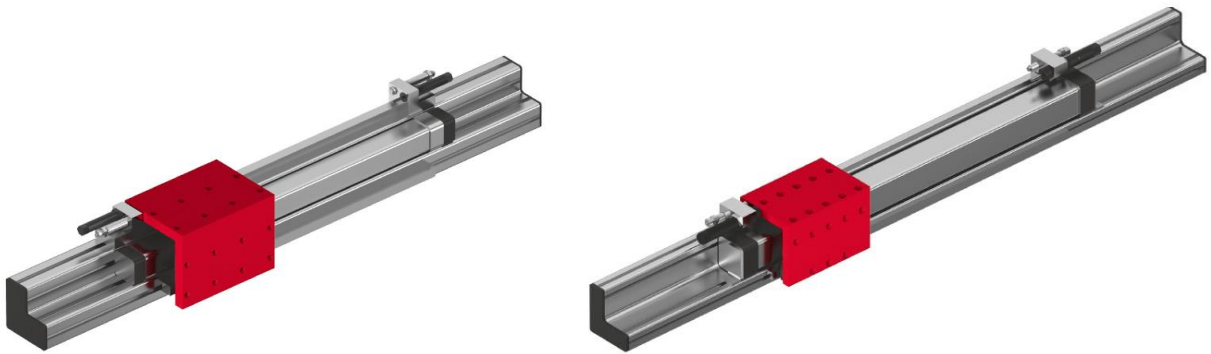


## Assembly and operating instructions

# Gantry modules PMP | PMP-c



### Translation of the Original Assembly Instructions EN

- PMP 01      ⇨ Order no.: 11000105
- PMP 02      ⇨ Order no.: 11000106
- PMP-c 01    ⇨ Order no.: 11015620
- PMP-c 02    ⇨ Order no.: 11015621

### Dear Customer

Thank you for choosing our products and placing your trust and confidence in our company!

These assembly and operating instructions contain all essential information you need about your product. Our aim is to provide the required information as concisely and clearly as possible. If, however, you still have any questions on the contents or suggestions, please do not hesitate to contact us. We are always grateful for any feedback.

Our team will also be glad to answer any further question you may have regarding the gantry module or other options.

We wish you every success with our products!

With kind regards

*Your Afag team*

### © Subject to modifications

The gantry modules have been designed by Afag Automation AG according to the state of the art. Due to the constant technical development and improvement of our products, we reserve the right to make technical changes at any time.

### Updates of our documentations

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Unlike the printed documents, our digital instructions manuals, product data sheets and catalogues are being continuously updated on our website.

Please keep in mind that the digital documents on our website are always the latest versions.

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## 1 General

### 1.1 Contents and purpose of these assembly instructions

These assembly instructions contain important information on assembly, commissioning, functioning and maintenance of the gantry modules PMP and PMP-c to ensure safe and efficient handling and operation.

Consistent compliance with these assembly instructions will ensure:

- permanent operational reliability of the module,
- optimal functioning of the module,
- timely detection and elimination of defects (thereby reducing maintenance and repair costs),
- prolongation of the module service life.

The illustrations in this manual shall provide you with a basic understanding of the module and may vary from the actual design of your module.

### 1.2 Explanation of symbols

The safety notes are marked by a pictogram and a signal word. The safety notes describe the extent of the hazard.

#### DANGER



##### **Danger!**

This safety note indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

#### WARNING



##### **Warning!**

This safety note points out a potentially hazardous situation which, if not avoided, could result in death or serious injury.

#### CAUTION



##### **Caution!**

This safety note points out a potentially dangerous situation which, if not avoided, can result in minor or slight injuries.

#### NOTICE

This safety note points out a potentially dangerous situation which, if not avoided, can cause substantial damage to property and the environment.



This note contains important additional information as well as useful tips for safe, efficient and trouble-free operation of the gantry module.

**Further warning signs:**

Where applicable, the following standardised symbols are used in this manual to point out the various potential health risks.

	Warning - Dangerous electrical voltage.
	Warning - Risk of injury from contact with hot surfaces.
	Warning - Risk of hand and finger injury due to uncontrolled movements of components.
	Warning - Risk of injury as a result of parts being flung out!
	Warning - high noise levels.

**1.3 Additional symbols**

In these assembly instructions the following symbols are used to highlight instructions, results, references, etc..

Symbol	Description
1.	Instructions (steps ...)
⇒	Results of actions
↻	References to sections
■	Enumerations not ordered

## 1.4 Applicable documents

In addition to the assembly instructions, the following documents must be observed:

- Safety data sheets etc.
- Instructions for integrated components (→supplier documentation)



Each gantry module is accompanied by a safety information sheet. This information sheet must be read carefully by every person who carries out work on and with the gantry module.

## 1.5 Warranty

The warranty terms for Afag handling components and handling systems are the following:

- 24 months from initial operation and up to a maximum of 27 months from delivery.
- Wear parts (e.g., shock absorbers) are excluded from the warranty.\*

The warranty covers the replacement or repair of defective Afag parts. Further claims are excluded.

\* *However, a customer has a right to a defect-free product. This does also apply to defective accessories and wear parts. Normal wear and tear are excluded from the warranty.*

### The warranty shall expire in the following cases:

- Improper use of the module.
- Non-observance of the instructions regarding assembly, commissioning, operation and maintenance of the module.
- Improper assembly, commissioning, operation and maintenance.
- Repairs and design changes carried out without prior technical instructions of Afag Automation AG.
- Removing the serial number from the product.
- Using the compact slide without shock absorbers or with defective shock absorbers.
- Inadequate checking of wear parts.
- Non-observance of the EC Machinery Directive, the Accident Prevention Regulations, the Standards of the German Electrotechnology Association (VDE) and these safety and assembly instructions.

## 1.6 Liability

No changes shall be made to the gantry module unless described in this instructions manual or approved in writing by Afag Automation AG.

Afag Automation AG accepts no liability for unauthorized changes or improper assembly, installation, commissioning, operation, maintenance or repair work.



## 2 Safety instructions

### 2.1 General

This chapter provides an overview of all important safety aspects to ensure safe and proper use of the gantry module and optimal protection of personnel.



---

Failure to follow the directions and safety instructions given in this instructions manual may result in serious hazards.

---

### 2.2 Intended use

The pneumatic gantry modules are used for the linear movement of fixed loads in non-hazardous atmospheres and in the ambient and operating conditions defined for this module (➔ technical catalogue).

The gantry modules are only approved for horizontal applications!

The PMP/PMP-c modules are exclusively intended for moving payloads up to a maximum of 15 kg for the PMP and 5 kg for the PMP-c, which do not react in a manner that endangers persons, property or the environment when manipulated.

The gantry modules can be used in combination with other modules as a pick-and-place station, whereby the permissible load capacity must not be exceeded.

Any use of the gantry module beyond the described purpose is not in accordance with the intended use.



---

The intended use of the module also includes:

- observance of all instructions given in this instructions manual.
  - compliance with the inspection and maintenance work and the specifications in the data sheets,
  - using only original spare parts.
- 

### 2.3 Foreseeable misuse

Any use other than or beyond the intended use described is considered a misuse of the gantry modules.

**Especially the following use is considered a misuse:**

- Use in potentially explosive atmospheres.
- Exceeding the permissible payloads.

**WARNING**

**Risk of injury if the module is not used as intended!**

The improper use of the gantry modules poses a potential hazard to the personnel.

- The gantry modules may only be used in a technically perfect condition in accordance with its intended use and the instructions in this manual as well as in compliance with the safety requirements!
- Any malfunctions, particularly those that could impair safety, must be eliminated immediately!



Risks can occur if the module is not used as intended. In the event of damages caused by improper use the following shall apply:

- the operating company shall be solely responsible for such damage, and
- the manufacturer does not accept any liability for damages caused by improper use.

## 2.4 Obligations of the operator and the personnel

### 2.4.1 Observe the assembly instructions

A basic prerequisite for safe and proper handling of the gantry module is a good knowledge of the basic safety instructions.



These assembly instructions, in particular the safety instructions contained therein, must be observed by all persons working with the gantry module.

### 2.4.2 Obligations of the operating company

In addition to the safety instructions given in this manual, the operating company must comply with the safety, accident prevention and environmental protection regulations valid for the field of application of the gantry module.

The operating company is required to use only personnel who :

- have the necessary professional qualifications and experience,
- are familiar with the basic rules regarding occupational safety and accident prevention,
- have been instructed in the correct handling of the modules,
- have read and understood these assembly instructions.

**The operating company is also required to:**

- monitor on an ongoing basis that the personnel work safely considering any potential hazard involved and the assembly instructions are observed,
- ensure that the assembly instructions are always kept at hand at the installation in which the modules are mounted,
- observe and communicate universally applicable laws and regulations regarding accident prevention and environmental protection,
- provide the necessary personal protective equipment (e.g., protective gloves) and instruct the personnel to wear it,
- update the related safety data sheets.

### 2.4.3 Obligations of the personnel

All personnel working with the modules are required to:

- read and observe these assembly instructions, especially the chapter on safety,
  - observe the occupational safety and accident prevention regulations,
  - observe all safety and warning signs on the modules,
  - refrain from any activity that might compromise safety and health.
- 



In addition, the personnel must wear the personal protective equipment required for carrying out their work. (➔Chapter 2.6).

---

## 2.5 Personnel requirements

### 2.5.1 Personnel qualification

The activities described in the assembly instructions require specific requisites at the level of professional qualifications of the personnel.

Personnel not having the required qualification will not be able to assess the risks that may arise from the use of the modules thus exposing himself and others to the risk of serious injury. Therefore, only qualified personnel may be permitted to carry out the described activities on the modules.

Persons whose ability to react is restricted due to the intake of medication or the like must not interact with the gantry module.

These installation instructions are intended for skilled personnel (installers, system integrators, maintenance personnel, technicians), electricians and operating personnel.

The following is a description of the professional skills (qualifications) required for carrying out the different activities:

#### **Qualified personnel:**

Qualified personnel with appropriate training who are qualified due to their special know-how and fully familiar with the machine and who have been given instructions on how to carry out the task entrusted to them safely.

#### **Operator (trained personnel):**

Authorized persons who due to their specialized professional training, expertise and experience are capable of identifying risks and preventing possible hazards arising from the use of the machine.





## 2.6 Personal protective equipment (PPE)

The personal protective equipment serves to protect the personnel from hazards affecting their safety and health at work.

When working on/with the gantry modules, the personnel must wear the personal protective equipment assigned by the safety officer of the operating company or as required by safety regulations. In addition, the personnel is required to:

- wear the personal protective equipment provided by the operating company (employer),
- check the personal protective equipment for proper condition, and
- immediately notify the person responsible on site of any defects found on the personal protective equipment.

Personal protective equipment and the respective mandatory signs:

	<p><i>Protective clothing</i> is a close-fitting clothing specifically designed to protect personnel from hazards during work.</p>
	<p><i>Protective gloves</i> are specifically designed to protect the personnel against hand injuries (such as cuts, abrasion, burns).</p>
	<p><i>Safety shoes</i> are specifically designed to protect the personnel against foot injuries from crushing, falling objects or slipping on slippery surfaces.</p>
	<p>Hearing <i>protectors</i> are required to protect the personnel against excessive noise levels to prevent noise-induced hearing loss.</p>

## 2.7 Changes & Modifications

No changes may be made to the gantry modules which have not been described in these assembly instructions or approved in writing Afag Automation AG.

Afag Automation AG accepts no liability for unauthorised changes or improper assembly, installation, commissioning, maintenance or repair work.



The gantry modules may not be changed or modified in any way, except with the prior written consent of AFAG.

## 2.8 General hazards / residual risks

Despite the safe design of the machine and the technical protective measures taken, there still remain residual risks that cannot be avoided, and which present a non-obvious residual risk when operating the rotary modules.

Observe the safety instructions in this chapter and in the other sections of this manual to avoid damage to property and dangerous situations for the personnel.



Always keep the assembly instructions ready at hand at the workplace! Please, also observe:

- the general and local regulations on accident prevention and environmental protection,
- the safety information sheet for the module.

### 2.8.1 General hazards at the workplace

The gantry modules have been built according to the state-of-the-art and the applicable health and safety requirements. However, improper use of the module may cause the following hazards to the personnel:

- danger to life and limb of the operator or third parties,
- on the gantry modules themselves,
- property damage.



The PMP/PMP-c gantry module is a fine mechanical unit and must be handled with the necessary care and cleanliness during transport and storage as well as when handling, setting up and assembling!

#### WARNING



#### Danger - Do not use in unsuitable environment !

The gantry modules are designed for use in **non** explosive atmospheres.

- Do **not** use the gantry module in potentially explosive atmospheres!

#### CAUTION



#### Risk of injuries due to uncontrolled parts movements!

When operating the gantry modules uncontrolled movements may occur which can cause personal injury or property damage.

- Only qualified personnel may work with or on the module.
- Read the assembly instructions carefully before carrying out any work on or with the module.

### CAUTION



#### Risk of noise-induced hearing loss!

When the gantry modules are installed in a machine or plant, the permissible noise level may be exceeded depending on the various components, the environment and the resonance.

- The operating company is responsible for ensuring that the permissible noise levels are observed.
- If the noise level exceeds 85 dB(A) in normal operation, the operator must wear hearing protectors at the workplace.

### 2.8.2 Danger due to electricity

### WARNING



#### Danger! Risk of electric shock!

If work on electrical components is required, ensure that the work is carried out properly, failure to do so will cause serious or fatal injuries.

- Work on the machine's electrical equipment may only be performed by skilled electrician or trained personnel under the supervision of a skilled electrician in accordance with all relevant electrical regulations.

### 2.8.3 Mechanical hazards

### WARNING



#### Risk of injury - Do not reach into the system during operation!

There is a risk of injury if the personnel reaches into the system during normal operation.

- Never reach into the system during normal operation!

### CAUTION



#### Danger of injury by moving components!

Limbs can be crushed by moving components!

- Work on and with gantry module may only be carried out by qualified personnel.

### 2.8.4 Danger due to pneumatics

#### WARNING



##### **Risks by the pneumatic system!**

The pneumatic system can pose various hazards that can cause serious or fatal injuries if the work is carried out improperly.

- Only qualified personnel may work with or on the pneumatic system!
  - The necessary personal protective equipment must be provided and used.
- 

### 2.8.5 Danger caused by omitting maintenance work

#### CAUTION



##### **Danger of injury!**

Poor or not regularly performed maintenance work may cause malfunction of the components which may result in injuries.

- The due diligence obligations of the operating company include ensuring that the personnel carrying out maintenance work is appropriately trained and qualified.
-

### 3 Technical data

#### 3.1 Gantry module PMP

##### 3.1.1 Dimensional drawing PMP

Typ	PMP 01	PMP 02
A	Montageüberstand 1	Montageüberstand 1
B	Montageüberstand 2	Montageüberstand 2
C	Zwischenanschlag	Zwischenanschlag
D	Initiatorhalter	Initiatorhalter
E	Anschlagschlitzen	Anschlagschlitzen
F	Initiator Ø 6.5 mm	Initiator Ø 6.5 mm
G	Endanschlag	Endanschlag
P1	G1/8 "	G1/8 "
P2	M5	M5

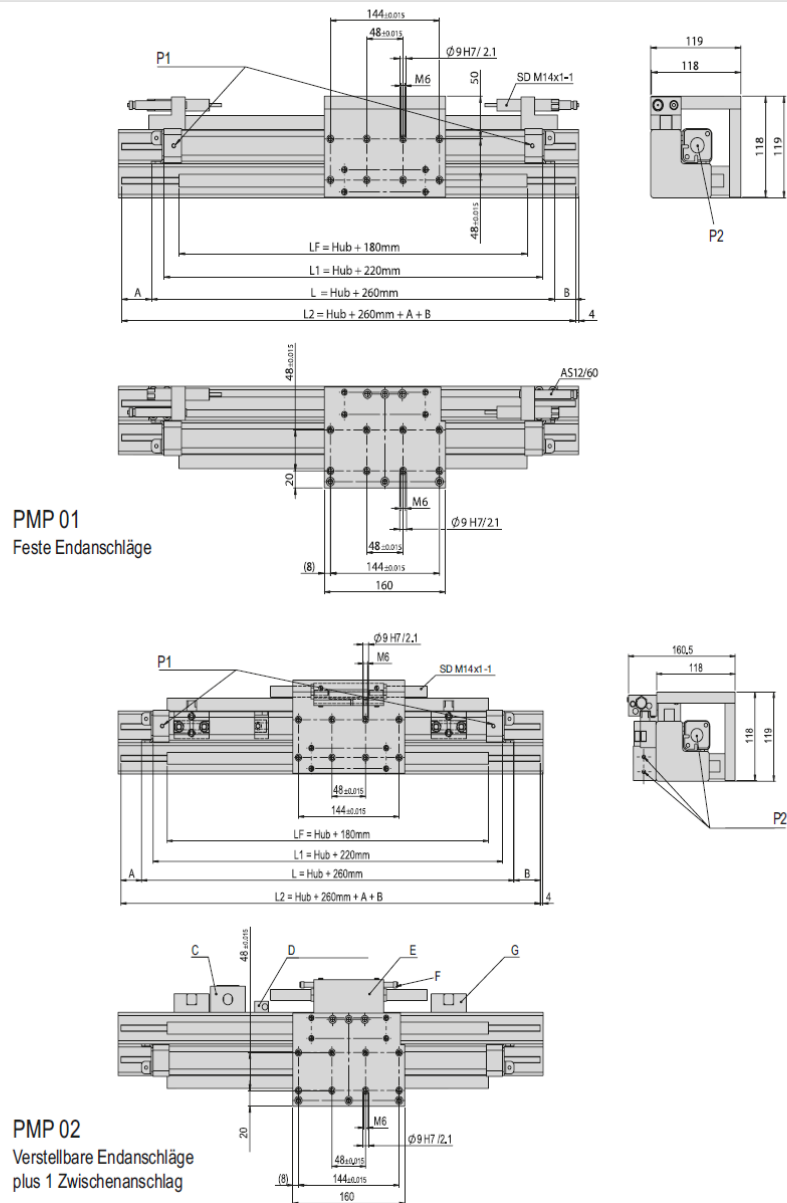


Fig. 1 Dimensional drawing PMP



**3.1.2 Technical data PMP**

PMP		
Befestigungs raster	48 x 48 mm	
Befestigungsgewinde	M6	
Betriebsdruck	6 +/-2 bar	
Luftanschluss P	M5 / G 1/8 "	
Zylinder Ø	25 mm	
Betriebstemperatur	0 - 50 °C	
Lagerungstemperatur	0 - 50 °C	
Luftfeuchtigkeit	< 90 %	

Typ	PMP 01	PMP 02
<b>Bestellnummer</b>	<b>11000105</b>	<b>11000106</b>
Max Hub	3000 mm	3000 mm
Nettogewicht	6 kg	9.1 kg
Gewicht bewegt	1.87 kg	2.33 kg
Gewicht/100 mm Hub	1.11 kg	1.11 kg
Modulgewicht bei 0 mm Hub	6 kg	6 kg
Max Nutzlast	*15 kg	*15 kg
Luftverbrauch/100 mm Hub	0.25 NL	0.25 NL
Kolbenkraft	250 N	250 N
Wiederholgenauigkeit	+/- 0.1 mm	+/- 0.1 mm
Max Profillänge	6000 mm	6000 mm
Einbaulage	↔	↔

Die technischen Daten beziehen sich auf einen Nenndruck von 6 bar und Afag Standard-Testbedingungen.

