

# Linear modules

## LM 20 and LM 25

- Declaration of Incorporation
- Assembly Instructions
- Operating Instruction
- Maintenance Instruction



**“Translation” of the Original Operating Instructions**

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These operating instructions apply to:

Linear modules LM 20

Linear modules LM 25

Version of this documentation: LM 20-LM 25-OI-vers.2.5 gb. 12.01.12

Symbols: Assembly and commissioning must be carried out by qualified personnel only and according to these operating instructions.

 **DANGER**



Indicates an immediate threatening danger.  
Non-compliance with this information can result in death or serious personal injuries (invalidity).

 **WARNING**



Indicates a possible dangerous situation.  
Non-compliance with this information can result in death or serious personal injuries (invalidity).

 **CAUTION**



Indicates a possibly dangerous situation.  
Non-compliance with this information can result in damage to property or light to medium personal injuries.

**NOTE**



Indicates general notes, useful operator tips and operating recommendations which don't affect safety and health of the personnel.

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## 1.0.0 Declaration of Incorporation for an incomplete machine

### 1.1.0 Declaration of Incorporation according to the EC Machinery Directive 2006/42/EC, Appendix II B

The manufacturer: **Afag Automation AG, Fiechtenstrasse 32, CH-4950 Huttwil**

Herewith declares that the incomplete machine:

Designation: **Linear module**

Type: **LM 20 / LM 25**

Consecutive serial no .50xxxxxx

Meets the basic safety and health requirements of the Machinery Directive  
**2006/42/EG Appendix II B**

The incomplete machine further complies with the:

Applicable EC Directives: Machinery Directive: 2006/42/EG

Harmonized standards applied:

especially : **EN ISO 12100-1; EN ISO 12100-2**

The technical documentation for this incomplete machine was written according to Appendix II, Part B. The manufacturer binds himself hereunder to transmit these technical documents electronically to any sovereign authorities if requested.

Authorized person for the compilation of the technical documentation was: Lanz Beat

**The start-up of the incomplete machine is prohibited until it is installed in a complete machine which complies with the regulations of the EC Machinery Directive and until the EC Declaration of Conformity according to Appendix II B was received.**

Place, Date: Firma: Afag Automation AG

Huttwil, 24. March. 2009

Mathias Schütz

Marc Zingg





Product Manager  
of Afag Automation AG

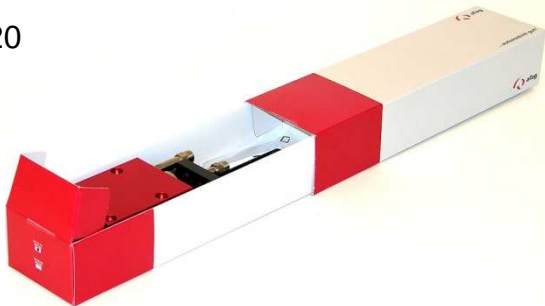
Managing Director  
of Afag Automation AG

## 2.0.0 Assembly instructions

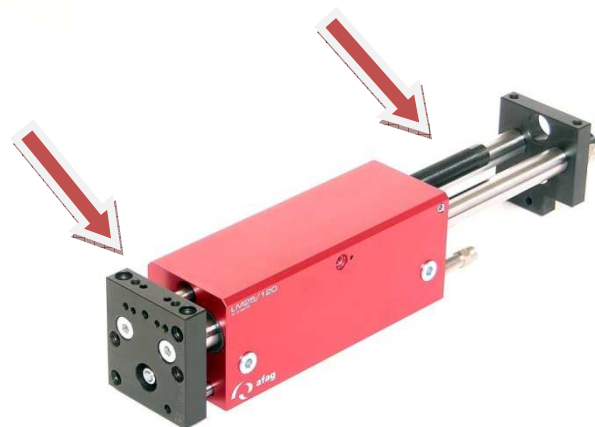
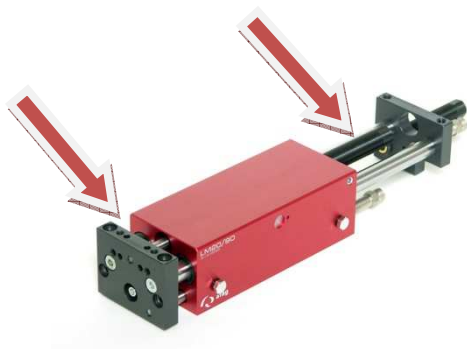
### 2.1.0 Transport and Storage (packing and unpacking)


 <b>CAUTION</b>	
	<p>The LM 20 module is packed in the original cardboard box, if the module is not handled properly it may fall out of the box when unpacking and cause injuries to limbs or squeeze your fingers.</p> <p>The LM 25 modules are not packaged, it can also be finger pinched in a wrong handling.</p>

LM 20

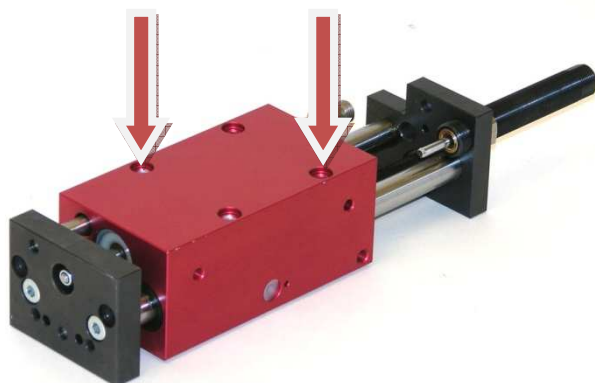


LM 25

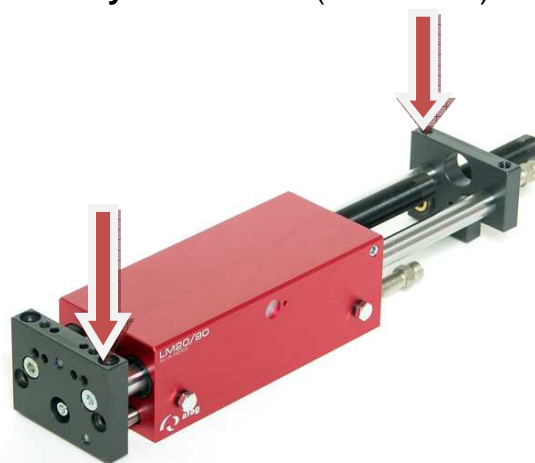


<b>NOTE</b>	
	<p><b>Consider please!</b></p> <p>With each module security is settled a technical newspaper. This newspaper is to be read busily by each person with the module.</p>

### 2.1.1 Mounting variants for LM 20 / LM 25 moduls



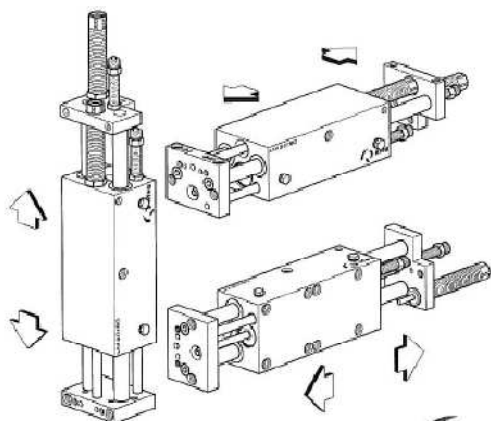
#### Installation of base body from below (M6 Thread)



Mounting plates on the front if the reason the body is used as a sled. (M6 Thread).

### 2.1.2 Mounting variants for LM 20/25

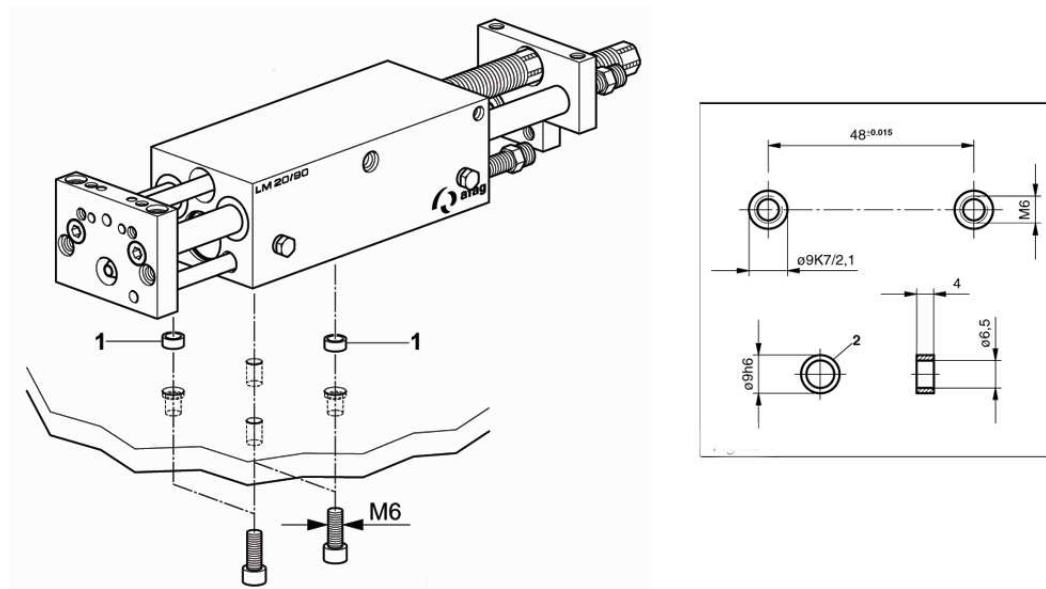
The LM can be combined in any required position to all other afag pick and place moduls.



### 2.1.3 Mounting for the modules (centering bushings)

Depending on the application either the base body or the slide can be mounting.