Hinweis: Zusätzlich im Lieferumfang von PMP 02 enthalten:

1x Anschlagschlitten PMP

2x Endanschlag PMP

1x Zwischenanschlag PMP

\*Verfahrzeit-Diagramm beachten

\*\*0 mm Hub

**Im Lieferumfang inbegriffen**

(Katalog HT Zubehör)

- 2x Stoßdämpfer SD M14x1 -1
- 2x Anschlagschraube AS 12/60

**Zubehör**

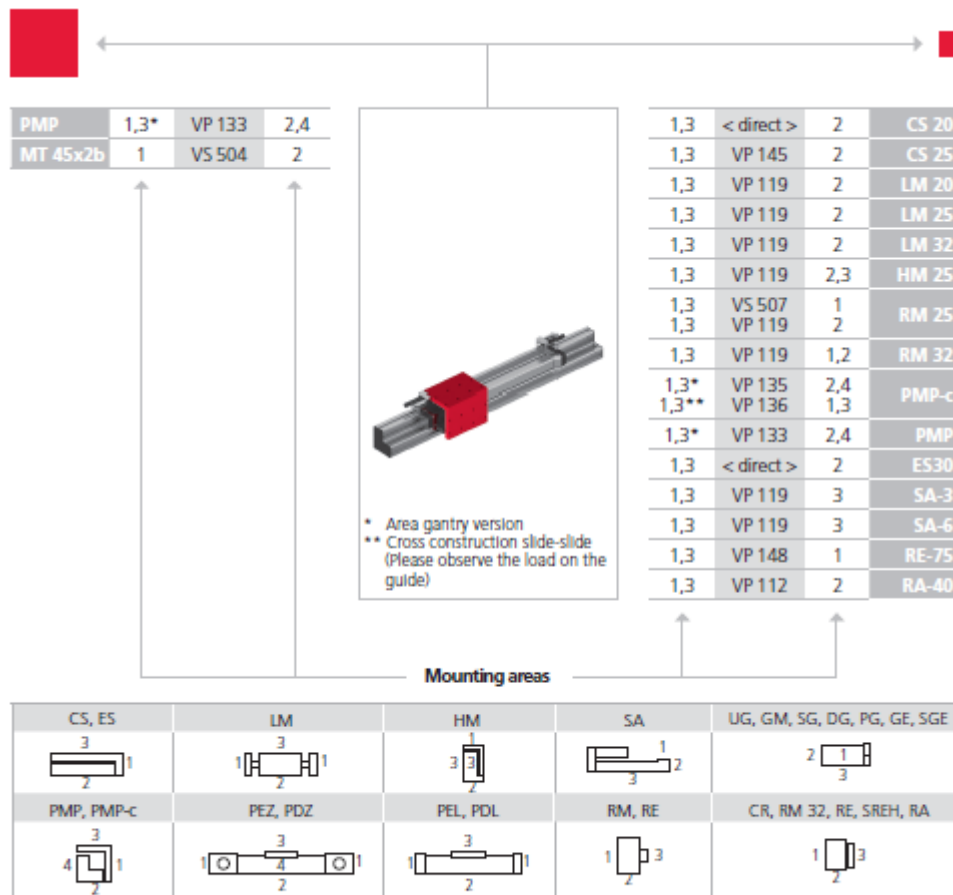
- Anschlagschlitten PMP [S. 154]
- Feststeller PMP [S. 154]
- Zwischenanschlag PMP [S. 155]
- Feineinstellung PMP [S. 155]
- Endanschlag PMP [S. 155]
- Initiatorhalter PMP [S. 155]
- Abdeckkappe 40 x 40 [S. 156]
- Abdeckkappe 40 x 80 [S. 156]
- Winkelprofil PMP [S. 156]
- Schmieradapter PMP [S. 156]

(Katalog HT Zubehör)

- Nutenstein M8
- INI d6.5x44-Sn1.5-PNP-NO-M8x1

Fig. 2 Table technical data PMP

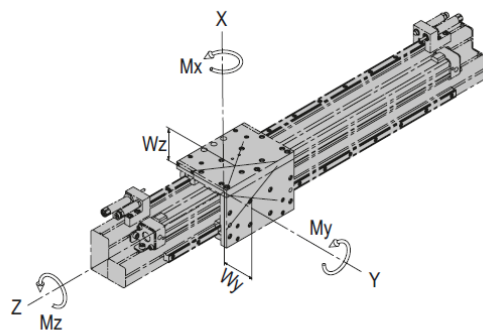
3.1.3 Preferred combinations PMP



Note that there might be different mounting positions from one module to another one.  
 The required connection elements and the range of support columns are depicted in the catalogue HT accessories.

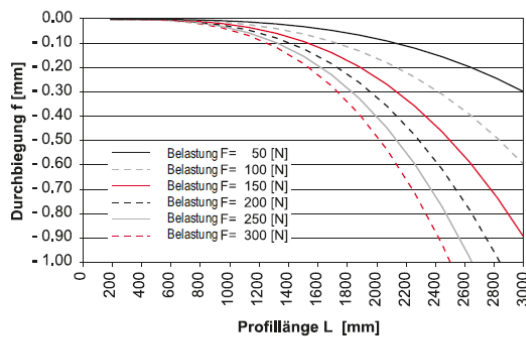
### 3.1.4 Module loads PMP

Typ	PMP 01	PMP 02
Max statisches Moment $M_x$	380 Nm	380 Nm
Max statisches Moment $M_y$	380 Nm	380 Nm
Max statisches Moment $M_z$	650 Nm	650 Nm
Max dynamisches Moment $M_x$	26.5 Nm	26.5 Nm
Max dynamisches Moment $M_y$	26.5 Nm	26.5 Nm
Max dynamisches Moment $M_z$	40 Nm	40 Nm
Wirkabstand $W_y$	40 mm	40 mm
Wirkabstand $W_z$	40 mm	40 mm

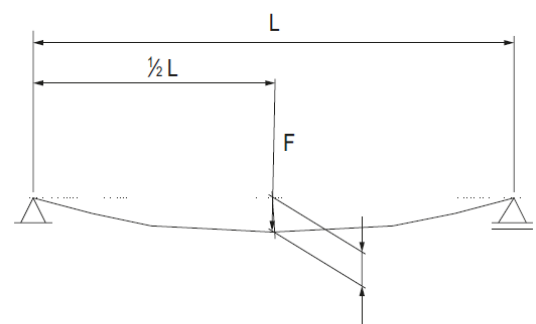


#### PMP-Diagramme

Biegekennlinien PMP



Durchbiegung Winkelprofil, Lastfall statisch



Verfahrzeit-Diagramm

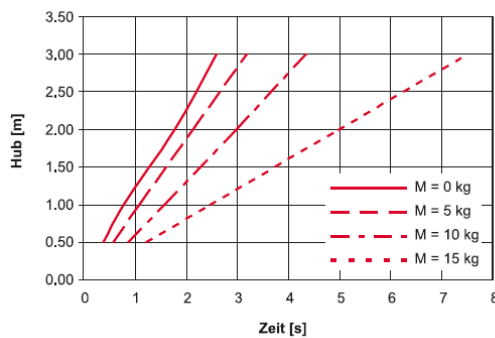
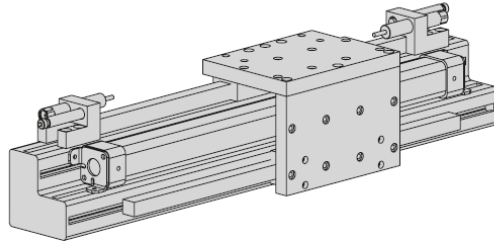


Fig. 3 Table module loads PMP

### 3.1.5 Determination of the stroke - PMP

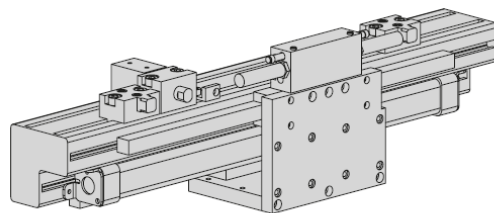
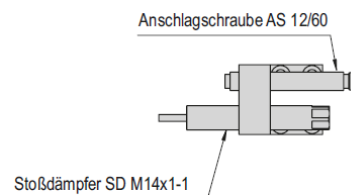
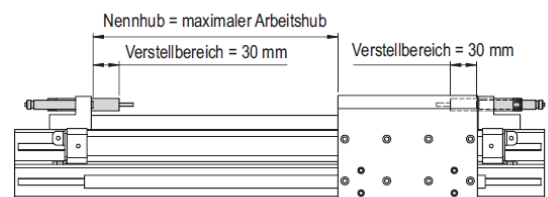


#### PMP 01

Ausführung mit Pneumatikzylinder und zwei festen Endanschlägen.

#### Bestimmung des Hubs für PMP 01

Mit der Angabe des Nennhubs bestimmen Sie den maximalen Arbeitsbereich. Wir empfehlen eine allfällige Hubreserve bei der Bestimmung des Nennhubs. Der Einstellbereich der Anschlagsschrauben beträgt bis 30 mm je Anschlagseite.



#### PMP 02

Ausführung mit Pneumatikzylinder und verstellbaren Zwischen- und Endanschlägen.

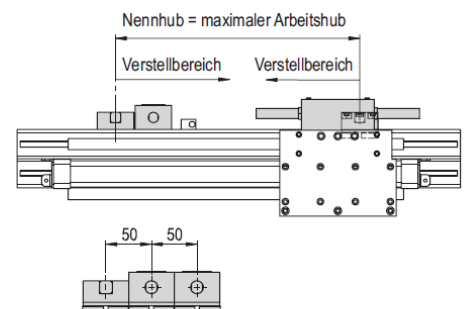
#### Bestimmung des Hubs für PMP 02

Mit der Angabe des Nennhubs bestimmen Sie den maximalen Arbeitsbereich. Wir empfehlen eine allfällige Hubreserve bei der Bestimmung des Nennhubs.

Mit den verschiebbaren Endanschlägen kann der Arbeitsbereich eingeschränkt werden.

Bitte achten Sie darauf, dass beim Einsatz von mehreren Zwischenanschlägen ein Minimalraster von 50 mm gegeben ist. Für Aufgabenstellungen, die ein kleineres Raster erfordern, wenden Sie sich an unsere Techniker.

Werden die Pneumatikzylinder mittels Magnetschalter abgefragt, ist ein Mindestabstand von 60 mm notwendig.



### 3.2 Gantry module PMP-c

#### 3.2.1 Dimensional drawing PMP-c

Typ	PMP-c 01	PMP-c 02
A	Montageüberstand 1	Montageüberstand 1
B	Montageüberstand 2	Montageüberstand 2
C	Endanschlag	Endanschlag
D	Anschlagschlitten	Anschlagschlitten
E	Zwischenanschlag	Zwischenanschlag
F	Initiator Ø 6.5 mm	Initiator Ø 6.5 mm
P	G1/8 "	G1/8 "

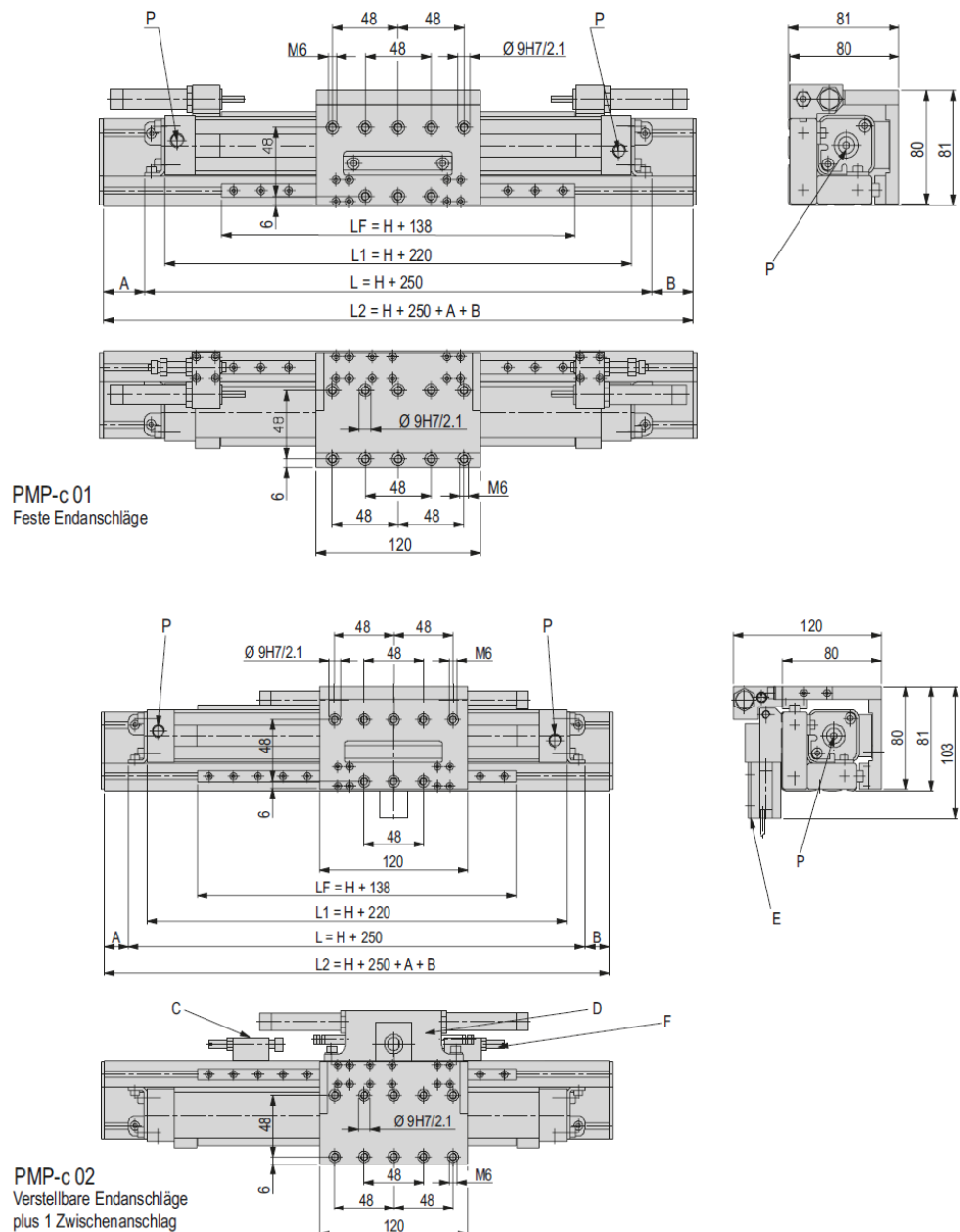


Fig. 4 Dimensional drawing PMP-c

**3.2.2 Technical data PMP-c**

PMP-c		
Befestigungsraster	48 x 48 mm	
Befestigungsgewinde	M6	
Betriebsdruck	6 +/- 2 bar	
Luftanschluss P	G 1/8 "	
Zylinder Ø	25 mm	
Betriebstemperatur	0 - 50 °C	
Lagerungstemperatur	0 - 50 °C	
Luftfeuchtigkeit	< 90 %	

Typ	PMP-c 01	PMP-c 02
<b>Bestellnummer</b>	<b>11015620</b>	<b>11015621</b>
Max Hub	2000 mm	2000 mm
Nettogewicht	2.2 kg	2.6 kg
Gewicht bewegt	0.55 kg	0.89 kg
Gewicht/100 mm Hub	0.54 kg	0.54 kg
Modulgewicht bei 0 mm Hub	2.22 kg	2.64 kg
Max Nutzlast	*5 kg	*5 kg
Luftverbrauch/100 mm Hub	0.25 NL	0.25 NL
Kolbenkraft	250 N	250 N
Wiederholgenauigkeit	+/- 0.1 mm	+/- 0.1 mm
Max Profillänge	3000 mm	3000 mm
Einbaulage	↔	↔

Die technischen Daten beziehen sich auf einen Nenndruck von 6 bar und Afag Standard-Testbedingungen.  
Hinweis: Zusätzlich im Lieferumfang von PMP-c 02 enthalten:

- 1x Anschlagsschlitten PMP-c
- 2x Endanschlag PMP-c
- 1x Zwischenanschlag PMP-c

\*Verfahrzeit-Diagramm beachten  
\*\*0 mm Hub

**Im Lieferumfang inbegriffen**

(Katalog HT Zubehör)