Use the centering bushings included in the scope of supply to determine the position and insert these bushings in the opposite borings of the mounting grid.



*Installation of base body from below*

### 2.1.4 Tightening Torques for bolts

Further elements to be mounted can be attached to the slide plates or the slide plate. The screws to be used for assembly must at least satisfy the following conditions:

Standard: VDI 2230  
 Strength: class 8.8  
 Surface: galvanized blue, oiled or greased

Thread	Torque
M3	1,1 ... 1,3 Nm
M4	2,5 ... 2,9 Nm
M5	4,9 ... 5,8 Nm
M6	8,5 ... 9,9 Nm

## 2.1.5 Installation of the LM 20 / LM 25 in a facility

### This is an incomplete machine

#### Assembly of the LM 20/25 module in a system

The series of the LM-Linear modules is used for the linear, smooth movement of rigidly mounted loads under the ambient and operating conditions defined for this module, see Technical data. The LM-Linear module can be installed in the horizontal or vertical position.

### NOTE

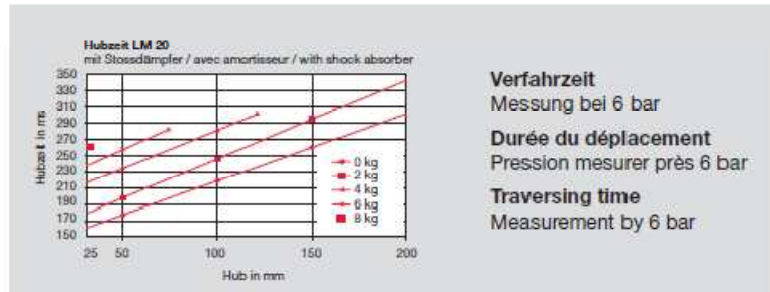
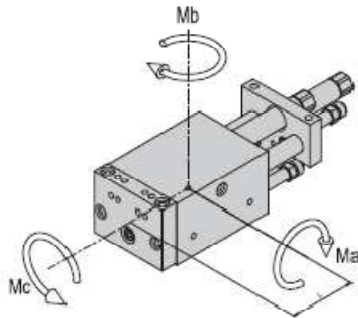


#### Safety instructions

Modifications on the LM 20/25 module that are not described in these operating instructions or have not been approved in writing by Afag Automation AG are not permitted. In case of improper changes or assembly, installation, operation and maintenance or repairs Afag rejects all liability.

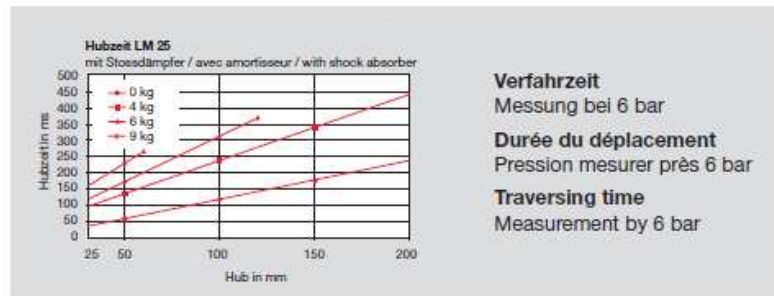
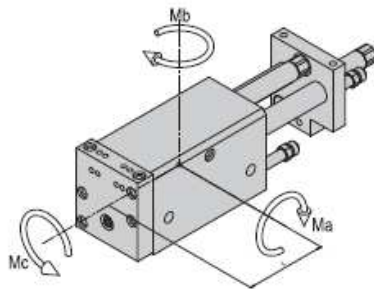
## 2.1.6 Slide unit load factors

### LM 20



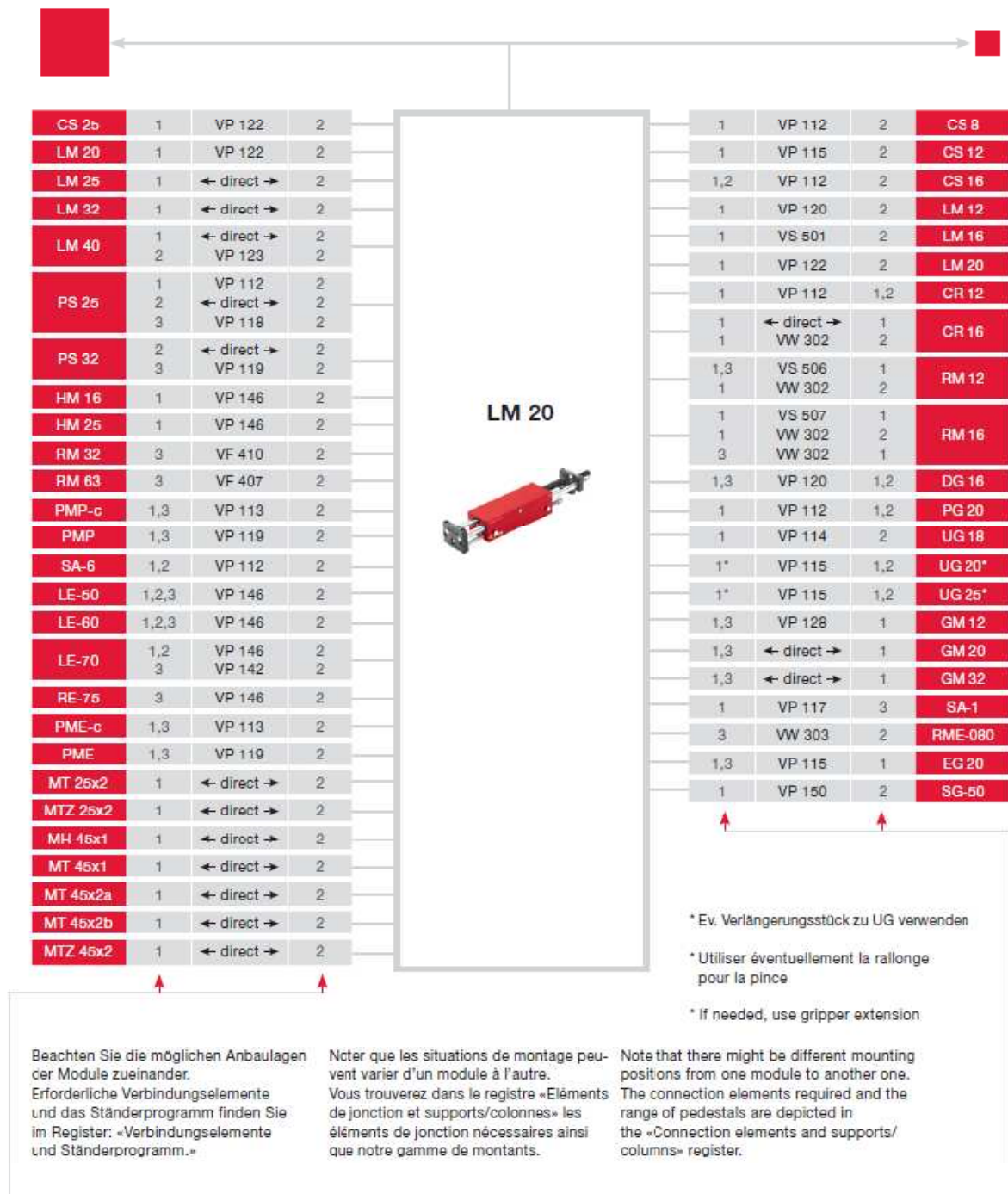
Typ	Type	Type		LM 20/30	LM 20/60	LM 20/90	LM 20/120	LM 20/150	LM 20/200
Max. zulässige statische Momente	Moments static max. autorisés	Max. permettet static torque	Ma	11 Nm	17 Nm	23 Nm	29 Nm	35 Nm	45 Nm
			Mb	11 Nm	17 Nm	23 Nm	29 Nm	35 Nm	45 Nm
			Mc	7 Nm	7 Nm	7 Nm	7 Nm	7 Nm	7 Nm
Max. zulässige dynamische Momente	Moments dynamique max. autorisés	Max. permitted dynamic torque	Ma	5 Nm	8 Nm	10 Nm	13 Nm	16 Nm	20 Nm
			Mb	5 Nm	8 Nm	10 Nm	13 Nm	16 Nm	20 Nm
			Mc	3 Nm	3 Nm	3 Nm	3 Nm	3 Nm	3 Nm
Wirkabstand	Distance active	Active distance	L	80 mm	110 mm	140 mm	170 mm	200 mm	250 mm

### LM 25



Typ	Type	Type		LM 25/60	LM 25/120	LM 25/200
Max. zulässige statische Momente	Moments static max. autorisés	Max. permettet static torque	Ma	20 Nm	35 Nm	55 Nm
			Mb	20 Nm	35 Nm	55 Nm
			Mc	8 Nm	8 Nm	8 Nm
Max. zulässige dynamische Momente	Moments dynamique max. autorisés	Max. permitted dynamic torque	Ma	9 Nm	16 Nm	25 Nm
			Mb	9 Nm	16 Nm	25 Nm
			Mc	4 Nm	4 Nm	4 Nm
Wirkabstand	Distance active	Active distance	L	85 mm	115 mm	145 mm