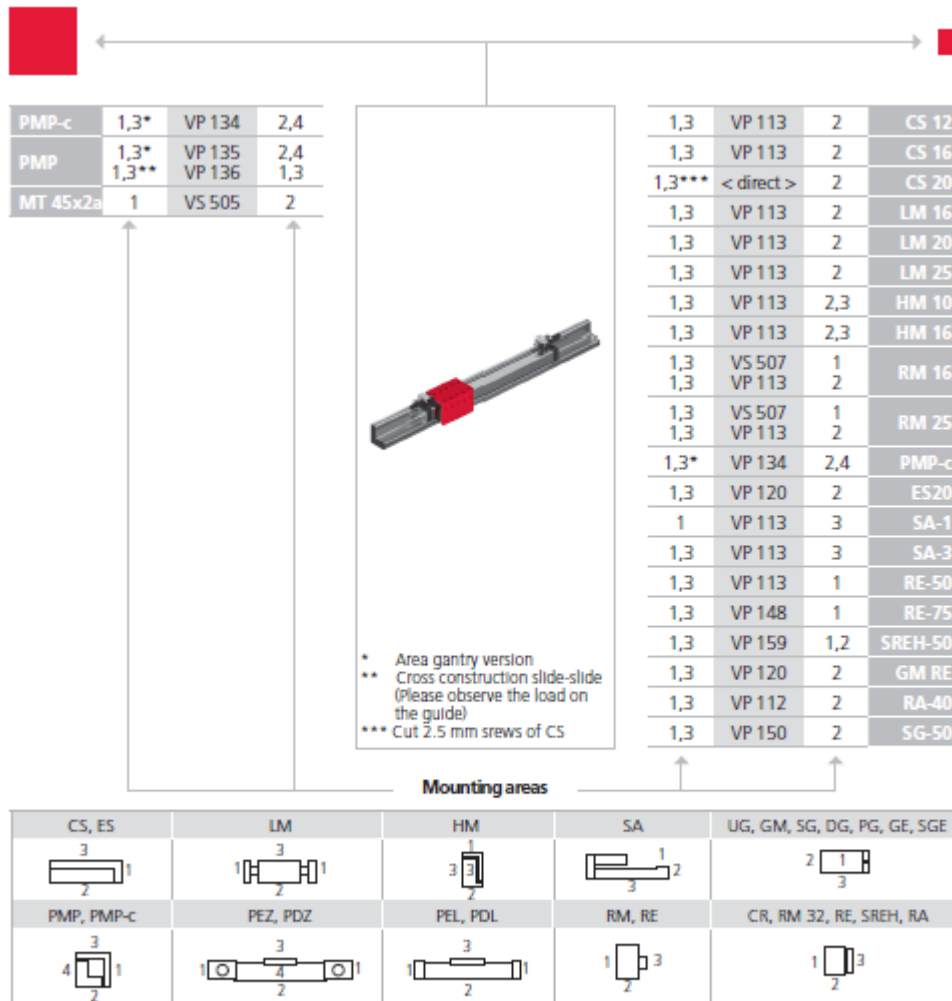
- 2x Anschlagsschraube AS 08/40
- 2x Stoßdämpfer SD M14x1 -1

**Zubehör**

- Anschlagsschlitten PMP-c [S. 157]
  - Feststeller PMP-c [S. 158]
  - Zwischenanschlag PMP-c [S. 157]
  - Feineinstellung PMP-c [S. 157]
  - Endanschlag PMP-c [S. 159]
  - Schleppkette PMP-c [S. 158]
  - Abdeckkappe 40 x 20 [S. 158]
  - Abdeckkappe 60 x 20 [S. 158]
  - Winkelprofil PMP-c [S. 159]
- (Katalog HT Zubehör)
- INI d6.5x44-Sn1.5-PNP-NO-M8x1
  - Nutenstein M4

Fig. 5 Table technical data PMP-c

### 3.2.3 Preferred combinations PMP-c

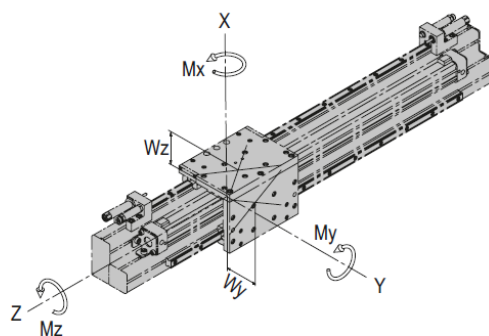


Note that there might be different mounting positions from one module to another one.

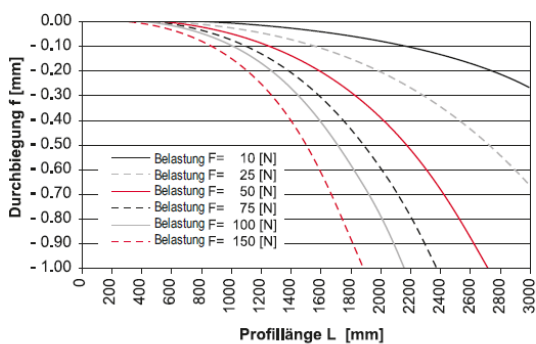
The required connection elements and the range of support columns are depicted in the catalogue HT accessories.

**3.2.4 Module loads PMP-c**

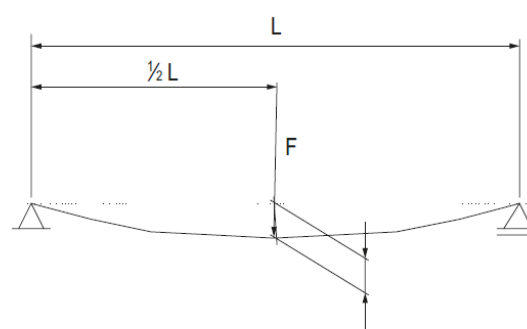
Typ	PMP-c 01	PMP-c 02
Max statisches Moment Mx	158 Nm	158 Nm
Max statisches Moment My	158 Nm	158 Nm
Max statisches Moment Mz	199 Nm	199 Nm
Max dynamisches Moment Mx	5.2 Nm	5.2 Nm
Max dynamisches Moment My	5.2 Nm	5.2 Nm
Max dynamisches Moment Mz	6.5 Nm	6.5 Nm
Wirkabstand Wy	26 mm	26 mm
Wirkabstand Wz	26 mm	26 mm


**PMP-c Diagramme**

Biegekennlinien PMP-c



Durchbiegung Winkelprofil, Lastfall statisch



Verfahrzeit-Diagramm

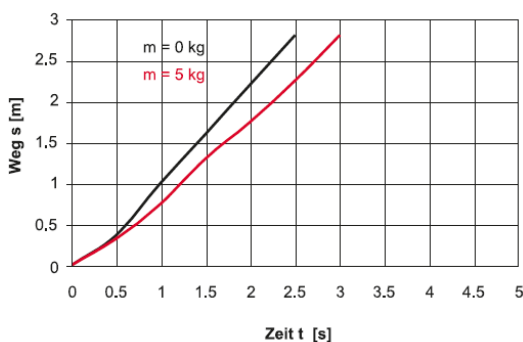
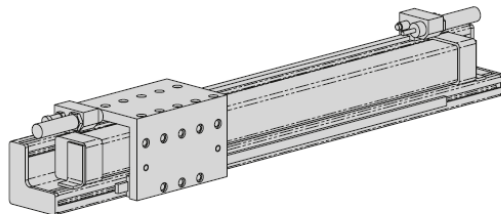


Fig. 6 Table module loads PMP-c



### 3.2.5 Determination of the stroke - PMP-c

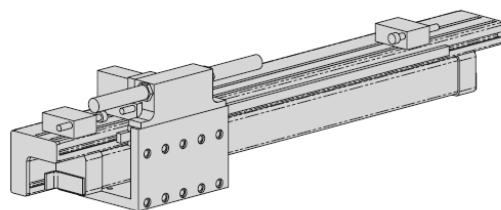
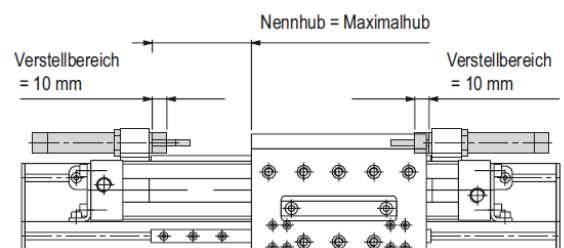


#### PMP-c 01

Ausführung mit Pneumatikzylinder und zwei festen Endanschlägen.

#### Bestimmung des Hubs für PMP-c 01

Mit der Angabe des Nennhubs bestimmen Sie den maximalen Arbeitsbereich. Wir empfehlen eine allfällige Hubreserve bei der Bestimmung des Nennhubs. Der Einstellbereich der Anschlagsschrauben beträgt bis 10 mm je Anschlagseite.

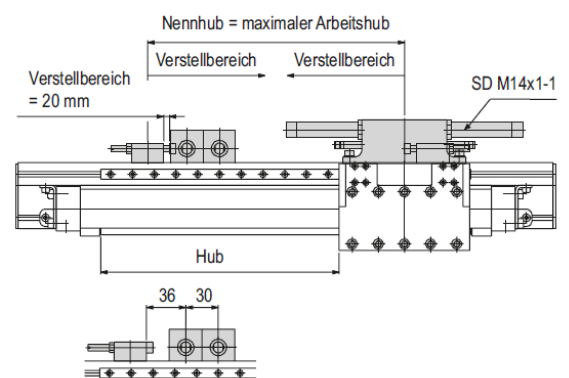


#### PMP-c 02

Ausführung mit Pneumatikzylinder und verstellbaren Zwischen- und Endanschlägen.

#### Bestimmung des Hubs für PMP-c 02

Mit der Angabe des Nennhubs bestimmen Sie den maximalen Arbeitsbereich. Wir empfehlen eine allfällige Hubreserve bei der Bestimmung des Nennhubs. Mit den verschiebbaren Endanschlägen kann der Arbeitsbereich eingeschränkt werden. Bitte achten Sie darauf, dass beim Einsatz von mehreren Zwischenanschlägen ein Minimalraster von 30 mm gegeben ist. Für Aufgabenstellungen, die ein kleineres Raster erfordern, wenden Sie sich an unsere Techniker. Werden die Pneumatikzylinder mittels Magnetschalter abgefragt, ist ein Mindest-Abstand von 40 mm notwendig.



## 4 Transport, packaging and storage

This chapter provides information regarding proper transport, packaging and storage of the gantry modules.

### 4.1 Safety instructions for transport

#### CAUTION



##### Risk of injury when unpacking the module!

The modules are not packed. Depending on the type, the modules can have a high weight. Fingers can be crushed if handled incorrectly.

- Carefully unpack the module.

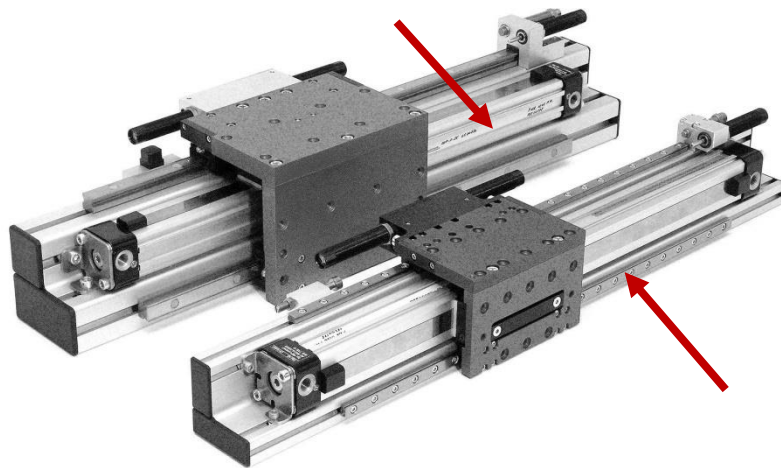


Fig. 7 Stroke module (danger of crushing)

#### NOTICE

##### Risk of material damage to shock absorbers!

The shock absorbers integrated in the modules are precision mechanical parts which can be damaged by careless handling.

- Handle the shock absorbers with care.



Also observe the safety instructions in ↻ chap. 2 „Safety instructions“ in this manual.

### 4.2 Scope of supply



The modules are supplied with an operating and assembly manual and a safety data sheet (see scope of supply below).

---

Ut.	PMP 01	Ut.	PMP 02
1 x	Gantry module PMP version 01	1 x	Gantry module PMP version 02
2 x	Shock absorber SD M14x1-1	2 x	Shock absorber SD M14x1-1
2 x	Stop screw AS12/60	1 x	Stop slide
		2 x	End stop
		1 x	Intermediate stop

### 4.3 Transport



No liability can be assumed for damages caused by improper installation on the part of the operating company.

---








The following conditions must be complied with for transport and storage:

- Storage temperature: 0-50 °C
  - Relative air humidity: < 90%, non condensing
-

#### 4.4 Packaging

The modules are packed in the most appropriate manner.

##### Standardized symbols for packages

Symbol	Note	Explanation
	Top	The package shall be transported, handled and stored with the arrows always pointing upwards (top side of the package).
	Fragile	Products marked with this symbol shall be handled with care and may never be turned upside down or tied up.
	Protect against moisture	The packages shall be protected against moisture and kept dry (keep covered during storage).
	Attachment points	The hosting equipment (chain, etc.) may only be attached to the points marked by this symbol.
	Centre of gravity	This symbol marks the centre of gravity of the packages (pay attention to the position of the centre of gravity).

#### NOTICE

##### Risk to the environment due to incorrect disposal of the packaging material

Environmental damage can be caused by incorrect disposal of the packaging material.

- Dispose of the packaging material in an environmentally sensitive way in accordance with the local environmental regulations.

#### 4.5 Storage

If the module is stored for an extended period of time, observe the following:

- Do not store the gantry modules outdoors or expose them to weather conditions.
- The storage space must be dry and dust free.
- Room temperature of the storage space: 0-50 °C.
- Relative air humidity: < 90% non condensing
- Clean the gantry module and protect the blank metal parts against corrosion using the appropriate means.
- Protect the gantry module from dirt and dust.

## 5 Design and description

This chapter provides an overview of the gantry modules' structure and functioning. Two variants are available for the basic version of the PMP /PMP-C.

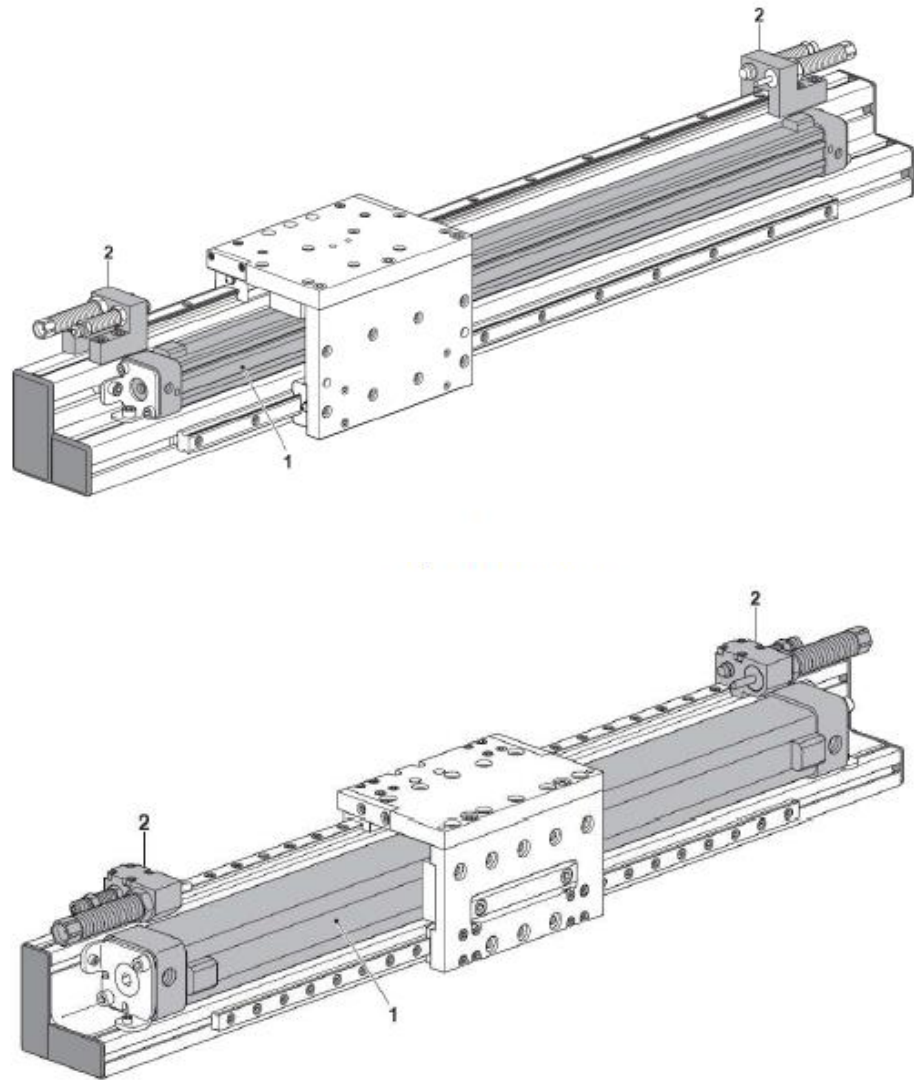


Fig. 8 Version 01: with pneumatic cylinder (1) and 2 fixed end stops (2)

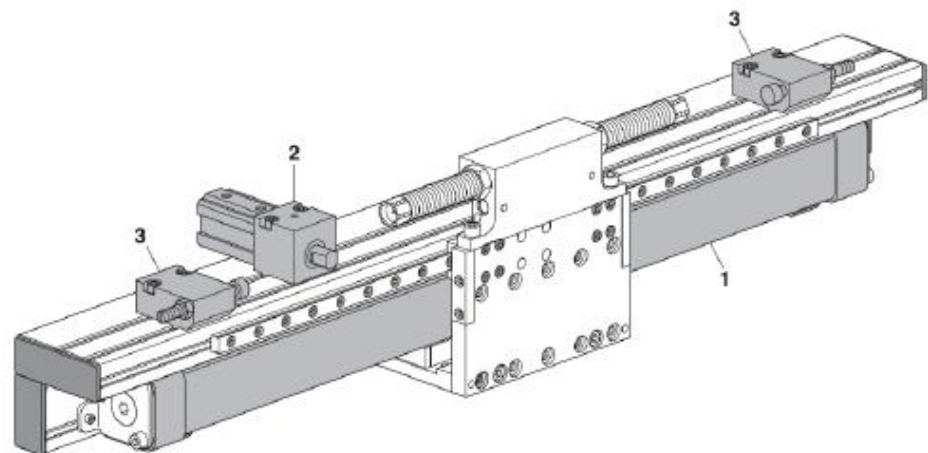
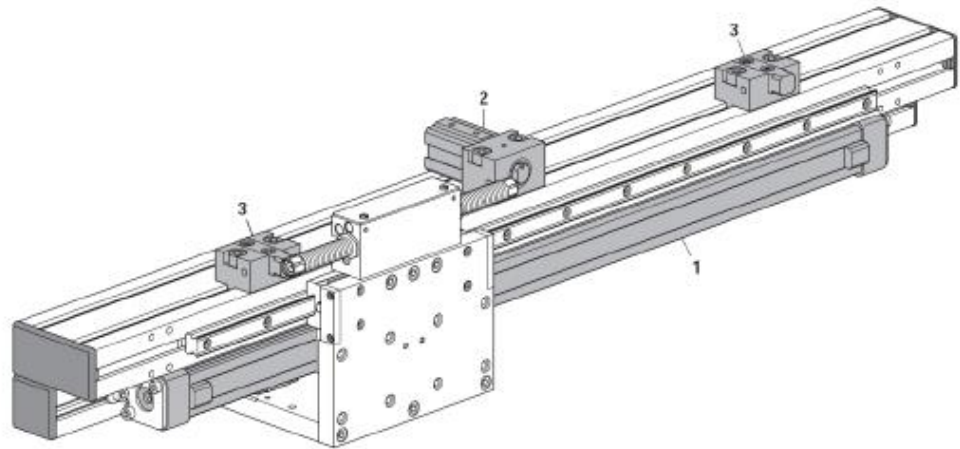


Fig. 9 Version 02: with pneumatic cylinder (1) and adjustable intermediate (2) and end stops (3)



The special versions with two drive cylinders on the base body are not dealt with separately in these assembly instructions, as the basic information on the standard versions also applies to the special versions.