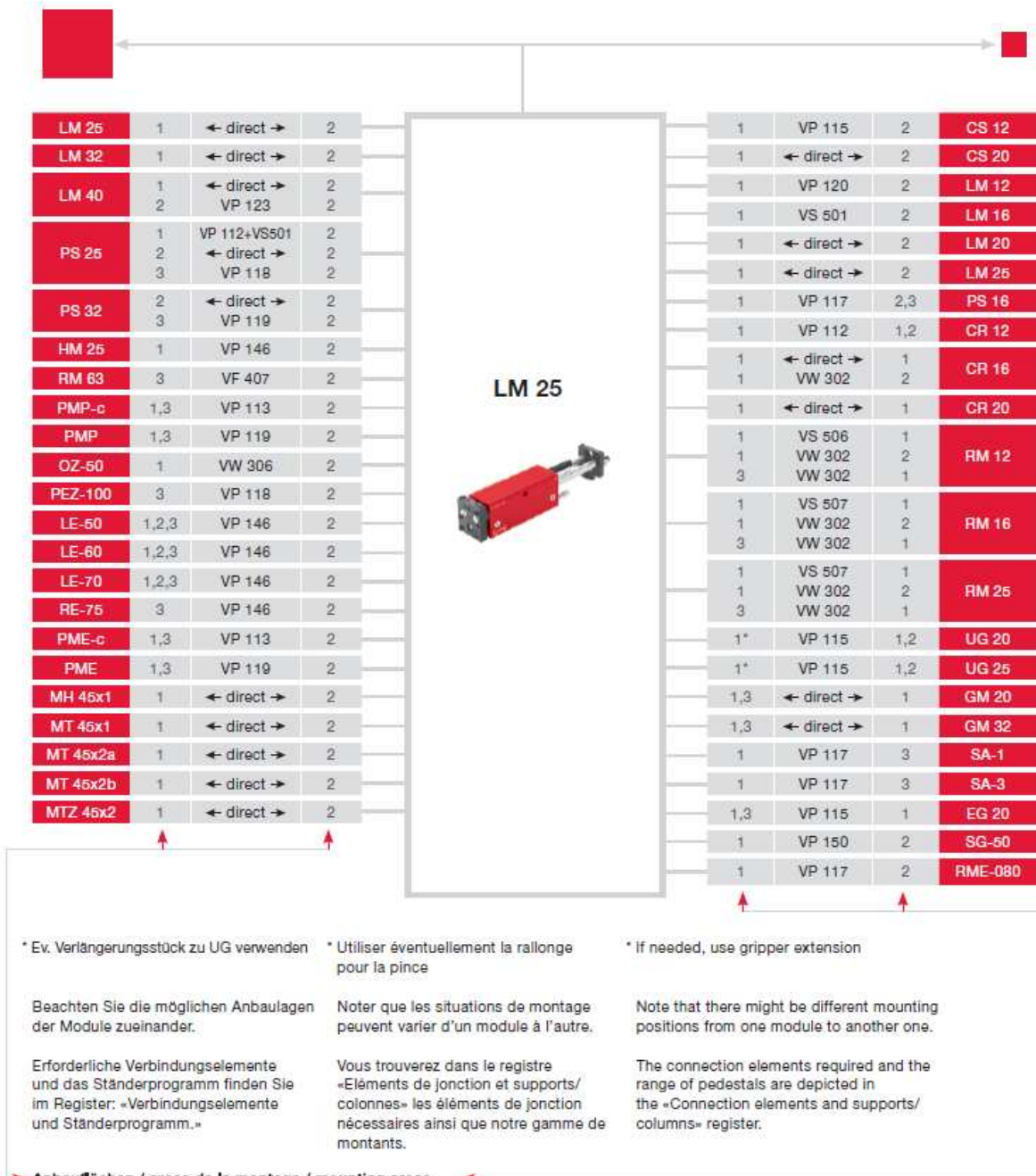
## 2.1.7 Preferred combinations for the LM 20 Modules



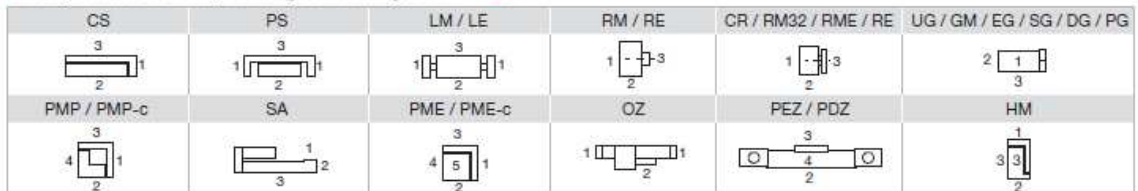
### ➔ Anbauflächen / areas de la montage / mounting areas

CS	PS	LM / LE	RM / RE	CR / RM32 / RME / RE	UG / GM / EG / SG / DG / PG
PMP / PMP-c	SA	PME / PME-c	OZ	PEZ / PDZ	HM

## 2.1.8 Preferred combinations for the LM 25 Modules



→ **Anbauflächen / areas de la montage / mounting areas** ←



### 3.0.0 Operating Instructions

#### 3.1.0 Declaration of the manufacturer:

Afag Automation AG  
Fiechtenstrasse 32  
CH-4950 Huttwil

Sales Handling:  
Tel. 0041 (0)62 959 87 02  
[www.afag.com](http://www.afag.com)

#### These operating instructions apply to:

Product: **Linear module**  
Type: **LM 20/30; LM 20/60, LM 20/90, LM 20/150,  
LM 20/200  
LM 25/60, LM 25/120, LM 25/200**

This documentation was written  
according to:



**The applicable EC-Directive 2006/42/EG**


Responsible person for the  
Documentation:

Lanz Beat, PM & Marketing-Services  
Afag Automation AG  
Fiechtenstrasse 32  
4950 Huttwil

### 3.1.1 Symbols

Assembly and initial start-up must be carried out by qualified personnel only and according to these instructions.

 <b>CAUTION</b>	
	<p>Indicates a possibly dangerous situation.</p> <p><b>Non-compliance with this information can result in damage to property or light to medium personal injuries.</b></p>

<b>NOTE</b>	
	<p>Indicates general notes, useful operator tips and operating recommendations which don't affect safety and health of the personnel.</p>

### 3.1.2 General description

#### **This is an incomplete machine!**

The series of the LM20 / LM25 linear module is used for the linear, smooth movement of rigidly mounted loads under the ambient and operating conditions defined, see Technical data.

The LM 20/25 module can be installed in the horizontal or vertical position.

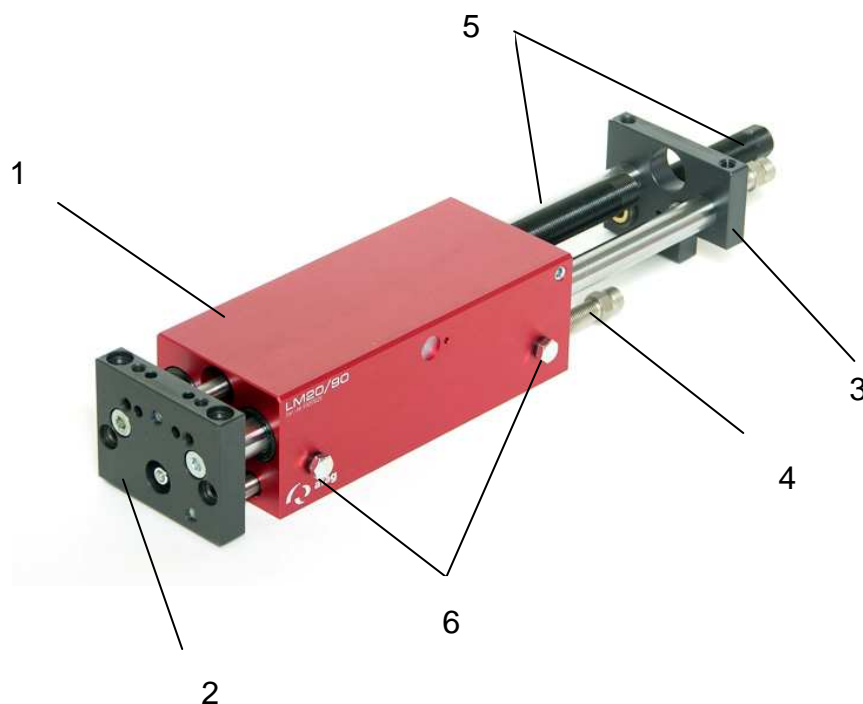
Modifications on the LM 20 / LM 25 Linear module that are not described in these operating instructions or have not been approved in writing by Afag Automation AG are not permitted. In case of improper changes or assembly, installation, operation, maintenance or repairs, Afag Automation AG rejects all liability.

### 3.1.3 Description of the LM 20/25 module

The LM 20/25 consists of the base body (1) with pneumatic connections (6) and cylinder and the front plates (2) and back plates (3).

The stop position are set by means of a stop screw (4). To query the limit positions an inductive sensor with a diameter of 6.5 mm (not included in the scope of delivery) can be fixed in the stop screw.

The movement at the limit positions is absorbed by a hydraulic shock absorber (5).




- |   |                 |   |   |
|---|-----------------|---|---|
| 1 | Base body       | 4 | Stop screw                                    |
| 2 | The front plate | 5 | Shock absorber                                |
| 3 | The back plate  | 6 | Air connection (LM 20= M5)<br>(LM 25 = G1/8") |



#### Includes in the delivery:

Pos.	Number	Description
1	1	Moduls LM 20 (LM25)
2	2	Stop screw AS 08/40
3	2	Shock absorbers SD M14x1-1
4	2	Centering bushings Ø 9x4mm

### 3.1.4 Intended use

The series of the linear module LM 20 and LM 25 is used for the linear movement of rigidly mounted loads in non-explosions hazardous ambient and operating conditions that are specified for this module; see catalogue technical.

<b>NOTE</b>	
	<p>These operating instructions should be read carefully before carrying out any activity on or with the module.</p> <p>The module may only be used in accordance with intended purpose.</p> <p>Modification on the module that are not described in these operating instructions or have not been approved in writing by Afag are not permitted. In case of inexpert changes or improper assembly, installation, operation, maintenance or repairs, Afag rejects all liability.</p>

 <b>CAUTION</b>	
	<p><b>Connection of compressed air and operation of pneumatic systems may cause unpredictable movements which may. Result in personal unjuri or damage to property.</b></p>

When connecting compressed air for the first time make sure that all air chokes are closed. Ventilate the system slowly.

### 3.1.5 Guarantee

The module is designed for 40 million load alternations\* under the ambient conditions and conditions of use defined for this module, see catalogue. Wearing parts (shock absorbers and stop screws) are excluded from the guarantee. The guarantee includes repair or replacement of faulty Afag parts.


\*whichever comes first

When repairs are carried out by the customer without prior training or instruction by Afag AG the warranty will become void. Any additional claims are excluded.

### 3.1.6 Areas of application

The Linear modules are exclusively for the linear movement in any position of payloads at the forehead to record maximum 2-8 kg (LM 20) and 4-9 kg (LM 25) designed, (see technical data). They can also be used in combination with other modules than Pick and Place machines, the permissible load capacities should, however, not be exceeded.

**Any other use is regarded as inadequate.**

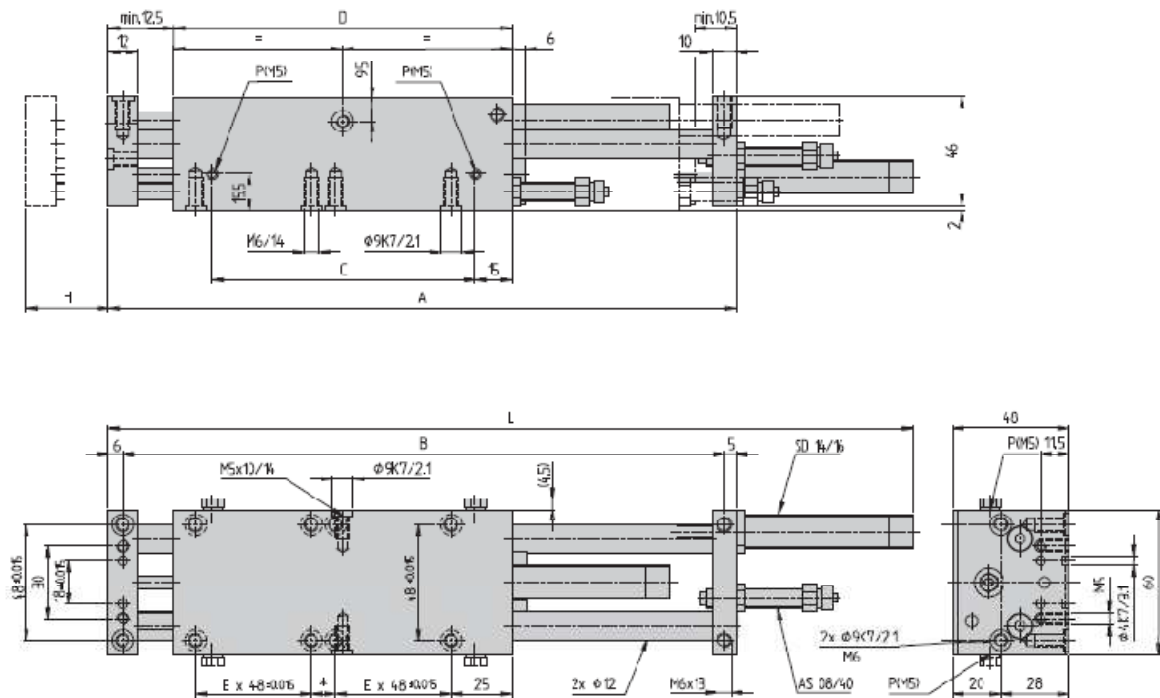
<b>NOTE</b>	
	<p>The manufacturer does not accept any liability for damage resulting from such use. The risk is that of the user alone.</p>

Intended use also includes paying attention to the operating instructions and observing the maintenance and repair instructions specified by manufacturer.

The Linear module LM 20/25 may only be operated and serviced by correspondingly trained personnel who have also profound knowledge of the dangers.

 <b>CAUTION</b>	
	<p><b>The applicable regulations for prevention of accidents and the other generally accepted safety-relevant and occupational safety and health regulations are to be followed.</b></p>

### 3.1.7 Dimension drawing LM 20



\* LM 20/90 = 10 mm  
 \* LM 20/120 = 24 mm

P = Luftanschluss M5  
 Raccord d'air M5  
 Air connections M5

Type	Type	LM 20/30	LM 20/60	LM 20/90	LM 20/120	LM 20/150	LM 20/200
Mass A	Dim. A	140 mm	200 mm	260 mm	320 mm	380 mm	480 mm
Mass B	Dim. B	129 mm	189 mm	249 mm	309 mm	369 mm	469 mm
Mass C	Dim. C	50 mm	79 mm	109 mm	139 mm	169 mm	219 mm
Mass D	Dim. D	80 mm	110 mm	140 mm	170 mm	200 mm	250 mm
Mass E x 48	Dim. E x 48	1x48 mm	1x48 mm	2x48 mm	2x48 mm	3x48 mm	4x48 mm
Mass L max.	Dim. L max.	212 mm	272 mm	332 mm	392 mm	452 mm	552 mm

### 3.1.8 Technical data of the LM 20

Typ	Type	Type	LM 20/30	LM 20/60	LM 20/90	LM 20/120	LM 20/150	LM 20/200
Bestellnummer	Article No.	Order No.	11001720	11001645	11001646	11001647	11001648	11009043
Hub = H	Course = H	Stroke = H	30 mm	60 mm	90 mm	120 mm	150 mm	200 mm
Hubbegrenzung	Limitation de course	Stroke limiter	2x25 mm	2x25 mm	2x25 mm	2x25 mm	2x25 mm	2x25 mm
Zylinder	Cylindre	Cylindre	20 mm	20 mm	20 mm	20 mm	20 mm	20 mm
*max. Nutzlast = M	*Charge utile max. = M	*Max. ef. weight = M	8 kg	7 kg	5 kg	4 kg	3 kg	2 kg
Kolbenkraft einfahren	Force du piston entrer	Piston force retract	140 N	140 N	140 N	140 N	140 N	140 N
Kolbenkraft ausfahren	Force du piston sortir	Piston force extend	172 N	172 N	172 N	172 N	172 N	172 N
Betriebsdruck	Pression d'alimentation	Operating pressure	6 bar +/-2	6 bar +/-2	6 bar +/-2	6 bar +/-2	6 bar +/-2	6 bar +/-2
Luftanschluss = P	Raccords d'air = P	Air connections = P	M5	M5	M5	M5	M5	M5
Luftverbrauch / Zyklus	Consom. d'air/cycle	Air consumption/cycle	0.065 NI	0.125 NI	0.190 NI	0.255 NI	0.32 NI	0.43 NI
Einbaulage	Position de montage	Mounting position	+	+	+	+	+	+
Modulgewicht	Poids du module	Weight of module	1.28 kg	1.55 kg	1.82 kg	2.1 kg	2.33 kg	2.82 kg
Dämpfweg	Chemin d'amortissem.	Damping traverse	15 mm	15 mm	15 mm	15 mm	15 mm	15 mm
Lärmpegel bei 6 bar max. Nutzl.	Niveau de bruit à 6 bar sous charge utile max.	Decibel level, at 6 bar, at max. effective weight	65 dB (A)	65 dB (A)	65 dB (A)	65 dB (A)	65 dB (A)	65 dB (A)
Befestigungsrastrer	Trame de fixation	Fixing grid	48x48mm	48x48mm	48x48mm	48x48mm	48x48mm	48x48mm
Befestigungsgewinde	Filet de montage	Mounting thread	M6	M6	M6	M6	M6	M6
Temperatur: - Lager - Betrieb	Température: - de Stockage - d'utilisation	Temperature: - Stored - Operation	0°C...50°C 0°C...50°C	0°C...50°C 0°C...50°C	0°C...50°C 0°C...50°C	0°C...50°C 0°C...50°C	0°C...50°C 0°C...50°C	0°C...50°C 0°C...50°C
Luftfeuchtigkeit (nicht kondensierend)	Humidité (sans condensation)	Humidity (non condensing)	< 90%	< 90%	< 90%	< 90%	< 90%	< 90%
Medium: gefilterte Druckluft	Fluide: air comprimé filtré	Medium: filtered compressed air	10...40µm	10...40µm	10...40µm	10...40µm	10...40µm	10...40µm
Wiederholgenauigkeit	Précision de répétition	Repeating precision	+/- 0.01 mm	+/- 0.01 mm	+/- 0.01 mm	+/- 0.02 mm	+/- 0.02 mm	+/- 0.02 mm
Endanschläge:	Butées terminales:	Final stops:						
Anschlagschraube	Vis de butée	Stop screw	AS08/40	AS08/40	AS08/40	AS08/40	AS08/40	AS08/40
Anz. Zwischenanschläge	Nombre butée intermed.	Number intermediate	-	1	1	1	1	1

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

\*Verfahrzeit-Diagramm beachten.

**Im Lieferumfang inbegriffen:**  
2 Anschlagsschrauben AS 08/40  
2 Stossdämpfer SD M14x1-1  
2 Zentrierhülsen Ø9x4 mm

Das LM 20 kann mit geölter oder ölfreier Luft betrieben werden.  
Reinraumklasse:  
10 000 (Federal Standard 209E)

**Betriebsanleitung: [www.afag.com](http://www.afag.com)**  
**Garantie: 40 Mio. Lastwechsel/2 Jahre**

Les caractéristiques techniques se basent sur une pression de consigne de 6 bar et les tests standard Afag.