## 5.1 Gantry module PMP version 01

### 5.1.1 Structure PMP Version 01

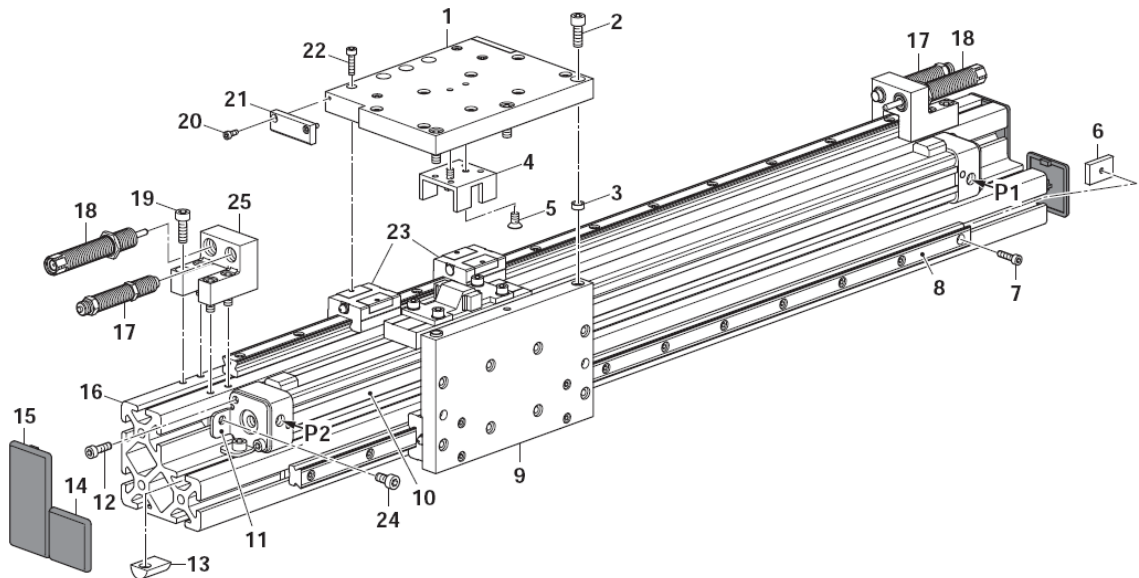


Fig. 10 Structure PMP version 01

- |   |                             |
|---|-----------------------------|
| 1. Stop carriage plate 14. Cover cap 40x40 mm | 15. Cover cap 40x80 mm      |
| 2. Socket head screw M6x18                    | 16. Angle profile           |
| 3. Centring sleeve                            | 17. Stop screw AS12/60      |
| 4. Actuator                                   | 18. Shock absorber SD14/16  |
| 5. Countersunk screw M5x10                    | 19. Socket head screw M6x18 |
| 6. Slot nut                                   | 20. Socket head screw M3x8  |
| 7. Socket head screw M4x20                    | 21. Stop plate              |
| 8. Guide rail                                 | 22. Socket head screw M4x16 |
| 9. Guide carriage plate                       | 23. Carriage                |
| 10. Linear cylinder                           | 24. Socket head screw M6x12 |
| 11. Fastening linear cylinder                 | 25. End stop                |
| 12. Socket head screw M5x18                   |                             |
| 13. Slot nut                                  |                             |

### 5.1.2 Functional description PMP Version 01

The pneumatic cylinder (Fig. 10, 10) is actuated via the compressed air connections (P1 and P2). The cylinder moves the carriage (Fig. 10, 1 and 9) mounted on four recirculating ball guides (Fig. 10, 23). The stroke is limited by the two stop screws (Fig. 10, 17) and is slowed down by the two shock absorbers (Fig. 10, 18).

## 5.2 Gantry module PMP version 02

### 5.2.1 Structure PMP Version 02

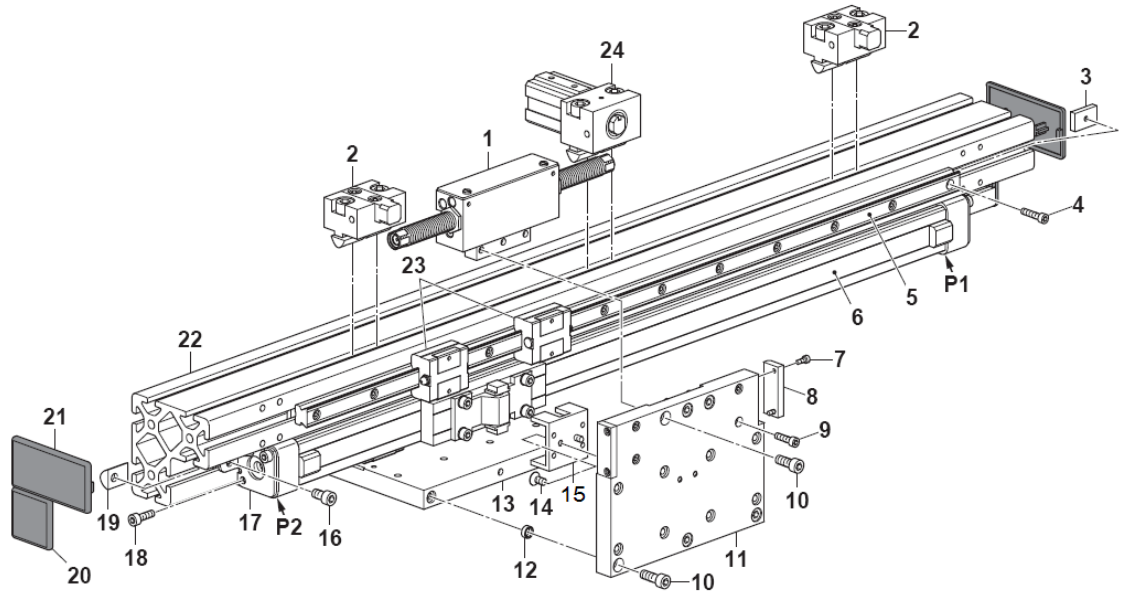


Fig. 11 Structure PMP version 02

- |                             |                               |
|-----------------------------|-------------------------------|
| 1. Stop slide               | 13. Carriage plate            |
| 2. End stop                 | 14. Countersunk screw M5x10   |
| 3. Slot nut                 | 15. Actuator                  |
| 4. Socket head screw M4x20  | 16. Socket head screw M8x40   |
| 5. Guide rail               | 17. Fastening linear cylinder |
| 6. Linear cylinder          | 18. Socket head screw M5x16   |
| 7. Socket head screw M3x8   | 19. Slot nut                  |
| 8. Stop plate               | 20. Cover cap 40x40 mm        |
| 9. Socket head screw M4.16  | 21. Cover cap 40x80 mm        |
| 10. Socket head screw M6x18 | 22. Angle profile             |
| 11. Stop carriage plate     | 23. Carriage                  |
| 12. Centring sleeve         | 24. Intermediate stop         |

### 5.2.2 Functional description PMP Version 02

The pneumatic cylinder (Fig. 11, 6) is actuated via the compressed air connections (P1 and P2). The cylinder moves the slide (Fig. 11, 23) mounted on four recirculating ball guides (Fig. 11, 23). The stroke is damped by the shock absorbers in the stop carriage (Fig. 11, 1) and limited by the two end stops (Fig. 11, 2). Intermediate positions can be reached with the intermediate stop (Fig. 11, 24). The end and intermediate stops can be moved as required on the angle profile.



### 5.3 Gantry module PMP-c version 01

#### 5.3.1 Structure PMP-c Version 01

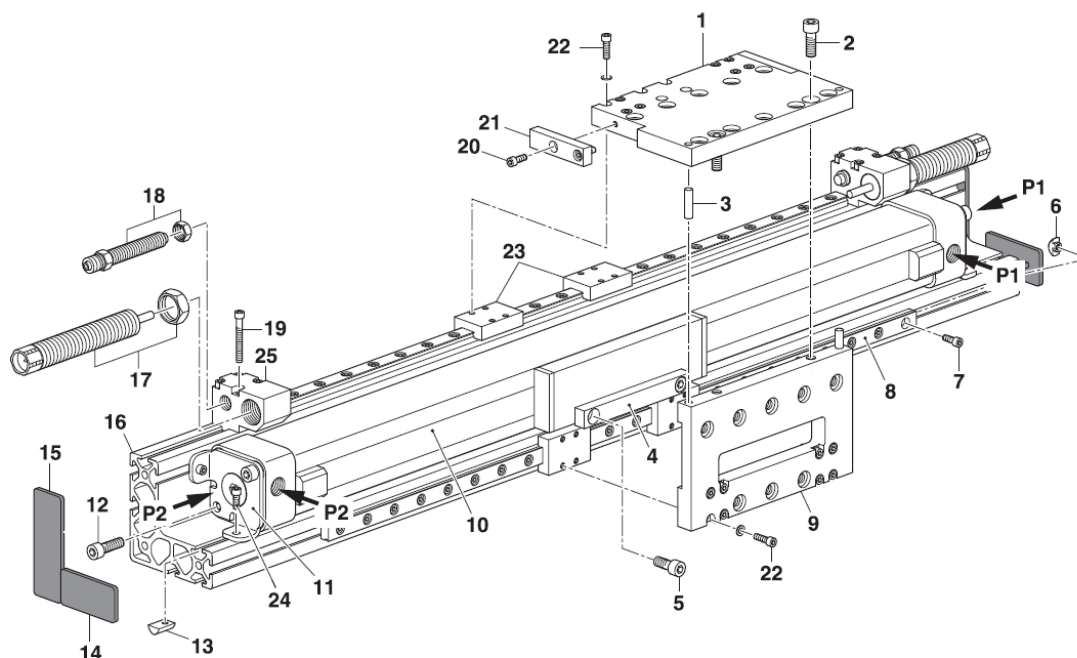


Fig. 12 Structure PMP-c version 01

- |                               |                             |
|-------------------------------|-----------------------------|
| 1. Stop carriage plate        | 14. Cover cap 20x40 mm      |
| 2. Socket head screw M5x14    | 15. Cover cap 20x60 mm      |
| 3. Centring pin Ø4x16         | 16. Angle profile           |
| 4. Actuator                   | 17. Shock absorber SD 14/16 |
| 5. Socket head screw M5x8     | 18. Stop screw AS 08/40     |
| 6. Slot nut                   | 19. Socket head screw M3x25 |
| 7. Socket head screw M3x8     | 20. Socket head screw M3x8  |
| 8. Guide rail                 | 21. Stop plate              |
| 9. Guide carriage plate       | 22. Socket head screw M3x8  |
| 10. Linear cylinder           | 23. Carriage                |
| 11. Fastening linear cylinder | 24. Socket head screw M4x8  |
| 12. Socket head screw M5x16   | 25. End stop                |
| 13. Slot nut                  |                             |

#### 5.3.2 Functional description PMP-c Version 01

The pneumatic cylinder (Fig. 12, 10) is actuated via the compressed air connections (P1 and P2). The cylinder moves the carriage (Fig. 12, 1 and 9) mounted on four recirculating ball guides (Fig. 12, 23). The stroke is limited by the two stop screws (18) and is slowed down by the two shock absorbers (Fig. 12, 17).

## 5.4 Gantry module PMP-c version 02

### 5.4.1 Structure PMP-c Version 02

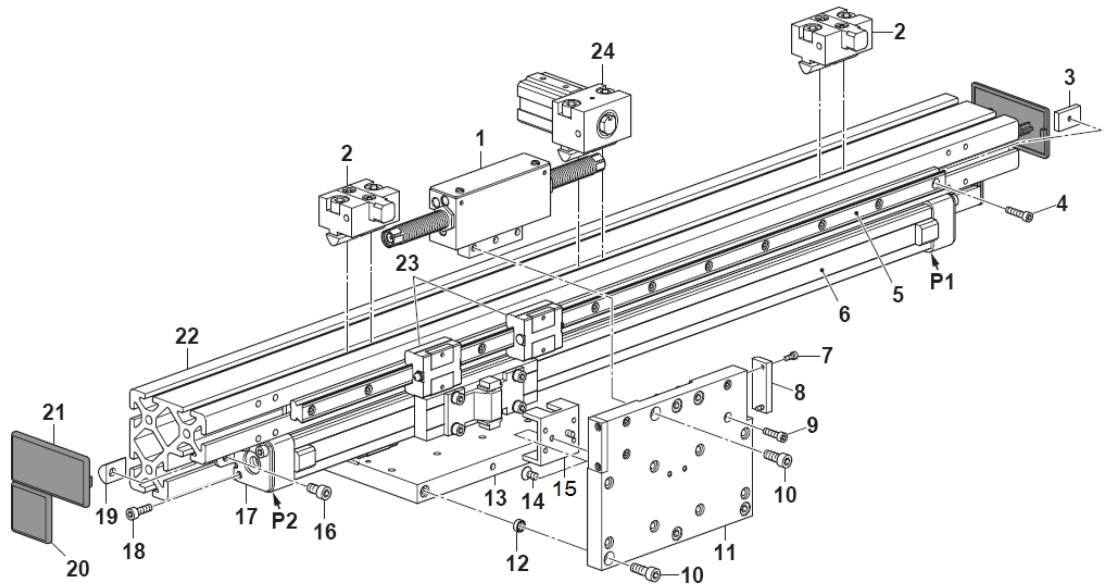


Fig. 13 Structure PMP-c version 02

- |                             |                               |
|-----------------------------|-------------------------------|
| 1. Stop slide               | 13. Carriage plate            |
| 2. End stop                 | 14. Countersunk screw M5x8    |
| 3. Slot nut                 | 15. Actuator                  |
| 4. Socket head screw M3x8   | 16. Socket head screw M4x8    |
| 5. Guide rail               | 17. Fastening linear cylinder |
| 6. Linear cylinder          | 18. Socket head screw M5x16   |
| 7. Socket head screw M3x8   | 19. Slot nut                  |
| 8. Stop plate               | 20. Cover cap 20x40 mm        |
| 9. Socket head screw M3.8   | 21. Cover cap 20x60 mm        |
| 10. Socket head screw M5x14 | 22. Angle profile             |
| 11. Stop carriage plate     | 23. Carriage                  |
| 12. Centring sleeve         | 24. Intermediate stop         |

### 5.4.2 Functional description PMP-c Version 02

The pneumatic cylinder (Fig. 13, 6) is actuated via the compressed air connections (P1 and P2). The cylinder moves the carriage (Fig. 13, 11 and 13), which is mounted on four recirculating ball guides (Fig. 13, 23).

The stroke is damped by the shock absorbers in the stop carriage (Fig. 13, 1) and limited by the two end stops (Fig. 13, 2). Intermediate positions can be reached with the intermediate stop (Fig. 13, 24). The end and intermediate stops can be moved as required on the angle profile.

### 5.5 Accessories

With additional accessories available separately, the PMP/PMP-c module can be equipped for a wide range of applications.



You will find more information on the accessories for the gantry modules on our website [www.afag.com](http://www.afag.com).

#### 5.5.1 PMP Version 01

Item	Article	Order no. (→ Catalogue)
1	Connecting plates	
2	Stop screws AS 12/60	
3	Shock absorber SD 14x1-1 and SD 14x1-2	
4	Cover cap 40x40 mm	
5	Cover cap 40x80 mm	
6	Angle profile	
7	Centering bushing	
8	Initiator INI d6x44-Sn1.5-PNP-close-M8x1	
9	Initiator INI d6.5x35-Sn1.5-PNP-close-M8x1	
10	Initiator holder IH Ø 6.5 mm	
11	Angle plug (pluggable)	
12	Angle plug (screwable)	
13	Plug straight (pluggable)	
14	Connector straight (screwable)	
15	Proximity switch holder IH 8x8 mm	
16	Initiator 8x8 mm	
17	Lubrication adapter	

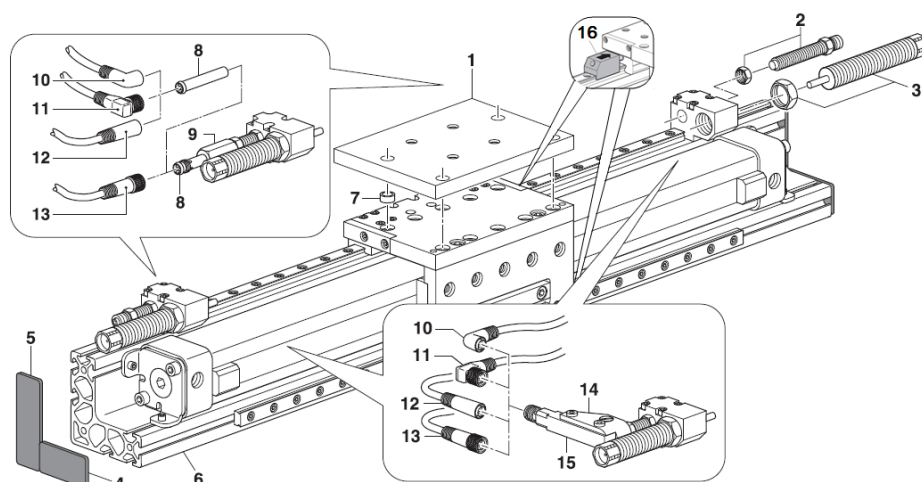


Fig. 14 Accessories PMP version 01

## 5.5.2 PMP Version 02

Item	Article	Order no. (→Catalogue)
1	Stop slide	
2	Shock absorber SD 14x1-1 and SD 14x1-2	
3	Initiator INI d6.5x35-Sn1.5-PNP-close-M8x1	
4	Initiator holder	
5	Intermediate stop	
6	End stop	
7	Centering bushing	
8	Connecting plates	
9	Cover cap 40x40 mm	
10	Cover cap 40x80 mm	
11	Angle profile	
12	Fine adjustment	
13	Proximity switch for intermediate stop	
14	Lubrication adapter	