\*Durée du déplacement diag. de noter.

**La livraison comprend:**  
2 Vis d'arrêt AS 08/40  
2 Amortisseurs SD M14x1-1  
2 Douilles de centrage Ø9x4 mm

Pour la commande du module LM 20 on peut utiliser aussi bien de l'air huilé que de l'air exempt d'huile.  
Classe de salle blanche:  
10000 (Federal Standard 209E)

**Instruction de service: [www.afag.com](http://www.afag.com)**  
**Garantie: 40 millions de courses/2 ans**

The technical data refer to a nominal pressure of 6 bar under Afag standard test conditions.

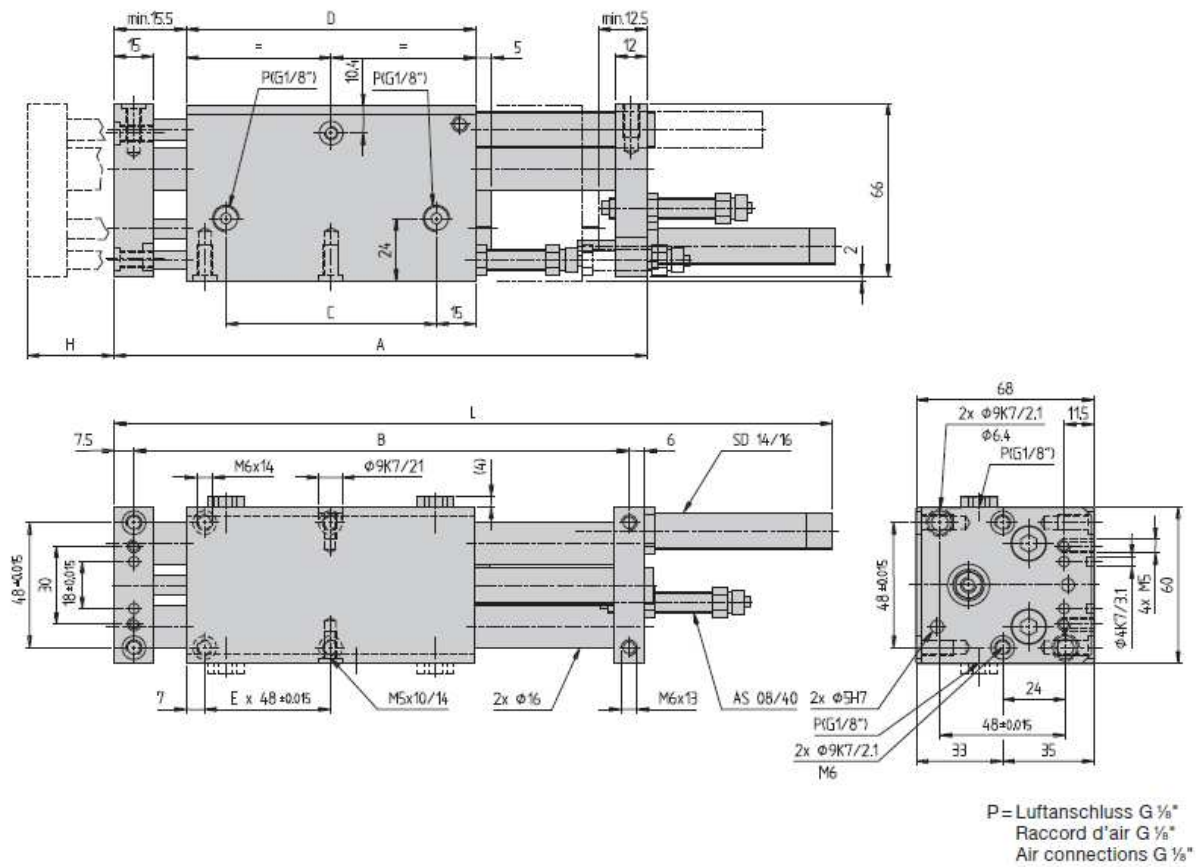
\*Traversing time diagramm note.

**Included in the delivery:**  
2 Adjusting stop screw AS 08/40  
2 Shock absorbers SD M14x1-1  
2 Centering bushings Ø9x4 mm

The LM 20 may be operated with oil-containing or oil-free air.  
Clean room class:  
10000 (Federal Standard 209E)

**Operating instruction: [www.afag.com](http://www.afag.com)**  
**Warranty: 40 Mio load strokes / 2 years**

### 3.1.9 Dimension drawing LM 25



Typ	Type	LM 25/60	LM 25/120	LM 25/200
Mass A	Dimension A	202.5 mm	322.5 mm	482.5 mm
Mass B	Dimension B	189 mm	309 mm	469 mm
Mass C	Dimension C	80 mm	140 mm	220 mm
Mass D	Dimension D	110 mm	170 mm	250 mm
Mass E x 48	Dimension E x 48	1 x 48 mm	2 x 48 mm	4 x 48 mm
Mass L max.	Dimension L max.	277.5 mm	397.5 mm	557.5 mm

### 3.2.0 Technical data of the LM 25

Typ	Type	Type	LM 25/60	LM 25/120	LM 25/200
Bestellnummer	Article No.	Order No.	11011895	11011896	11011897
Hub = H	Course = H	Stroke = H	60 mm	120 mm	200 mm
Hubbegrenzung	Limitation de course	Stroke limiter	25 mm	25 mm	25 mm
Zylinder	Cylindre	Cylindre	25 mm	25 mm	25 mm
*max. Nutzlast = M	*Charge utile max. = M	*Max. ef. weight = M	9.0 kg	6.0 kg	4.0 kg
Kolbenkraft einfahren	Force du piston entrer	Piston force retract	265 N	265 N	265 N
Kolbenkraft ausfahren	Force du piston sortir	Piston force extend	295 N	295 N	295 N
Betriebsdruck	Pression d'alimentation	Operating pressure	6 bar +/-2	6 bar +/-2	6 bar +/-2
Luftanschluss = P	Raccords d'air = P	Air connections = P	G 1/4"	G 1/4"	G 1/4"
Luftverbrauch / Zyklus	Consomation d'air / cycle	Air consumption / cycle	0.164 NI	0.33 NI	0.55 NI
Einbaulage	Position de montage	Mounting position	+	+	+
Modulgewicht	Poids du module	Weight of module	2.0 kg	2.84 kg	3.97 kg
Lärmpegel bei 6 bar max. Nutzl.	Niveau de bruit à 6 bar sous charge utile max.	Decibel level, at 6 bar at max. effective weight	65 dB (A)	65 dB (A)	65 dB (A)
Befestigungsrastrer	Trame de fixation	Fixing grid	48x48 mm	48x48 mm	48x48 mm
Befestigungsgewinde	Filet de montage	Mounting thread	M6	M6	M6
Temperatur:	Température:	Temperature:			
- Lager	- de Stockage	- Stored	0 °C...+50 °C	0 °C...+50 °C	0 °C...+50 °C
- Betrieb	- d'utilisation	- Operation	0 °C...+50 °C	0 °C...+50 °C	0 °C...+50 °C
Luftfeuchtigkeit (nicht kondensierend)	Humidité (sans condensation)	Humidity (non condensing)	< 90 %	< 90 %	< 90 %
Medium:	Fluide:	Medium:			
gefilterte Druckluft	air comprimé filtré	filtered compressed air	10...40 µm	10...40 µm	10...40 µm
Anhaltgenauigkeit	Précision position	Stopping accuracy	+/- 0.01 mm	+/- 0.02 mm	+/- 0.02 mm

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

\*Verfahrzeit-Diagramm beachten.

**Im Lieferumfang inbegriffen:**

2 Anschlagsschrauben AS 08/40  
2 Stossdämpfer SD M14x1-1  
2 Zentrierhülsen Ø9 x4 mm

Das LM 25 kann mit geölter oder ölfreier Luft betrieben werden.

Reinraumklasse:  
10000 (Federal Standard 209E)

**Betriebsanleitung: [www.afag.com](http://www.afag.com)**  
**Garantie: 40 Mio. Lastwechsel/2 Jahre**

Les caractéristiques techniques se basent sur une pression de consigne de 6 bar et les tests standard Afag.

\*Durée du déplacement diagr. de noter.

**La livraison comprend:**

2 Vis d'arrêt AS 08/40  
2 Amortisseurs SD M14x1-1  
2 Douilles de centrage Ø9 x4 mm

Pour la commande du module LM 25 on peut utiliser aussi bien de l'air huilé que de l'air exempt d'huile.  
Classe de salle blanche:  
10000 (Federal Standard 209E)

**Instruction de service: [www.afag.com](http://www.afag.com)**  
**Garantie: 40 millions de courses/2 ans**

The technical data refer to a nominal pressure of 6 bar under Afag standard test conditions.

\*Traversing time diagramm note.

**Included in the delivery:**

2 Adjusting stop screw AS 08/40  
2 Shock absorbers SD M14x1-1  
2 Centering bushings Ø9 x4 mm

The LM 25 may be operated with oil-containing or oil-free air.