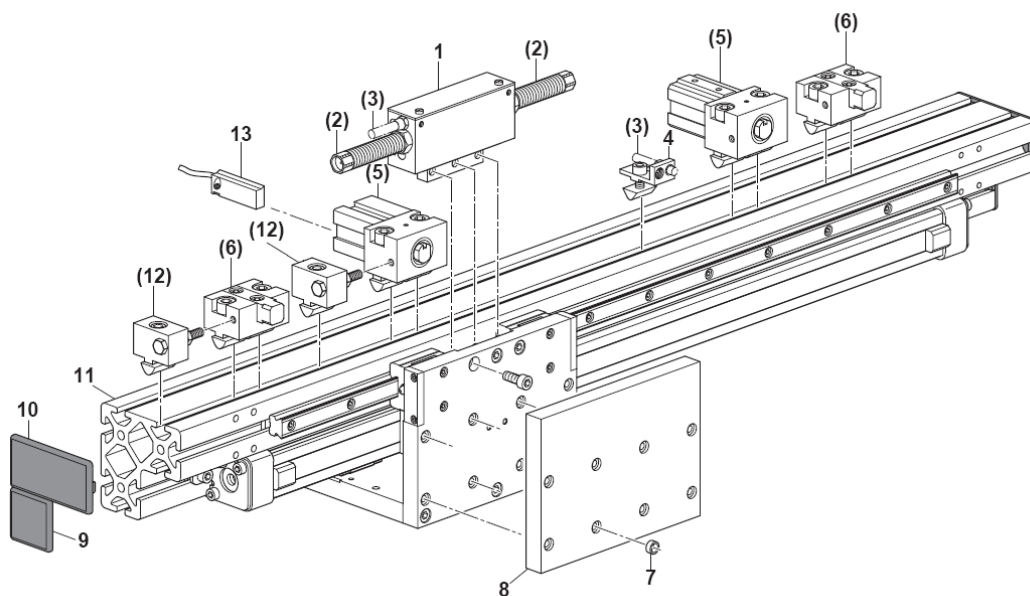


Fig. 15 Accessories PMP version 02

### 5.5.3 PMP-c Version 01

Item	Article	Order no. (→ Catalogue)
1	Connecting plates	
2	Stop screws AS 08/40	
3	Shock absorber SD 14x1-1 and SD 14x1-2	
4	Cover cap 20x40 mm	
5	Cover cap 20x60 mm	
6	Angle profile	
7	Centering bushing	
8	Initiator IH Ø 6.5 mm	
9	Initiator holder IH Ø 6.5 mm	
10	Angle plug (pluggable)	
11	Angle plug (screwable)	
12	Plug straight (pluggable)	
13	Connector straight (screwable)	
14	Proximity switch holder IH 8x8 mm	
15	Initiator 8x8 mm	
16	Lubrication adapter	

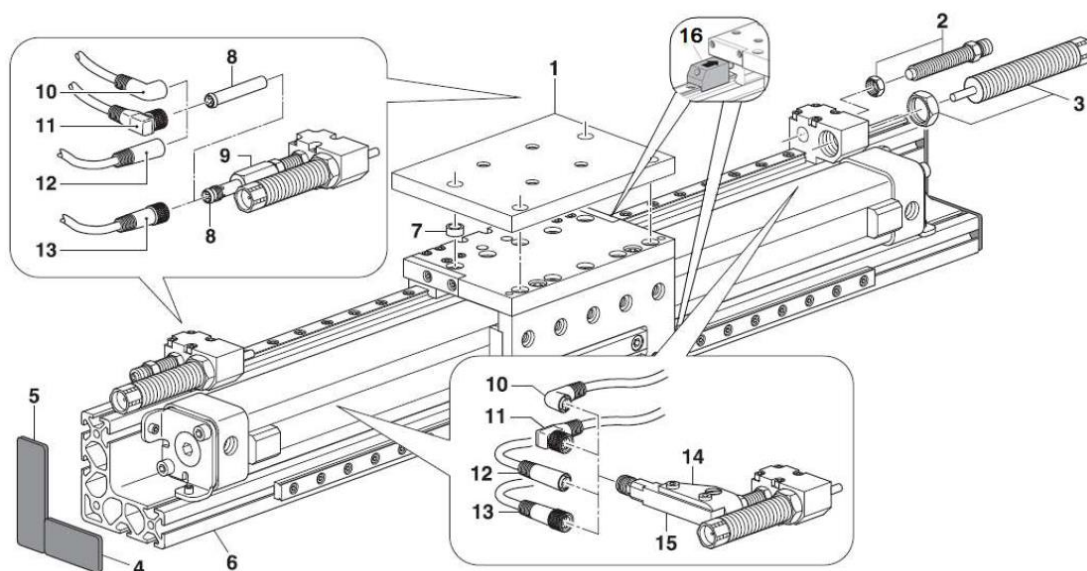


Fig. 16 Accessories PMP-c version 01

## 5.5.4 PMP-c Version 02

Item	Article	Order no. (→Catalogue)
1	Stop slide	
2	Shock absorber SD 14x1-1 and SD 14x1-2	
3	Initiators IH Ø 6.5 mm	
4	Intermediate stop	
5	End stop	
6	Fine adjustment	
7	Proximity switch for intermediate stop	
8	Connecting plates	
9	Centering bushing	
10	Cover cap 20x40 mm	
11	Cover cap 20x60 mm	
12	Angle profile	
13	Lubrication adapter	

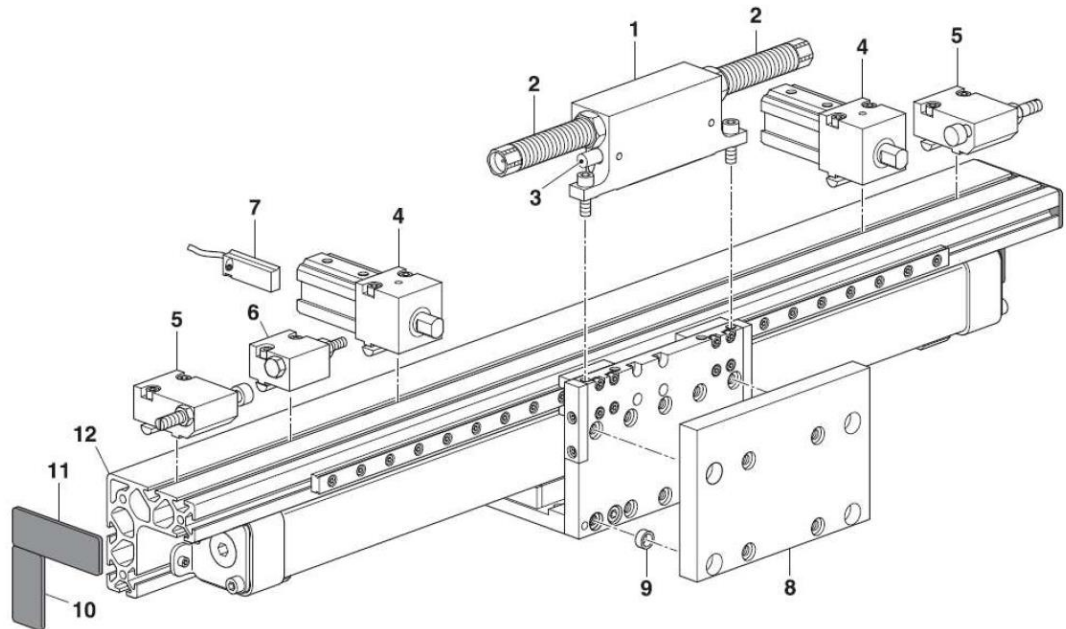


Fig. 17 Accessories PMP-c version 02

## 6 Installation, assembly and setting

This chapter contains specific safety instructions and information regarding proper installation, assembly and setting of the gantry modules including their connection to the control unit and the pneumatic system.

### 6.1 Safety Instructions for Installation and assembly

#### CAUTION



##### **Danger of injury when connecting the module to the control unit and the compressed-air system!**

When connecting the gantry modules to the control unit or the compressed-air system sudden, unpredictable movements may occur which can cause personal injury or property damage.

- Installation may only be carried out by a qualified specialist!
- Read carefully the assembly and safety instructions before working with or on the gantry module.

#### CAUTION



##### **Danger of injury when handling the gantry modules!**

Careless handling of the module can cause personal injuries and damage to the gantry modules.

- Only qualified personnel may work with or on the module!
- Observe the assembly instructions!

#### WARNING



##### **Danger of injury due to uncontrolled movement of the equipment!**

Uncontrolled movements of parts can cause injury to third parties and damage to property.

- Ensure that there are no persons in the working area of the gantry modules.

#### NOTICE

No liability can be assumed for damages caused by improper installation/assembling work on the gantry modules by the operator.



Also observe the safety instructions in ↻ chap. 2 „Safety instructions“ in this manual.

## 6.2 Installation and assembly

### 6.2.1 Assembly & attachment



The PMP/PMP-c modules were only designed for use in a horizontal position and may only be operated in this position!

Fixing is carried out directly in the profile grooves or with a component from the AFAG range. The AFAG range can be found in the technical catalogue under "Accessories".

#### Attachment options:

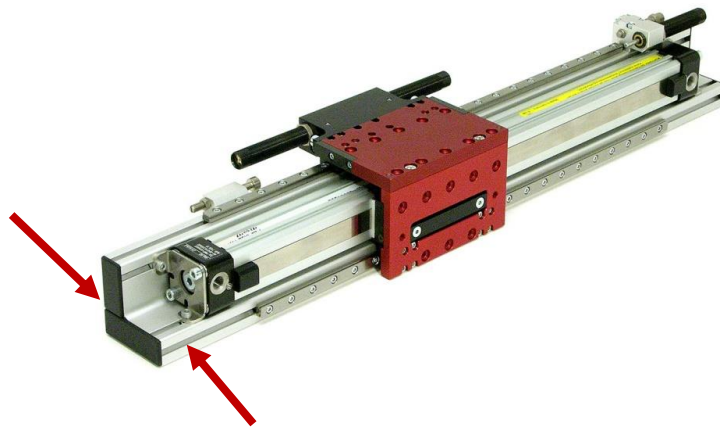


Fig. 18 Fastening to the profile

#### Possible installation suggestions:

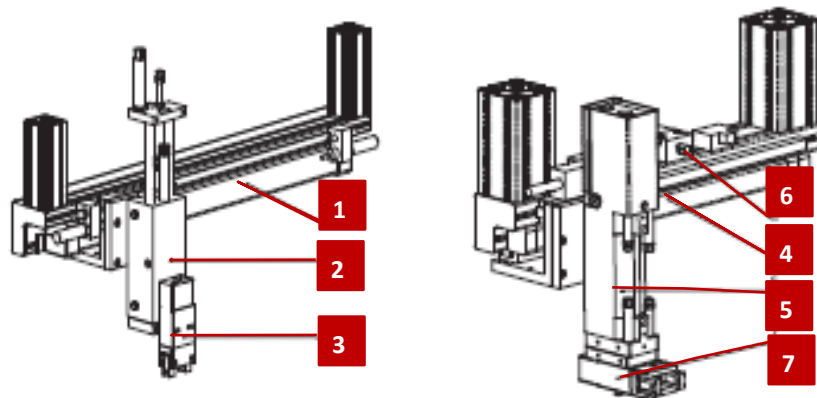


Fig. 19 Installation suggestions

- |             |                      |
|-------------|----------------------|
| 1. PMP-c    | 5. LM 32/100         |
| 2. LM 20/90 | 6. Intermediate stop |
| 3. GMQ 20/K | 7. GMQ 32/K          |
| 4. PMP      |                      |



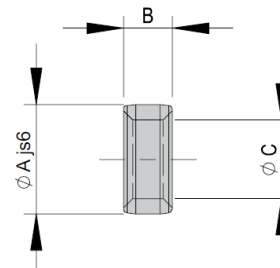
## Centering bushing and hole grid



To position the modules, insert the centring sleeves supplied (⇒ chap. 5.5 "Accessories") in two diagonally opposite holes.

	PMP / PMP-c
Hole grid	48 x 48 mm
Thread/Bore	M6
Centering bushing (H7)	Ø 9 x 4 mm

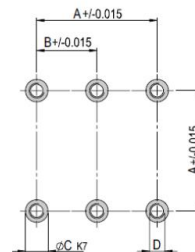
Centering bushings	Ø4x2	Ø5x2.5	Ø7x3	Ø8x3.5	Ø9x4	Ø12x4.8	Ø19x5.8
Order number	50332257	50035831	11016850	50263565	11004942	50187424	50189497
Net weight	0.001 kg	0.001 kg	0.001 kg	0.001 kg	0.001 kg	0.002 kg	0.006 kg
A	4 mm	5 mm	7 mm	8 mm	9 mm	12 mm	19 mm
B	2 mm	2.5 mm	3 mm	3.5 mm	4 mm	4.8 mm	5.8 mm
C	2.6 mm	3.2 mm	4.3 mm	5.4 mm	6.5 mm	8.5 mm	13 mm



Attachment grid	16x16 mm	20x20 mm	30x30 mm	38x38 mm	48x48 mm	60x60 mm	75x75 mm	96x96 mm
A	16 mm	20 mm	30 mm	38 mm	48 mm	60 mm	75 mm	96 mm
B	8 mm	10 mm	15 mm	19 mm	24 mm	30 mm	38 mm	48 mm
C	4x1.1 mm	5x1.3 mm	7x1.6 mm	8x1.8 mm	9x2.1 mm	12x2.5 mm	15x2.7 mm	19x3 mm
D	M2.5	M3	M4	M5	M6	M8	M10	M12

### Module-centering, centering bushings

In order to guarantee a high and repetitive fit accuracy during installation, operation or replacement of a module, all components of the entire program are consequently provided with a precise module centering. Centering bushings or pins are supplied as standard with each module.



## 6.2.2 Tightening torques for screws

Use screws with the following minimum specifications for mounting:

Standard	VDI 2230
Screw strength	Category 8.8
Surface:	Galvanized blue, oiled or greased

Thread	Tightening torque
M3	1.1 ... 1.4 Nm
M4	2.6 ... 3.3 Nm
M5	5.2 ... 6.5 Nm
M6	9.0 ... 11.3 Nm
M8	21.6 ... 27.3 Nm

## 6.3 Setting the PMP/PMP-c modules

### 6.3.1 PMP/PMP-c Version 01

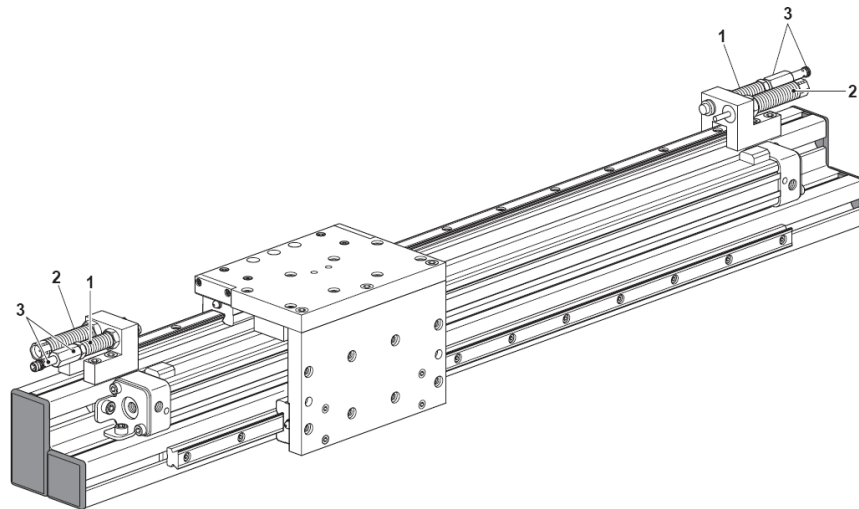


Fig. 20 Adjustment of stop screws PMP version 01

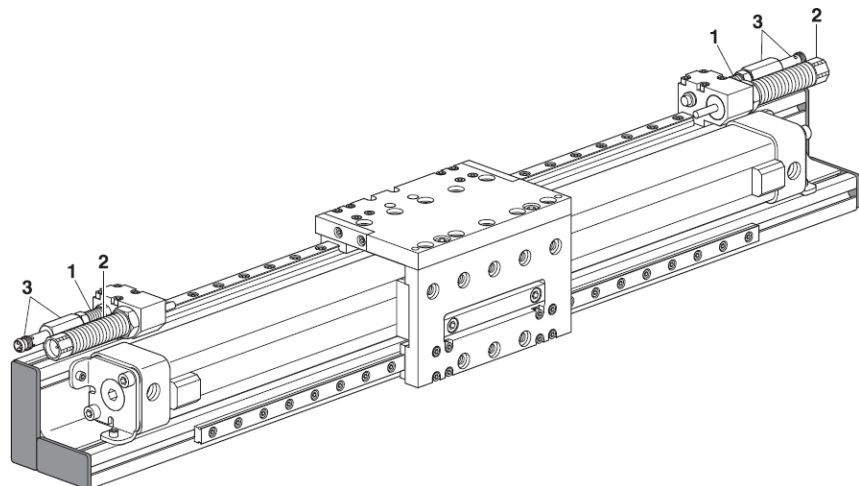


Fig. 21 Adjustment of stop screws PMP-c version 01

1. Stop screws
2. Shock absorber
3. Initiators

#### Procedure for setting the PMP/PMP-c version 01:

1. Install PMP/PMP-c mechanically.
  2. Install valves and throttle valves according to the pneumatic diagram.
  3. Adjust the stroke length using the stop screws (Fig. 20, 1) (⇒ chap. 6.6).
  4. Adjust the shock absorber (Fig. 20, 2) (⇒ chap. 6.7).
  5. Mount the proximity switches (Fig. 20, 3) (⇒ chap. 6.8).
- ⇒ The process is complete.