Clean room class:  
10 000 (Federal Standard 209E)

**Operating instruction: [www.afag.com](http://www.afag.com)**  
**Warranty: 40 Mio load strokes/2 years**

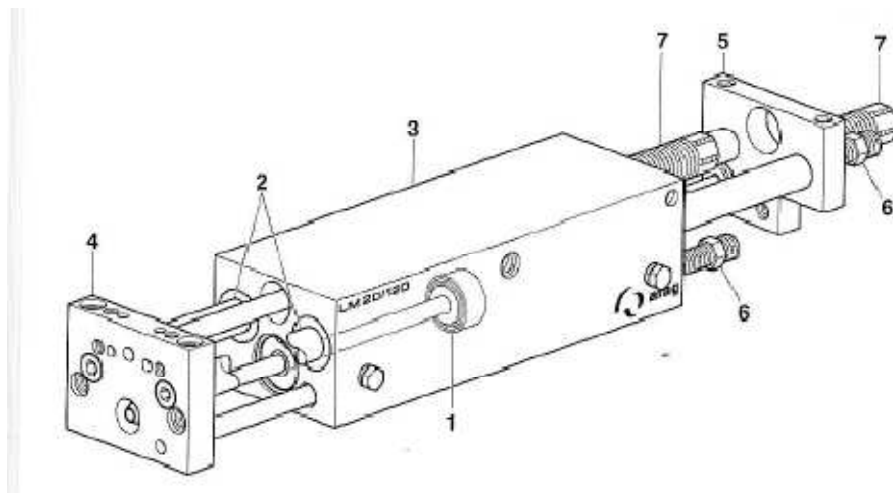
### 3.2.1 Function of the module linear

The linear module LM 20/25 pneumatic devices are operated for longitudinal movements of 0 a 200 mm stroke. All modules are customer order is delivered ready for installation.

An air-operated double-acting piston generates the longitudinal motion.

Two waves in housing management with lifetime lubricated bearing bushes led, connect the front and back plate. The infinitely adjustable stop screw to limit the stroke.

The stroke comes with Afag end damped shock absorbers.



- 1 Pistons
- 2 Guide shaft
- 3 Housing
- 4 Forehead plate
- 5 Rear plate
- 6 Stop screw
- 7 Afag-Shock absorbers

## ⚠ CAUTION



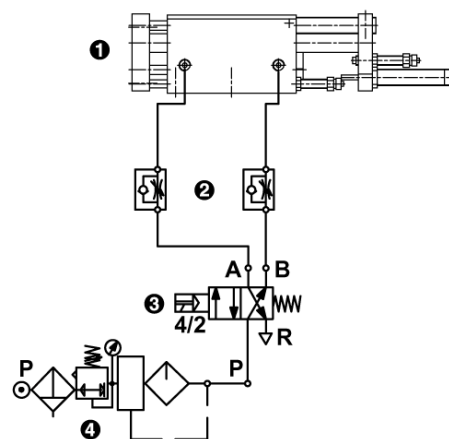
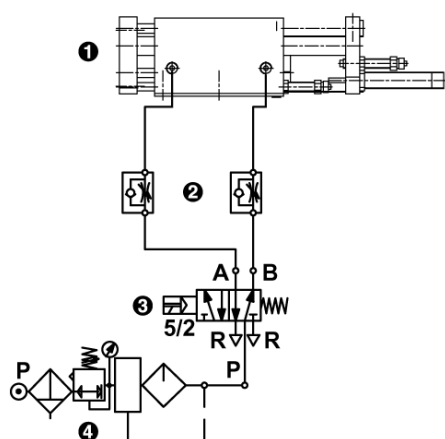
**When the module is installed in a vertical position, the slide should always be moved, before the installation, into the lowermost position, since masses that move suddenly can cause injury.**

### 3.2.2 Pneumatic connection LM 20 / LM 25

At the base are located on the right and left sides each 2 pneumatic connectors M5, (LM 25, G 1/8")

The non-pneumatic connections must be used with the supplied screw cap fitted with an airtight lid.

Operating pressure: 6 bar +/-2



1 *Linear module*

2 *One-way restrictor*

3 *Directional valve  
(Standard 5/2)*

4 *Compressed air connection*

P *Air connection*

### 3.2.3 Adjusting the linear modules

Following delivery of the LM states are realized by the Afag.

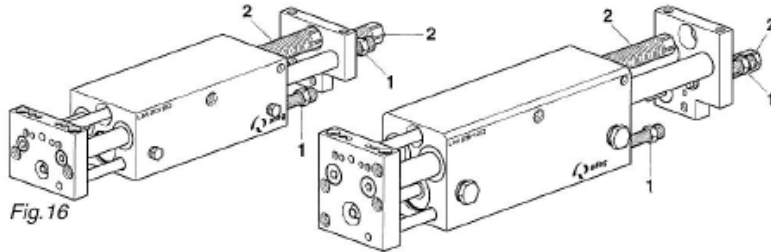


Fig. 16

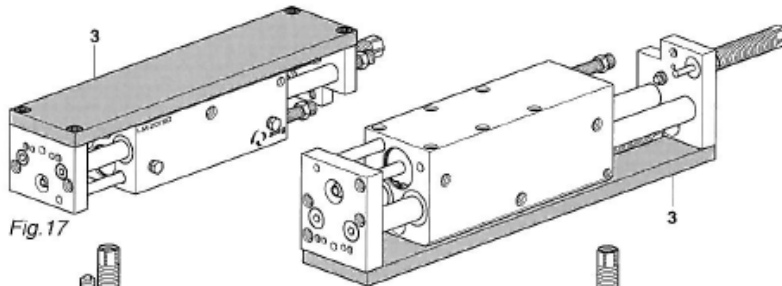


Fig. 17

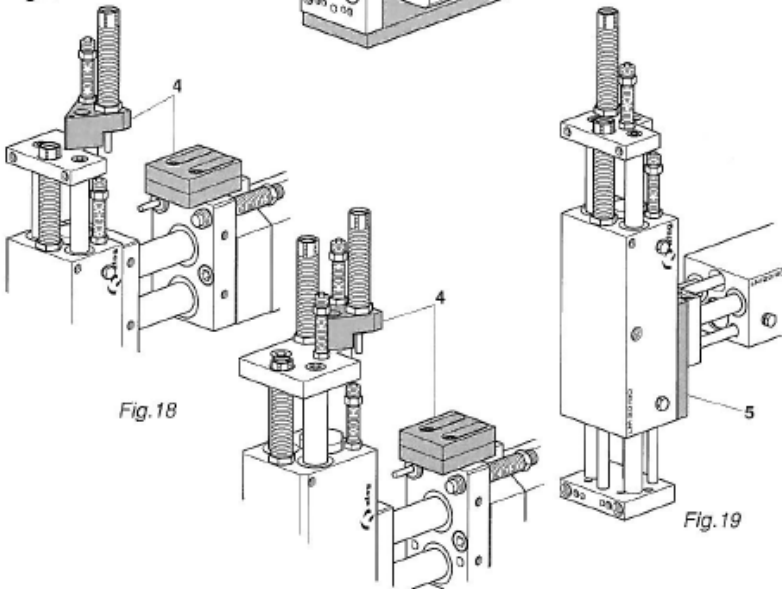


Fig. 18

Fig. 19

(Fig. 16) **Linear module LM 20 /25**; Standard equipment includes two stop screws AS 08/40 (1) and two shock absorbers SD 14/16 (2) to end setting.

(Fig. 17) **Base plate LM 20/25**; With the help of the base plate (3) can realize a portal module. The base plate also serves to stabilize and the customer may be edited.

(Fig. 18) **3. Position LM 20/25**; In combination with a linear Afag module LM 32 is a simple solution to a 3<sup>rd</sup> Position (4) feasible. This is available in the entire stroke range of the linear module used, is subdued and end with acknowledgeable initiator.

(Fig. 19) **Intermediate plate LM 20**; the intermediate plate (5) allows the combination of LM 20 and LM 20 another module.

### 3.2.4 Stroke and stop screw adjusting

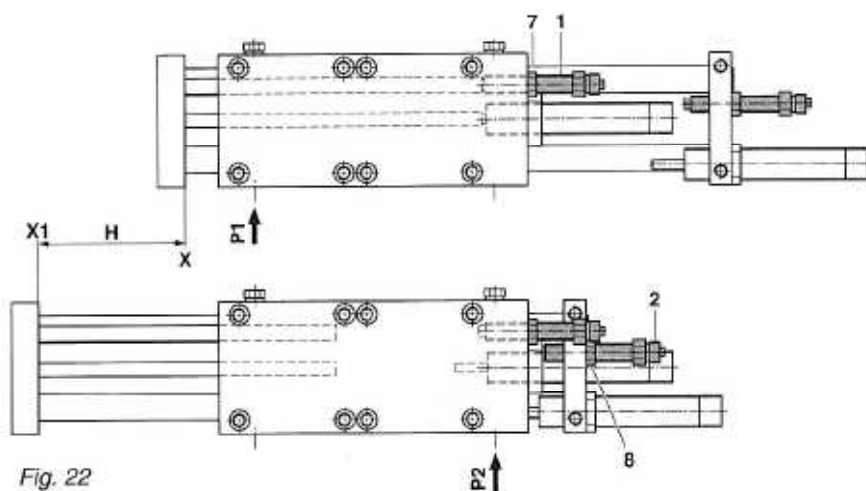
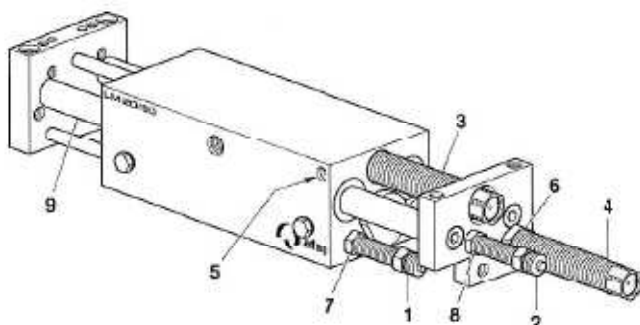


Fig. 22

#### Stroke adjusting

The setting of the stroke LM linear module via the adjusting of the stop screw. (1 + 2)

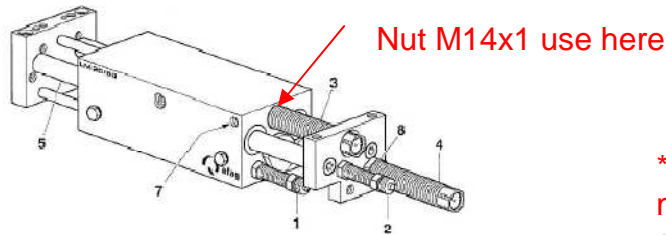
#### Stop screw setting

The stop screw can be equipped with an initiator and initiator holder d or 6.5 mm with an angle bracket initiator 8x8 mm end to the query initiator combined.