### 6.3.2 PMP/PMP-c Version 02

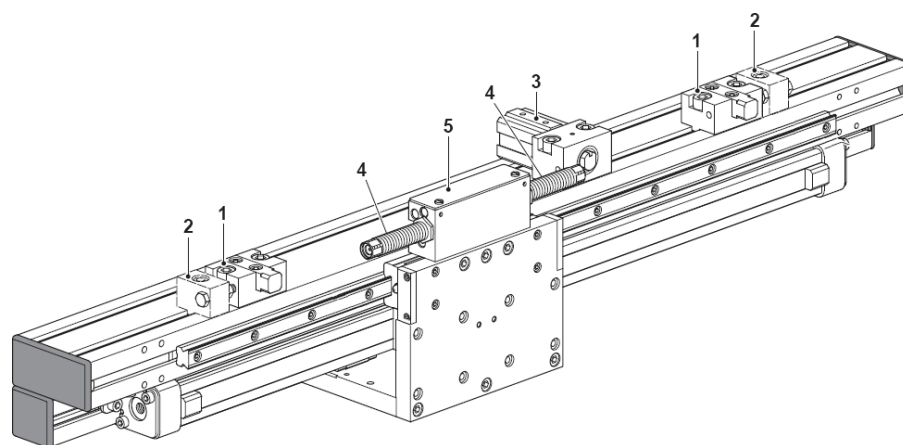


Fig. 22 Adjustment of stop screws PMP version 02

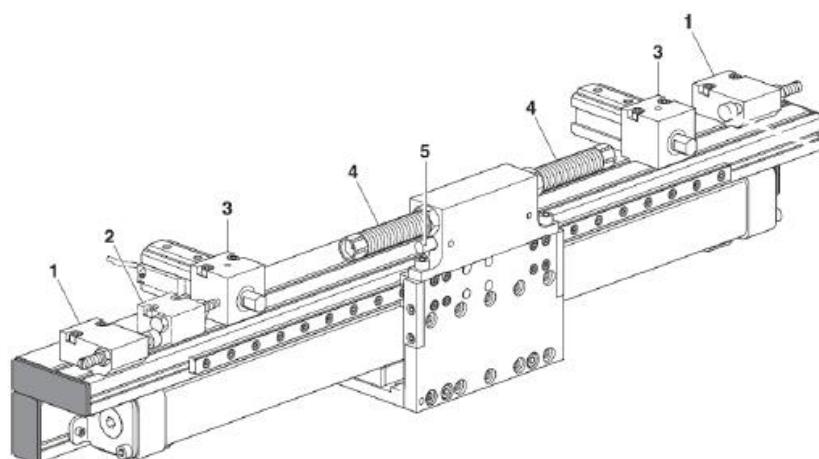


Fig. 23 Adjustment of stop screws PMP-c version 02

- |                       |                   |
|-----------------------|-------------------|
| 1. End stops          | 4. Shock absorber |
| 2. Fine adjustment    | 5. Initiators     |
| 3. Intermediate stops |                   |

#### Procedure for setting the PMP/PMP-c version 02:

1. Install PMP/PMP-c mechanically.
  2. Install valves and throttle valves according to the pneumatic diagram.
  3. Adjust the stroke length using the end stops (Fig. 23, 1) and, if necessary, the fine adjustment (Fig. 23, 2).
  4. Adjust the intermediate stops (Fig. 23, 3).
  5. Adjust the shock absorber (Fig. 23, 2) (⇒ chap. 6.7).
  6. Mount the proximity switches (Fig. 23, 3) (⇒ chap. 6.8)
- ⇒ The process is complete.

## 6.4 Connection to the pneumatic system

### WARNING



#### Danger when connecting to pneumatics!

The pneumatic system may present hazards (e.g., unexpected movement) if work is carried out incorrectly, which may result in serious injury or damage to property.

- Only qualified personnel may work with or on the pneumatic system!
- The required protective equipment shall be provided and used.

### NOTICE

#### Functional impairment to leaking compressed air connections!

Unused air connections that are not hermetically sealed lead to a pressure loss and thus to functional impairment.

- Before installing the module in a system, all unused compressed air connections must hermetically sealed.

### NOTICE

#### Risk of damage to property!

The operation of the gantry modules with oil-lubricated compressed air causes the factory primary lubrication to be washed out.

- Once the modules have been operated with oil-lubricated compressed air, they **may never** be operated without oil-lubricated compressed air.



The minimum compressed air quality shall comply with the specifications of ISO 8573-1:2010.

### 6.4.1 Pneumatic diagram PMP/PMP-c Version 01

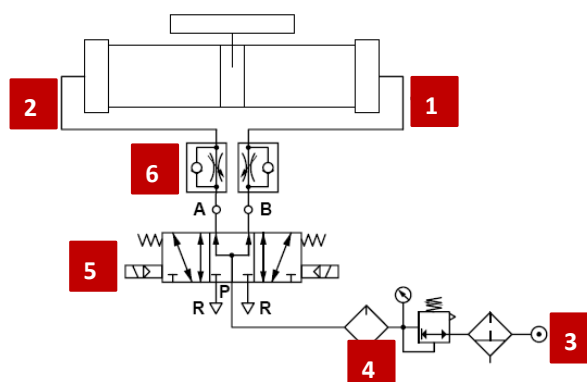


Fig. 24 Pneumatic circuit diagram PMP/PMP-c Version 01

- |                                 |                     |
|---------------------------------|---------------------|
| 1. Rear air connection (G1/8")  | 4. Maintenance unit |
| 2. Front air connection (G1/8") | 5. 5/3 Way-valve    |
| 3. Air supply                   | 6. Throttle valve   |

### 6.4.2 Pneumatic diagram PMP / PMP-c Version 02

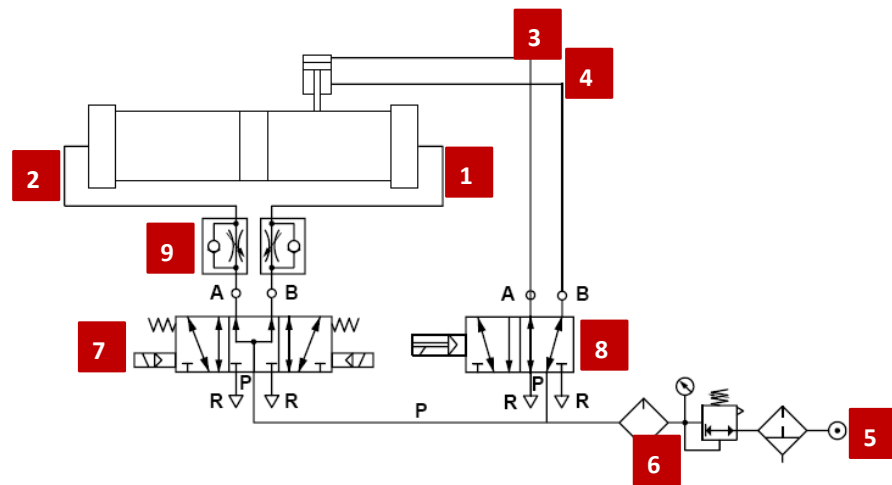


Fig. 25 Pneumatic circuit diagram PMP/PMP-c Version 02

- |  |                     |
|--|---------------------|
| 1. Compressed air connection rear (G1//8")       | 6. Maintenance unit |
| 2. Compressed air connection front (G1//8")      | 7. 5/3 Way-valve    |
| 3. Rear air connection intermediate position M5  | 8. 5/2 Way-valve    |
| 4. Front air connection intermediate position M5 | 9. Throttle valve   |
| 5. Compressed air supply                         |                     |

## 6.5 Installation of intermediate stops

### 6.5.1 Gantry module PMP

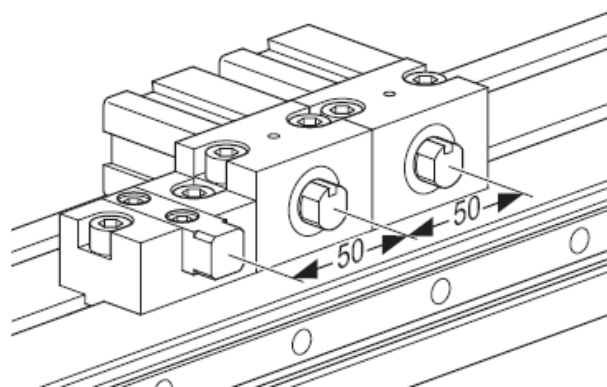


Fig. 26 Pneumatic circuit diagram PMP



When using several intermediate stops, a **minimum grid of 50 mm** must be provided.

If the pneumatic cylinders are detected with magnetic switches, a **minimum distance of 60 mm** is necessary!

### 6.5.2 Gantry module PMP-c

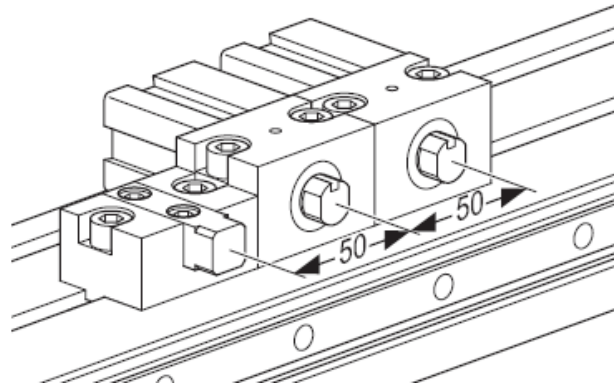


Fig. 27 Pneumatic circuit diagram PMP-c



When using several intermediate stops, a **minimum grid of 30 mm** must be provided.

If the pneumatic cylinders are detected with magnetic switches, a **minimum distance of 40 mm** is necessary!

### 6.5.3 Installation magnetic switch to intermediate stop

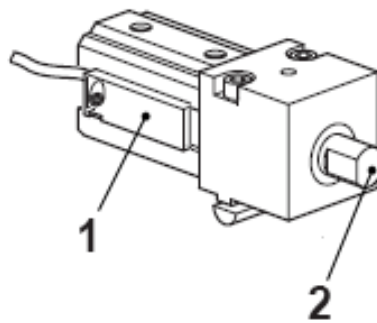


Fig. 28 Magnetic switch of intermediate stop

#### Procedure for installing the magnetic switch:

1. Push the magnetic switch (Fig. 28, 1) into the slot.
  2. Position the intermediate stop (Fig. 28, 2) in the working position.
  3. Move magnetic switch (Fig. 28, 1) and search for activation threshold (LED).
  4. Tighten the magnetic switch (Fig. 28, 1).
  5. Carry out function check.
- ⇒ Commissioning is completed.

## 6.6 Adjustment of stop screws (AS 12/60)

This chapter contains information on adjusting the stop screws (➔ chap. 5.5 „Accessories“). The stop screws AS 12/60 can be combined with a holder and an initiator for end position sensing.

### Gantry modules PMP and PMP-c

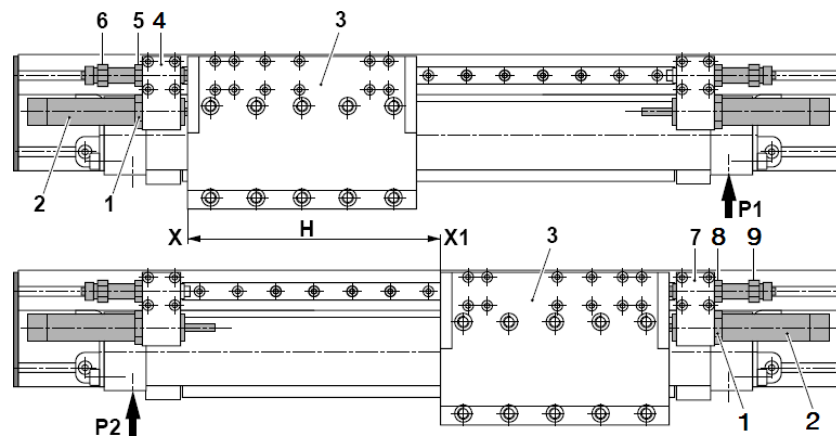


Fig. 29 Adjustment of stop screws PMP

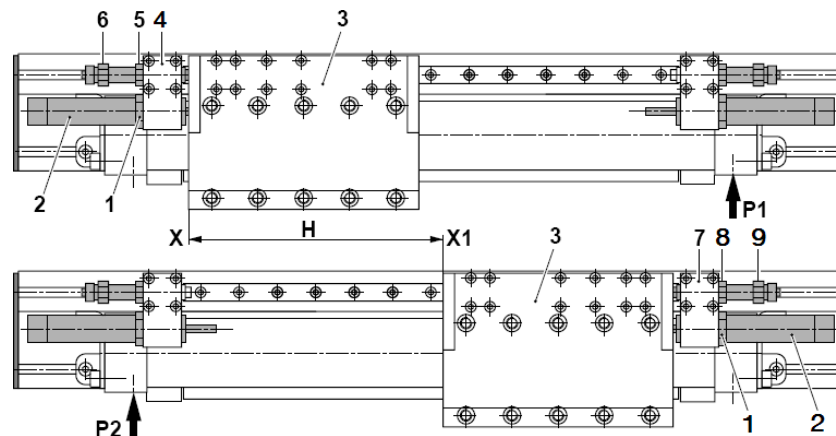


Fig. 30 Adjustment of stop screws PMP-c

- |                   |               |
|-------------------|---------------|
| 1. Lock nut       | 6. Stop screw |
| 2. Shock absorber | 7. End stop   |
| 3. Slide          | 8. Lock nut   |
| 4. End stop       | 9. Stop screw |
| 5. Lock nut       |               |



The assembly procedure is identical for the module PMP and PMP-c version 01 and 02!

**Procedure for setting the stop screws:**

1. Loosen the lock nut (Fig. 30, 1) and unscrew the shock absorber (Fig. 30, 2) by counterclockwise turns.
2. Apply compressed air to P1.
  - The slide (Fig. 30, 3) of the module moves to the limit by the end stop (Fig. 30, 4).
3. Loosen lock nut (Fig. 30, 5).
4. Determine the rear position X by turning the stop screw (Fig. 30, 6).
5. Secure lock nut (Fig. 30, 5).
  - 1 turn = 1 mm
6. Apply compressed air at P2.
  - The slide (Fig. 30, 3) of the PMP moves up to the limit by the end stop (Fig. 30, 7).
7. Loosen lock nut (Fig. 30, 8).
8. Determine the front position X1 by turning the stop screw (Fig. 30, 9).
9. Secure lock nut (Fig. 30, 8).
  - ⇒ Setting of the stop screws position is completed.

## 6.7 Adjustment of the shock absorber

This chapter contains information on adjusting the shock absorbers (➔ chap. 5.5 „Accessories“).

### 6.7.1 Safety notes for settings

#### CAUTION

##### **Danger arising from work carried out improperly!**

Improper adjustment work can cause injuries and damage to property.

- Adjustment and conversion work may only be carried out by qualified personnel!
- When working on the modules, make sure that the control unit and the pneumatic system are switched off and secured against being switched on again.





### 6.7.2 Shock absorber adjustment (SD 14x1-1)

The stroke movement  $H$  is braked in the end positions against the stop screws with the AFAG shock absorbers SD 14x1-1 to ensure a smooth movement sequence.

#### NOTICE

##### Material damage to the shock absorbers due to incorrect use!

Do not use shock absorbers as a stop, as they can be damaged. The stroke "H" must be limited by the stop screws!

- Only use stop screws to limit the stroke!

#### Gantry modules PMP and PMP-c

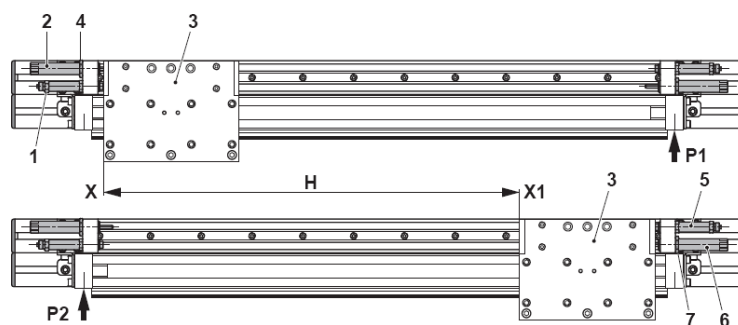


Fig. 31 Adjustment of shock absorber PMP

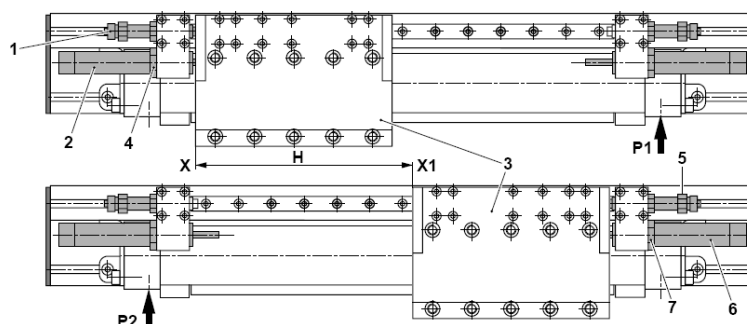


Fig. 32 Adjustment of shock absorber PMP-c

- |                   |                   |
|-------------------|-------------------|
| 1. Stop screw     | 5. Stop screw     |
| 2. Shock absorber | 6. Shock absorber |
| 3. Slide          | 7. Lock nut       |
| 4. Lock nut       |                   |



The assembly procedure is identical for the module PMP and PMP-c version 01 and Issue 02!

**Procedure for adjusting the shock absorbers:**

1. Apply compressed air at P1.
  - The slide (Fig. 32, 3) of the module moves to the limit by the stop screw (Fig. 32, 1) in position X.
2. Screw in the shock absorber (Fig. 32, 2) clockwise.
  - The damper pin is pressed into the damper until the slide (Fig. 32, 3) starts to move.
3. Now unscrew the shock absorber (Fig. 32, 2) counterclockwise two turns and secure it with the lock nut (Fig. 32, 4).
  - 1 turn = 1 mm
4. Apply compressed air at P2.
  - The slide (Fig. 32, 3) of the module moves to the limit by the stop screw (Fig. 32, 5) in position X1.
5. Repeat steps 2 and 3 with shock absorber (Fig. 32, 6).
6. Secure shock absorber with lock nut (Fig. 32, 7).
  - ⇒ Setting of the shock absorbers are completed.

**6.8 Installation of the initiator (sensors)**

Plug-in/screwable  $\varnothing 6.5$  mm (Fig. 33, 1) or 8x8 mm (Fig. 33, 2) initiators with holder (Fig. 33, 3) are used for end position detection of the PMP.

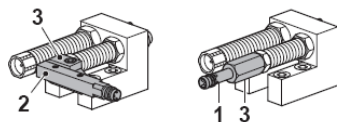


Fig. 33 Initiators for end position sensing

Depending on the controller type, the switching type PNP or NPN must be determined. A LED on the initiator is used for function monitoring during end position monitoring. If the LED does not change its switching state during end position monitoring, the Initiator is defective and must be replaced (➔chap. 8.3)!



The  $\varnothing 6,5$  mm and 8x8 mm proximity switches can only be used with the stop screws of the AS series.



The initiators and holders are not included in the scope of delivery of the PMP module!

**Technical data initiators**

Operating voltage range	10 – 30 VDC
Switching distance	2mm
Short circuit and reverse polarity protected	Yes

### 6.8.1 Proximity switches Ø6.5 mm - for PMP/PMP-c version 01

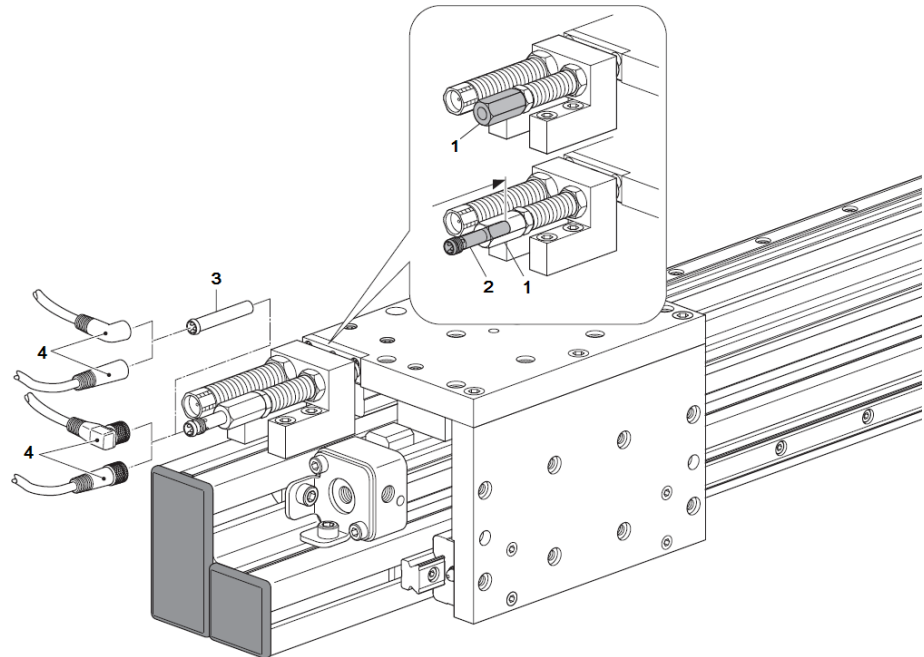


Fig. 34 Installation of initiator Ø6.5 mm in PMP version 01

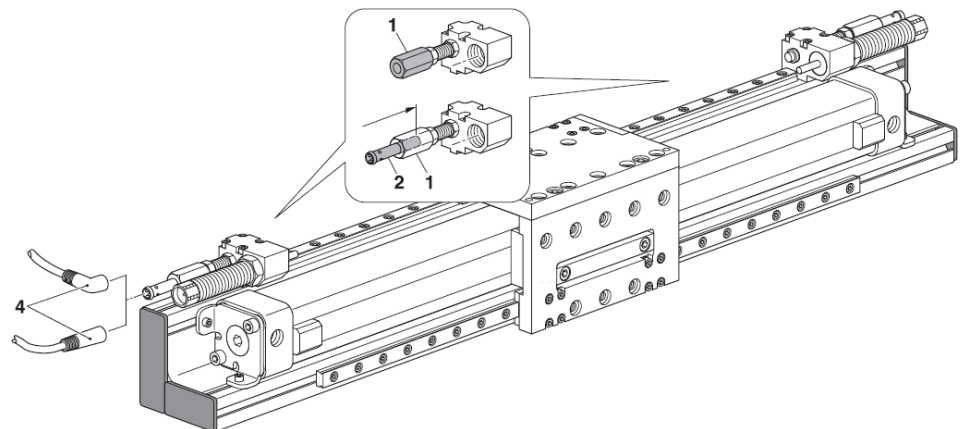


Fig. 35 Installation of initiator Ø6.5 mm in PMP-c version 01

- |                     |              |
|---------------------|--------------|
| 1. Initiator holder | 3. Initiator |
| 2. Initiator        | 4. Connector |

#### Mounting the initiator - D 6.5 mm Version 01

Proceed as follows to install the initiator:

1. Screw the initiator holder (Fig. 35, 1) onto the stop screw.
2. Insert the initiator (Fig. 35, 2+3) into initiator holder as far as it will go.
3. Slightly tighten the initiator holder (Fig. 35, 1).
4. Mount the connector (Fig. 35, 4).
5. Carry out function check.
  - ⇒ The initiator is mounted.

### 6.8.2 Initiator Ø6.5 mm Version 02

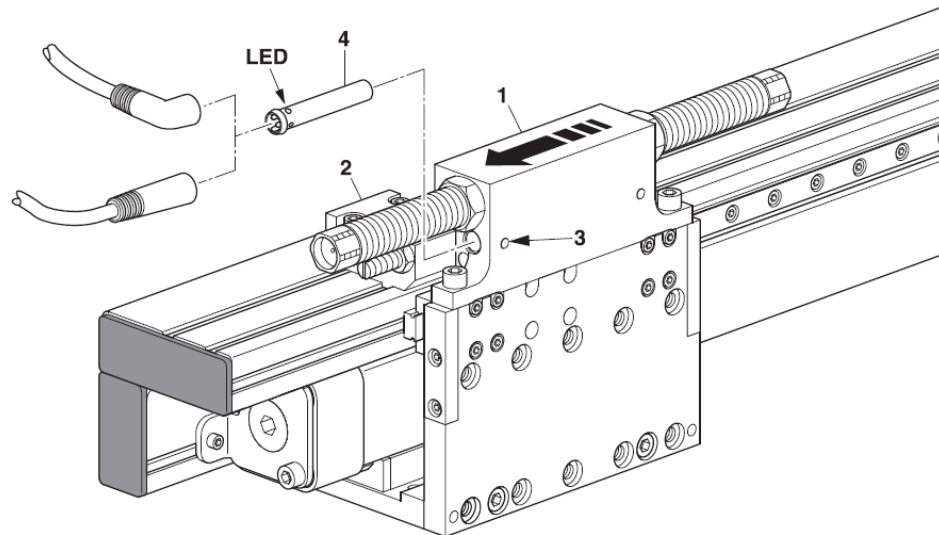


Fig. 36 Installation of initiator Ø6.5 mm in PMP/PMP-c version 02

- |                 |              |
|-----------------|--------------|
| 1. Slide        | 3. Screw     |
| 2. End position | 4. Initiator |

#### Mounting the initiator - D 6.5 mm Version 02

Proceed as follows to install the initiator:

1. Move the carriage (Fig. 36, 1) to the end position (Fig. 36, 2)
  2. Loosen screw (Fig. 36, 3).
  3. Push the initiator (Fig. 36, 4) into the box until it is activated (LED).
  4. Tighten the screw (Fig. 36, 3).
  5. Mount the opposite initiator in the same way.
- ⇒ The initiator is mounted.

### 6.8.3 Initiator 8x8 mm

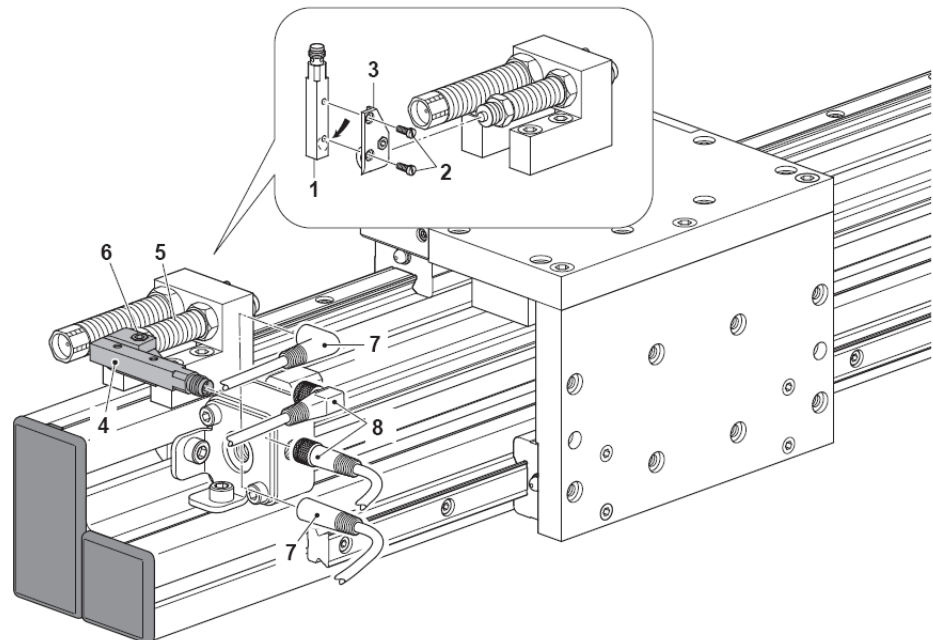


Fig. 37 Installation of initiator 8x8 mm in PMP/PMP-c

- |                     |               |
|---------------------|---------------|
| 1. Initiator        | 5. Stop screw |
| 2. Screws           | 6. Screw      |
| 3. Initiator holder | 7. Connector  |
| 4. Initiator        | 8. Connector  |

#### Mounting the proximity switches 8x8 mm

Proceed as follows to install the initiator:

1. Screw the initiator (Fig. 37, 1) onto the initiator holder (Fig. 37, 3) with screws (Fig. 37, 2).
  - The switching point of the initiator must cover the hole of the initiator holder (see arrow)!
2. Push the initiator holder with initiator (Fig. 37, 4) onto the stop screw (Fig. 37, 5) as far as it will go and clamp it with the screw (Fig. 37, 6).
3. Mount the connector (Fig. 37, 7 +8).
4. Carry out function check.
  - ⇒ The initiator is mounted.

### 6.8.4 Option - Initiator for slide control

With the slide control, the slide position can be additionally controlled in the intermediate position.

#### Mounting of the initiator for the slide position control



The assembly procedure is identical for PMP and PMP-c version 01 and 02!

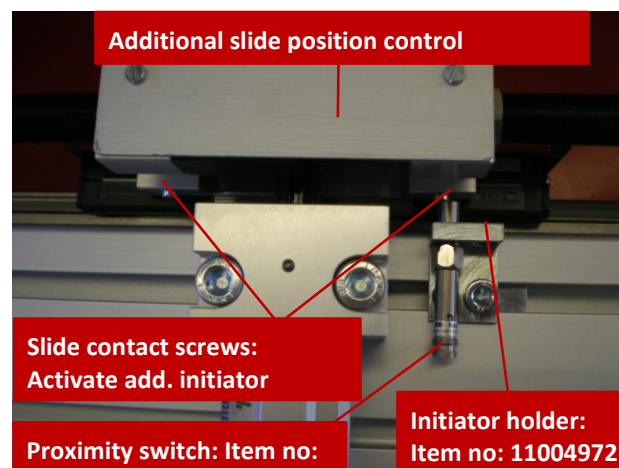
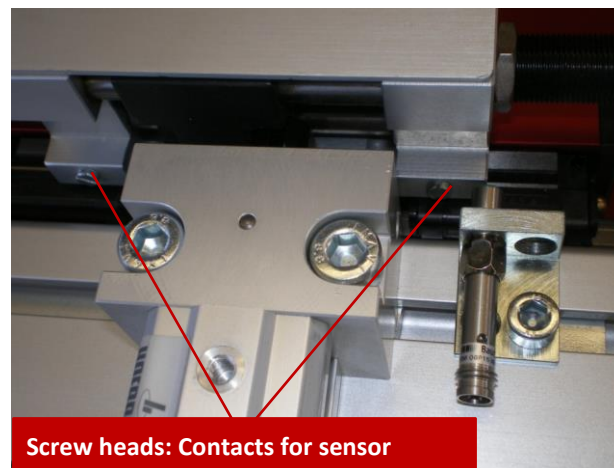


Fig. 38 Installation of initiator for carriage control

## 7 Commissioning

This chapter contains information on how to commission the gantry modules.

After connection to the pneumatic system and mounting of the sensors, the gantry modules are commissioned for the first time via the system control.

### 7.1 Safety instructions for commissioning

#### CAUTION



##### **Danger of injury by moving components!**

Limbs can be crushed by moving components!

- Work on and with the gantry modules may only be carried out by qualified personnel.
- Make sure that there are no persons or tools in the working area of the rotary modules.

#### CAUTION



##### **Danger of injury in the working area of the gantry modules!**

During operation of the gantry modules, persons within the working area of the modules may be injured.

- When operating the gantry modules, ensure a good overview of the entire working area.
- Unauthorized persons must not stay within the working area during operation.

#### NOTICE

##### **Material damage due to operation without shock absorbers!**

Operation of the gantry modules without shock absorbers leads to mechanical damage and loss of warranty.

- Always operate the gantry modules with shock absorbers!



Also observe the safety instructions in ➔ chap. 2 „Safety instructions“ in this manual.

## 7.2 Commissioning of the modules



Before commissioning, first adjust the stop screws so that the traverse path. Then adjust the sensors.

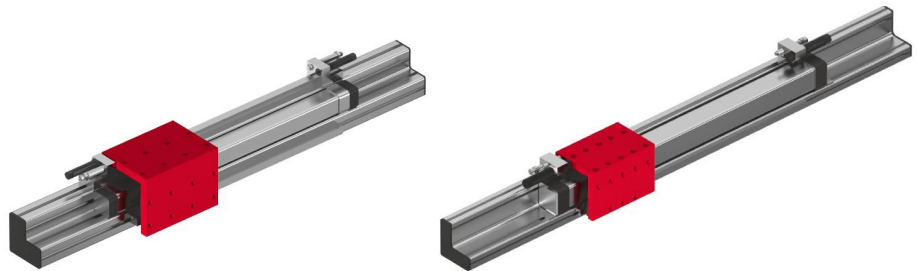


Fig. 39 Commissioning the gantry module

Proceed carefully and follow the instructions step by step when commissioning the modules for the first time:

1. Switch on compressed air and system control.
  2. Note the permissible values of the module → chap. 3 for:
    - Payload.
    - Movement frequency.
    - mechanical stress.
  3. Make sure that there are no persons or tools within the working area of the module.
  4. Perform test run:
    - Start with slow traversing movements.
    - Then continue under normal operating conditions.
- ⇒ Commissioning is completed.



## 8 Fault elimination

### 8.1 General Notes

This chapter contains general information and safety instructions for troubleshooting.

### 8.2 Safety instructions for troubleshooting

#### WARNING

---



##### **Danger of injury due to improper work!**

Poorly performed troubleshooting work can lead to serious injuries and damage to property.

- The operator shall ensure that only trained and skilled personnel are assigned to carry out the activities.
- 

#### CAUTION

---



Risk of injury due to uncontrolled movements of the compact slides!

Signals from the control system can trigger unintentional movements of the modules, which can cause injury.

- Before starting any work on the module, switch off the control unit and secure to prevent it from being switched on.
  - Depressurise the PMP module!
- 



Also observe the safety instructions in ➔ chap. 2 „Safety instructions“ in this manual.

---

### 8.3 Table troubleshooting

The following table contains an overview of possible fault causes and how to proceed to eliminate them. Defective components must be replaced exclusively by Afag original spare parts.

<b>Fault</b>	<b>Possible cause</b>	<b>Remedy:</b>
Module does not move	<ul style="list-style-type: none"> <li>▪ No compressed air</li> <li>▪ Pneumatic connection incorrect</li> <li>▪ Cylinder defective</li> <li>▪ Carriage defective</li> <li>▪ Controller error</li> </ul>	<ul style="list-style-type: none"> <li>▪ Check compressed air connections</li> <li>▪ Check pneumatic connections</li> <li>▪ Replace cylinder (➔8.3.1)</li> <li>▪ Replace carriage and guide rail (➔8.3.2)</li> <li>▪ Check the error message on the controller</li> </ul>
End position no signal	<ul style="list-style-type: none"> <li>▪ Limit stop screw incorrectly adjusted</li> <li>▪ Initiator with holder mounted inaccurately to stop screw</li> <li>▪ Initiator defect</li> <li>▪ Cable break in the initiator cable</li> </ul>	<ul style="list-style-type: none"> <li>▪ Readjust the stop screw</li> <li>▪ Adjust the initiator holder exactly to the stop screw</li> <li>▪ Replace initiator</li> <li>▪ Replacing the initiator cable</li> </ul>
Slide hits the end positions	<ul style="list-style-type: none"> <li>▪ Shock absorber incorrect adjust.</li> <li>▪ Shock absorber defective</li> <li>▪ Exhaust air throttles defective</li> <li>▪ No shock absorber available</li> <li>▪ Lifting speed too high</li> </ul>	<ul style="list-style-type: none"> <li>▪ Readjust shock absorber</li> <li>▪ Replace shock absorber</li> <li>▪ Replace exhaust air throttle</li> <li>▪ Retrofitting of shock absorber</li> <li>▪ Adjust exhaust air throttle</li> </ul>
Payload hits the end positions	<ul style="list-style-type: none"> <li>▪ Lifting speed too high</li> <li>▪ Not optimal damping</li> <li>▪ Unfavourable installation position</li> </ul>	<ul style="list-style-type: none"> <li>▪ Adjust exhaust air throttle</li> <li>▪ Optimise damper type, stroke</li> <li>▪ Adaptation of the construction</li> </ul>
Carriage runs unevenly/ too slowly or noisily	<ul style="list-style-type: none"> <li>▪ Cylinder defective</li> <li>▪ Supply air throttled</li> <li>▪ Carriage defective</li> <li>▪ Incorrect assembly, insufficient angular accuracy, torsional load, heavy soiling, missing or insufficient lubrication</li> </ul>	<ul style="list-style-type: none"> <li>▪ Replace cylinder</li> <li>▪ Throttle exhaust air (instead of supply air)</li> <li>▪ Replace carriage and guide rail</li> <li>▪ Determine cause of malfunction and take appropriate measures</li> </ul>

## 9 Maintenance and repair

### 9.1 General notes

The gantry modules are almost maintenance-free. Nevertheless, some maintenance work must be carried out to ensure an optimum operating condition of the gantry module. This chapter describes the required maintenance activities.



Each Module is accompanied by a safety information sheet. This information sheet must be read carefully by every person who carries out work on and with the module.

### 9.2 Safety instructions for Maintenance and Repair

#### WARNING



#### Danger of injury due to improper maintenance!

Improperly carried out maintenance activities can cause considerable damage to property and serious injury.

- The operator shall ensure that only trained maintenance personnel are used to carry out the activities.
- Always wear personal protective equipment when carrying out maintenance and repair work!

#### WARNING



Risk of injury due to uncontrolled movements of the compact slides!

Signals from the controller can trigger unintentional movements of the modules, which can cause injuries and property damage.

- Before starting any work on the the module, switch off the controller unit and secure it to prevent it from being switched on. Observe the operating instructions of the controller used!
- Before starting any activities, switch off the media supply (pneumatics) and secure it from being switched on again!



Also observe the safety instructions in  chap. 2 „Safety instructions“ in this manual.