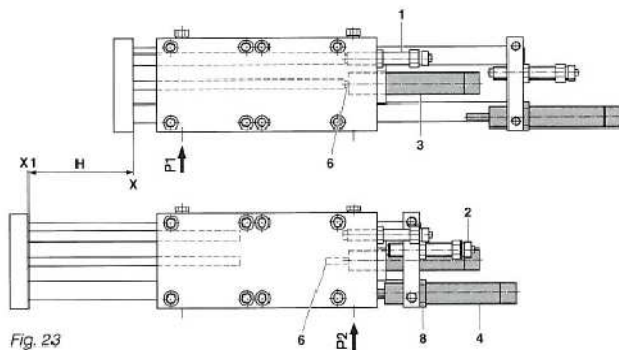
Example: LM 20

1. Pin screw (5) and nut (6) and shock absorbers to solve (3,4) about 5 turns in the counter-clockwise from screws.
2. P1 air to enter. The Sleigh (9) of the LM goes to the stop screw (1).
3. Rear position **X** of the stroke **H** by adjusting the stop screw (1) determine, after locking nut (7) secure. (1 revolution = 1 mm distance)
4. **P2** Air to enter. The Sleigh (9) of the LM goes to the stop screw (2).
5. Front position **X** of the stroke by adjusting the stop screw (2) determine, after locking nut (8) secure.(Fig. 22)

### 3.2.5 Adjusting shock absorber



\*At a stroke reduction of 25 mm is recommended that the shock absorber with a nut M14x1 Order no. 11012242 to fix a possible jamming of the SD – ram avoided.



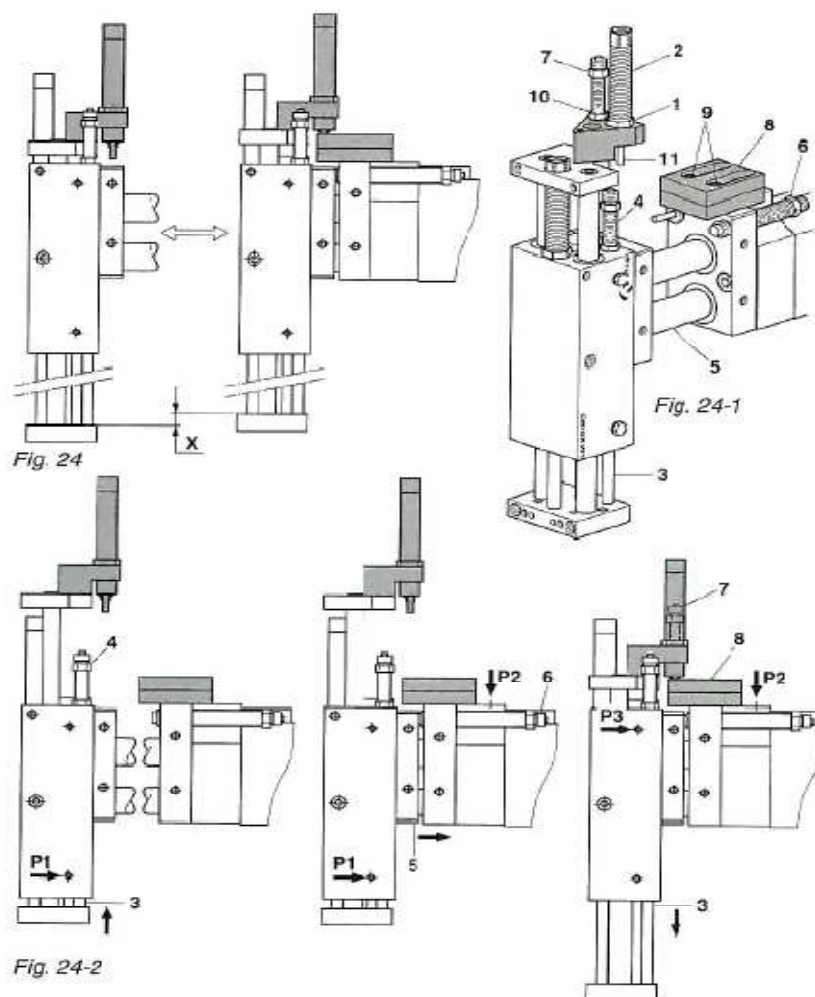
For a smooth end of the stroke motion H is moved to the end against the stop screw (1+2) using Afag shock absorbers (3+4) slowed.

#### Shock absorbers adjust

1. Stroke **H** adjust.
2. **P1** air to enter. The slide (5) of the LM runs right up to attack by limiting screw (1) in position **X**
3. Shock absorbers (3) screwed in a clockwise sense (the absorber pin (8) is in the absorber is pressed into it until the sled (5) begins to move.
4. Shock absorbers (3) now in counter-clockwise from two affable with screws and screw pin (7\*) secure.. (1 revolution = 1mm distance).
5. **P2** Air to enter. The slide (5) of the LM goes to the left to attack by limiting screw (2) in position **X1**.
6. The same process as in 3-4 with shock absorbers (4) repeat. After shock-absorbers with nut (8) secure.
7. Shock absorber (2) clockwise two ambulatories unscrew (1) and protect with mother.

 <b>CAUTION</b>	
	<b>If shock absorbers are used as an as an attack, they can be damaged and unusable.</b>

### 3.2.6 Assembly for the accessory 3rd. position

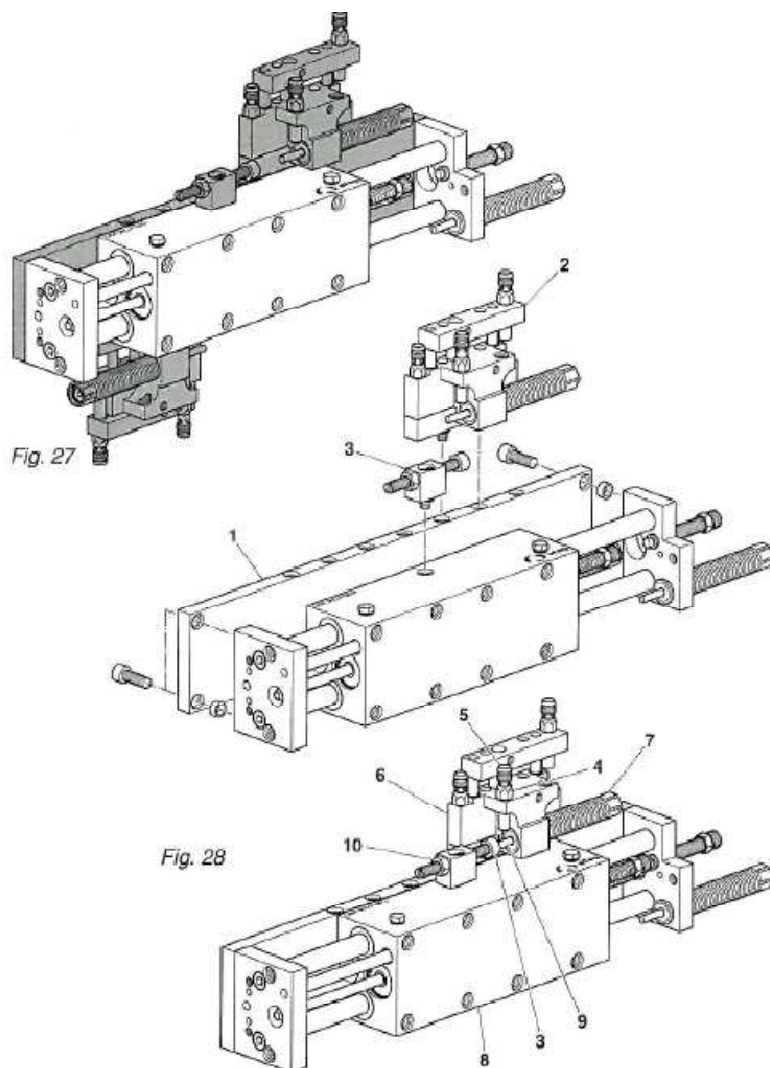


The 3rd Position is different in height  $X$  between the workpiece and workpiece-transfer absorption in. (Fig. 24-2)

#### 3. Position on the example: LM 20

1. Nut (1) solve and shock absorbers (2) counter-clockwise in about 5 affable unscrew. (Fig. 24-1).
2. **P1** air to enter. The sled (3) goes up, up by limiting stop screw (4) (Fig. 24-2).
3. Compressed air to solve **P1** and **P3** to give. The sled (3) goes to attack by limiting screw (6).
4. Compressed air to solve **P1** and **P3** to give the sled (3) goes to the limit stop screw (7) to disk (8) below. Plate (8) may be solved by the screw (9) adjust.
5. Vertical position of the slides (3) by adjusting the stop screw (7), ans then with his nut (10) secure.
6. Shock absorbers (2) until it stops in a clockwise sense screwing. The setback pin (11) is in the absorber is pressed.
7. Shock absorbers (2) now in the opposite clockwise sense from two affable screw and nut (1) secure. (one revolution = 1 mm path).