### 9.3 Maintenance activities and maintenance intervals

#### 9.3.1 Overview of the maintenance points

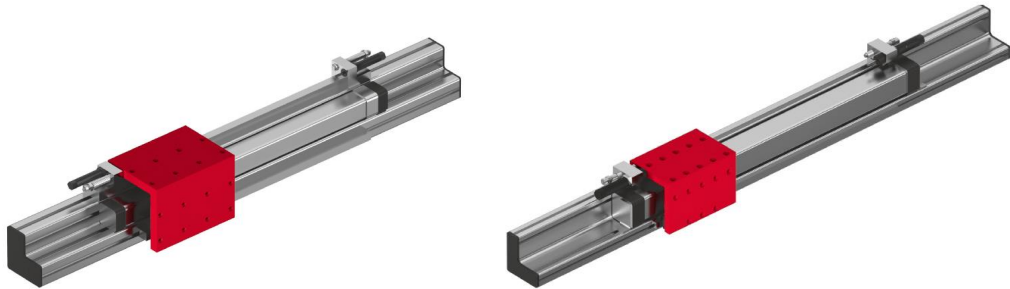







Fig. 40 Maintenance points Gantry module (PMP and PMP-c)

No.	Maintenance point	Maintenance work	Interval	System [On/Off]	Remarks
1	Gantry module	Cleaning 	Regularly	[Off]	Check for dirt particles and solids  <ul style="list-style-type: none"> <li>▪ Clean the module with a dry, lint-free cloth.</li> <li>- do not spray with water</li> <li>- Do not use aggressive cleaning agents.</li> </ul>
2	Shock absorber*	Check functioning 	Monthly	[On]	<ul style="list-style-type: none"> <li>▪ Check function of shock absorbers, replace if necessary</li> <li>▪ replacing after max. 5 million load cycles</li> </ul>
3	Gantry module	Check 	Monthly	[On]	-  <ul style="list-style-type: none"> <li>▪ Acoustic control for unusual noise generation</li> </ul>
4	Carriages and guides	Lubricating 	 Reference values	[Off]	<ul style="list-style-type: none"> <li>▪ Guide values for normal applications: <ul style="list-style-type: none"> <li>- Grease lubricat.: 2.000 to 20.000 km traverse distance</li> <li>- Oil lubrication: 1.000 to 5.000 km traverse distance</li> </ul> </li> </ul>



Incorrectly adjusted, missing or defective shock absorbers impair the function of the module and can lead to its destruction!

\*Shock absorbers and stop screws must be checked regularly for correct function and replaced if necessary. We recommend replacing the shock absorbers after max. 5 million load cycles.

### 9.3.2 Lubrication of the ball bearing carriages

The carriages must be relubricated at regular intervals. Both grease and oil lubrication are possible.



Lubrication sets for the guides are available as accessories (➔ chap. 5.5 "Accessories").

The relubrication interval in operating hours can be determined as follows:

$$\text{Nachschmie Interval [Betriebsstunden]} = \frac{\text{Laufweg [m]} \times \text{Taktzeit [s]}}{\text{Hub [m]} \times 7.200 \text{ s/h}}$$

#### Calculation example:

Relubrication interval (h) = 2.000.000 [m] x 10 [s] / (1 m x 7.200 s/h) = 2778 h

#### Guide values for normal applications:

- Grease lubrication: 2.000 to 20.000 km traverse distance
- Oil lubrication: 1.000 to 5.000 km traverse distance



Shorter lubrication intervals are to be provided for:

- High speed
- Temperatures above 25°C
- Short strokes

#### Quantities grease lubrication

Lubrication quantity	Grease lubrication
Initial lubrication	0.5 cm <sup>3</sup>
Relubrication	0.3 cm <sup>3</sup>
Grease recommended	AFB Grease from THK
Grease alternative	Type KP-2, K (Din 51502)
	Type NLGI-Class 1 (DIN 51818)

#### Maintenance and care (lubrication)

Lubrication quantity	Grease lubrication
Initial lubrication	0.5 cm <sup>3</sup>
Relubrication	0.5 cm <sup>3</sup>

Lubrication sets for PMP/PMP-c guides are available as accessories. Order number: see options.

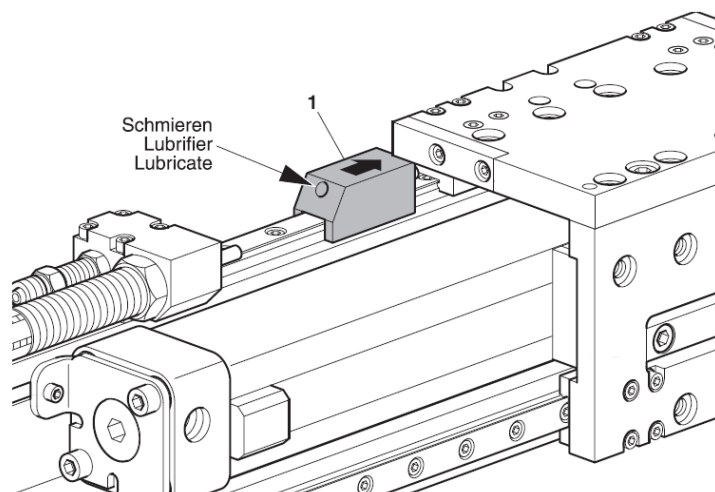
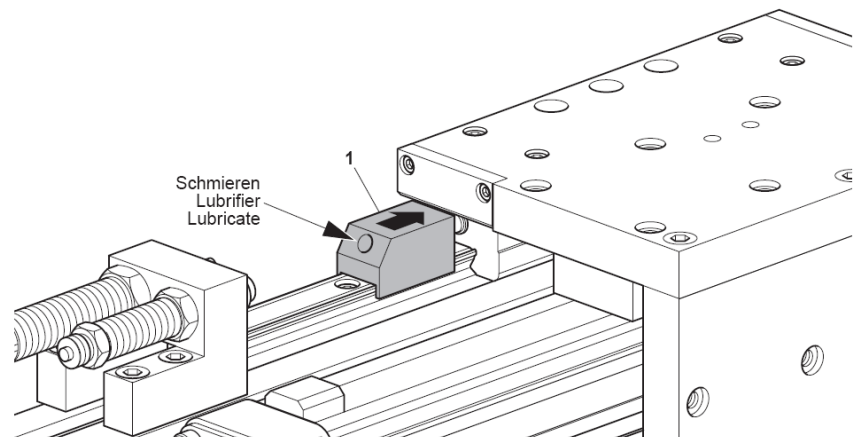


Fig. 41 Lubrication set for guides gantry module (PMP and PMP-c)



With oil lubrication, the lubrication quantity must be applied with a single lubrication pulse!

**Lubricants with additives such as e.g: MoS<sub>2</sub>, graphite or PTFE must not be used for maintenance of the module!**

### 9.3.3 Compressed air specifications

The gantry modules are lifetime lubricated and can be operated with lubricated or non-lubricated compressed air.



Before operating the PMP with oil-free compressed air, make sure that the module has never been operated with oil-lubricated compressed air!

Compressed air specification
Dry (condensation-free)
Filtered (40 µm filter for lubricated air)
Filtered (5 µm filter for non-lubricated air)

If the gantry modules are operated with lubricated compressed air, we recommend that you use the following types of oil:

oil type
Festo Special Oil
Avia Avilub RSL 10
BP Energol HPL 10
Esso Spinesso 10
Shell Tellus Oel C 10
Mobil DTE 21
Blaser Blasol 154

**Oil quantity:** 5-10 drops of oil per 1000 ltr. Compressed air

**Viscosity range:** 9 to 11 mm<sup>2</sup>/s (= cST) at 40°C, ISO class VG 10 according to ISO 3448

## NOTICE

### Risk of damage to property!

The operation of the gantry modules with oil-lubricated compressed air causes the factory primary lubrication to be washed out. Therefore, it is absolutely essential that the modules continue to be operated with oil-lubricated compressed air in order to avoid damage to the modules.

- Once the modules have been operated with oil-lubricated compressed air, they **may never** be operated without oil-lubricated compressed air.



When using the gantry modules in an ionized air environment (e.g., for high-voltage processors/coronization), coat open guides and piston rods with grease to prevent rust formation!

**Afag standard lubrication:**

- Staburax NBU8EP (flat guides)
- Blasolube 301 (piston rods)

**9.3.4 Further maintenance**

Further maintenance is not required, if the ambient conditions listed below are complied with:

- Clean working area
- No use of splash water
- No abrasive or process dust and vapours
- Climate and temperature as specified in the technical data

**9.4 Spare and wear parts lists, repairs**

**9.4.1 General notes**

Afag Automation AG offers a reliable repair service. Defective gantry modules can be sent to Afag for repair within the warranty period.

After the official warranty period has expired, wear parts can be replaced by the customer. Other defective module parts may only be replaced by Afag!



Please note that Afag does not assume any warranty for gantry modules that have not been replaced or repaired by Afag!

**9.4.2 Safety instructions**

**CAUTION**

**Risk of injury when removing the modules due to uncontrolled movements!**

When disassembling the from a system, there is a danger of uncontrolled movements.



- Disconnect the media supply (pneumatics) before removing the modules!
- Disassembling should only be carried out by qualified personnel!
- Bleed and deactivate the equipment before removing the module!
- Before removing the module, switch off the control unit and secure it against being switched on again!



### 9.4.3 Replace pneumatic cylinder

Depending on the system configuration, the PMP/PMP-c module must be removed from the entire system before the cylinder can be replaced.

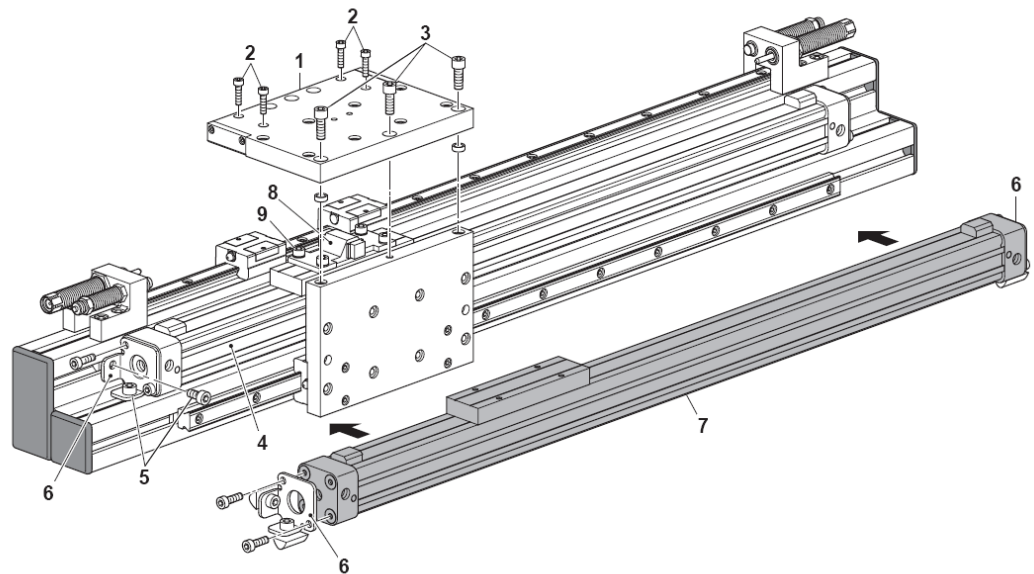


Fig. 42 Commissioning the gantry module

#### Procedure for the PMP modules version 01 and 02

1. Loosen the pneumatic connections on the PMP
2. Unscrew the cap screws (Fig. 42, 2) and (Fig. 42, 3) and remove the slide plate.
3. Release the screws (Fig. 42, 5) and remove the cylinder (Fig. 42, 4).
4. Unscrew the fastening (Fig. 42, 6) on the linear cylinder.
5. Loosen four cap screws (Fig. 42, 9) and remove the actuator (Fig. 42, 8).
6. Fasten the actuator (Fig. 42, 8) to the new linear cylinder with the cap screws (Fig. 42, 9).
7. Screw the fastening (Fig. 42, 6) back onto the new linear cylinder (Fig. 42, 7) in the correct position.
8. Fasten the new linear cylinder (Fig. 42, 7) with the cap screws (Fig. 42, 5).
9. Mount the slide plate (Fig. 42, 1) with the cap screws (Fig. 42, 2) and (Fig. 42, 3).
  - Grease the screws!
10. Reattach the pneumatic connections correctly.
  - ⇒ The process is complete.

## Procedure for the PMP-c version 01 and 02

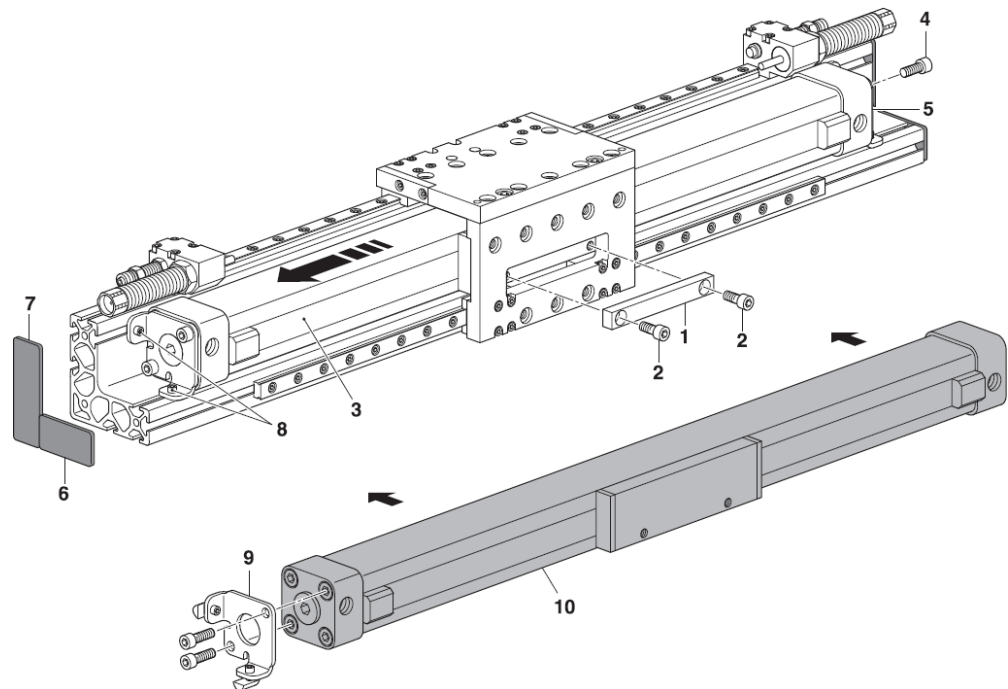


Fig. 43 Commissioning the gantry module

1. Loosen the pneumatic connections on the PMP-c.
2. Unscrew the cap screws (Fig. 43, 2) and remove the actuator (Fig. 43, 1).
3. Unscrew the cylinder screws (Fig. 43, 4) and detach the cylinder (Fig. 43, 3) from the base body and extend it.
  - Mark the position of the cylinder.
4. Remove end piece (Fig. 43, 9) from old cylinder (Fig. 43, 3) and reattach to new cylinder (Fig. 43, 10).
5. Insert new cylinder (Fig. 43, 10) and fix it to the fixed end piece (Fig. 43, 5).
6. Screw the other end of the cylinder to the body using the end piece (Fig. 43, 9) and refit the actuator (Fig. 43, 1).
7. Insert the cover plates (Fig. 43, 6 +7).
8. Reattach the pneumatic connections correctly.
  - ⇒ The process is complete.

## 9.4.4 Replace carriage and guide rail



If the carriage is defective, the guide rail must also be replaced.

Remove the PMP/PMP-c module from the system and send it to Afag Automation AG for repair!

### 10 Decommissioning, disassembly, disposal

The gantry modules must be properly dismantled after use and disposed of in an environmentally friendly manner.

#### 10.1 Safety instructions for decommissioning, disassembling and disposal

##### WARNING



##### **Risk of injury due to improper decommissioning, disassembly and disposal!**

Improperly carried out activities can result in considerable material damage and serious injury.

- The operator must exercise due care and only use specially trained and qualified personnel for this work.



Also observe the safety instructions in ➔ chap. 2 „Safety instructions“ in this manual.

#### 10.2 Decommissioning

If the gantry modules are not used for a longer period, they must be properly commissioned and stored as described in ➔ chapter 4.5.

#### 10.3 Disassembly

##### CAUTION



##### **Risk of injury due to uncontrolled movements of the modules!**

When disassembling the gantry modules from a system, there is a danger of uncontrolled movements. If pneumatic connections are disconnected under pressure, serious bodily injury may result.

- Disconnect the media supply (pneumatics) before removing the modules!
- Disassembly should only be carried out by qualified personnel!
- Only remove module when the controller is switched off and secured!

## 10.4 Disposal

The gantry module must be disposed of properly at the end of their service life and the raw materials used must be recycled. Observe the legal regulations and company requirements.

The gantry module must not be disposed of as a complete unit. Dismantle the gantry modules and separate the various components according to type of material and dispose of them properly:

- Scrap the metallic materials.
- Hand over plastic parts for recycling.
- Sort the rest of the components by their material properties and dispose of them accordingly.

### NOTICE

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#### **Risk to the environment due to incorrect disposal of the gantry modules material!**

Environmental damage can be caused by improper disposal of the gantry modules.

- Electronic parts, electrical scrap, auxiliary and operating materials must be disposed of by approved specialist companies.
  - Information on proper disposal can be obtained from the responsible local authorities.
-

## Declaration of incorporation

### 11 Declaration of incorporation

#### Declaration of incorporation

for partly completed machinery according to the Machinery Directive 2006/42/EC, Annex II, 1.B

The manufacturer hereby declares:

**Afag Automation AG, Luzernstrasse 32, CH-6144 Zell**

that the partly completed machine:

Product description	Gantry module (pneumatics)
Type:	PMP 01, PMP 02, PMP-c 01, PMP-c 02
Consecutive serial no.	50XXXXXX

complies with the following essential health and safety requirements of the Machinery Directive 2006/42/EC at the time of declaration: 1.1; 1.1.1; 1.1.2; 1.2.3; 1.3; 1.3.3; 1.3.7; 1.3.8.1; 1.4.1; 1.5.7; 1.6; 1.6.1; 1.6.2; 1.6.3; 1.6.4; 1.7; 1.7.4; 1.7.4.2; 1.7.4.3.

Harmonised standards applied, in particular:

EN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction.
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**Note:** The partly completed machinery must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of Machinery Directive 2006/42/EC.

The manufacturer undertakes to transmit, in response to a reasoned request by the national authorities, relevant technical documentation for the partly completed machinery.


The relevant technical documentation was created according to Annex VII, Part B of the above-mentioned Directive .

#### Authorised representative for compiling the technical documentation:

Niklaus Röthlisberger, Product Manager, Afag Automation AG, CH-6144 Zell

Zell, 31.05.2023

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