### 3.2.7 Assembly the intermediate stop (ZA 20/25)



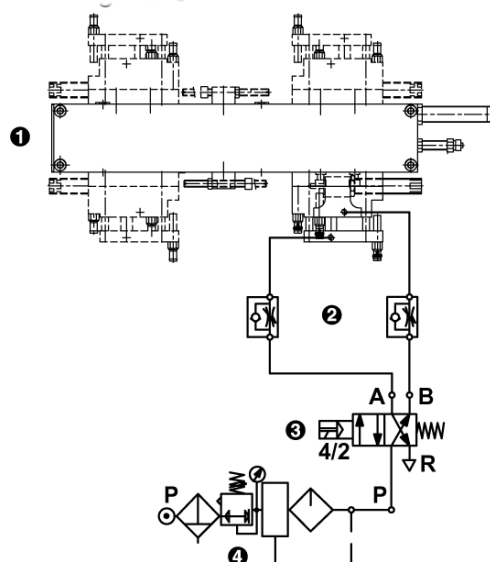
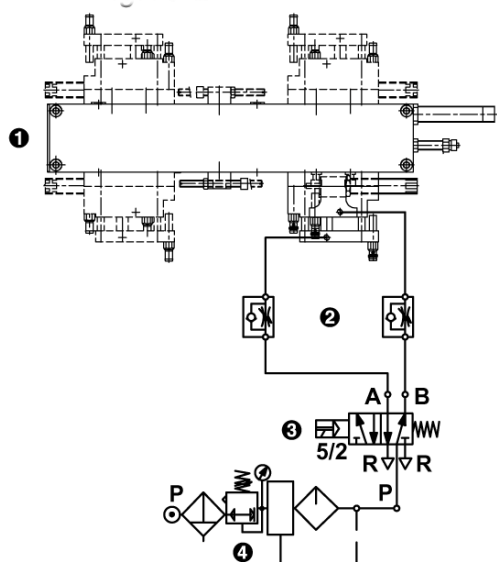
The intermediate stop ZA 20/25 is an add-on module for the linear series LM 20/25, which is an arbitrary intermediate position within the entire stroke range of the linear module allows. The intermediate stop may be of the symmetric structure to the front to rear as acting on the base plate ZA installed. (Fig.27).

#### Intermediate stop setting (Example: LM 20)

1. Base plate (1), intermediate stop (2) and stop screw (3) assemble.
2. Initiator holder (4) and solve the initiator (5) remove.
3. The slide (6) together with the shock absorber (7) in the bottom position. The housing (8) LM 20/25 linearly to limit leadership in the direction of shock absorber (7) move. The shock absorbers pin (9) is controlled by the stop screw (3) in the shock absorbers inside pressed.
4. Nut (10) of the stop screw loose and finely adjust the position by the stop screw determined. Then stop screw (3) with nut (10) secure.

### 3.2.8 Air connection intermediate stop ZA 20/25

Operating pressure: 6 bar +/-2



1 *Linear modules (ZA)*

2 *One-way restrictor*

3 *Directional valve  
(Standard 5/2)*

4 *Maintenance unit*

P *Compressed air connection*

### 3.2.9 Proximity switches assembly

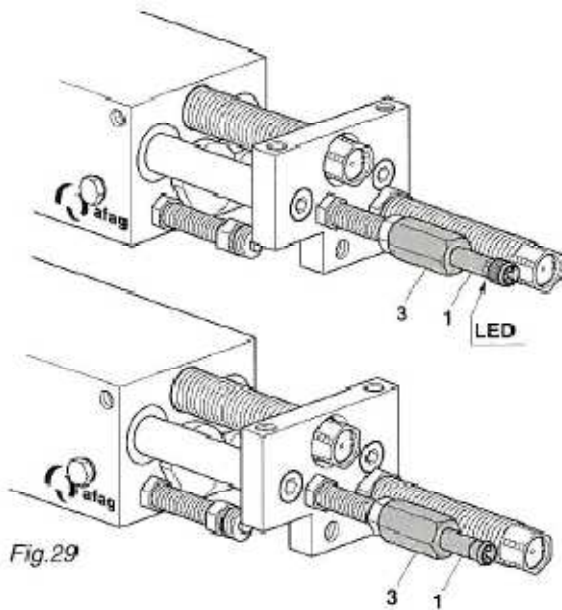


Fig.29

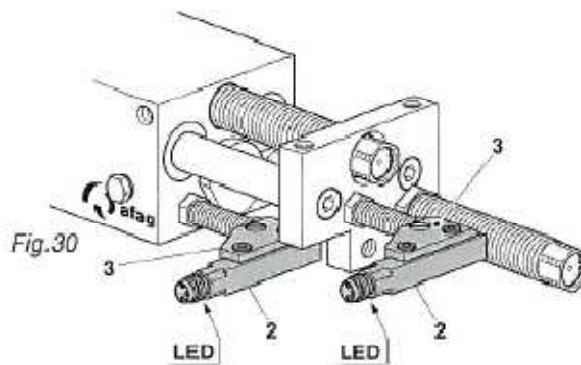
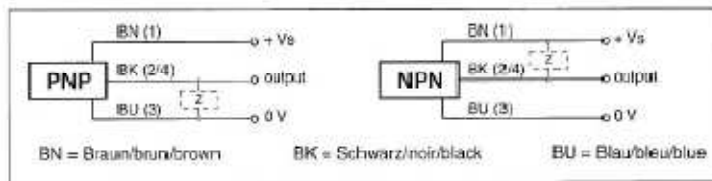


Fig.30



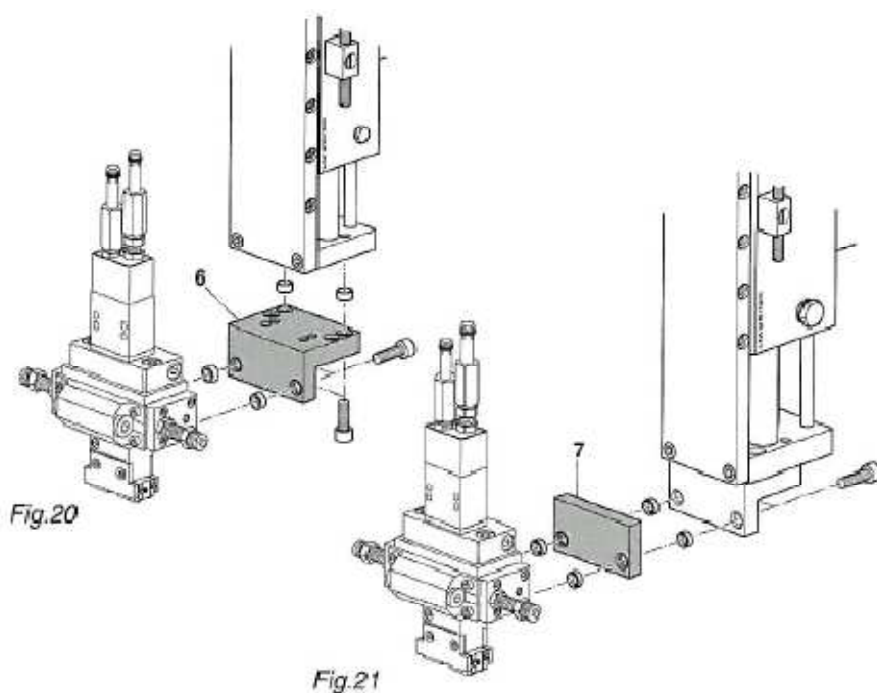
To end the query LM are plug and screw d6.5 mm (1) or 8x8 mm (2) with initiators initiators holder (3) used. (Fig.29+30) an LED on the initiator used to function monitoring in the end beaten query. Changes the LED in the end their query condition is not switching, the initiator is defective and must be made!

## **WARNING**



**LM's and proximity switches must not be used in an explosive environment!**

### 3.3.0 Cultivation of mounting angle or intermediate plate



#### **Mounting angle** (Fig. 20)



With the mounting angle (6) can be Z.B. at the end plate of the LM 20 with mounted touch ZA between a RM 12, RM 16 or RM 25 attached.

#### **Intermediate plate** (Fig. 21)

The intermediate plate (7) is also needed when in a LM 25 with mounted ZA, forehead side a RM 12, RM 16 or RM 25 will be fastened.

### 3.3.1 Preparation for Commissioning

Before commissioning first set the stop screw and then the shock absorbers.

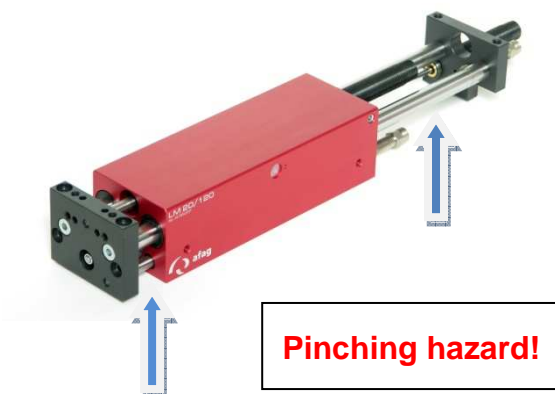
 <b>CAUTION</b>	
	<b>An LM is a precise mechanical unit and must be handled with the necessary care and cleanliness during transport and storage as well as when handling, setting and assembling.</b>

#### Commissioning

- Ventilate the total system slowly.
- Note the permissible values (see catalogue) regarding::
  - Useful load
  - Operating pressure
  - Motion frequency
  - Moment loads on the guide system
  -



 <b>CAUTION</b>	
	<b>Limbs may be squeezed by moving components.</b>

- Make sure that there are no persons or tools within the operative range of the module.
- Carry out a test run
  - First of all with slow travel movements,
  - Afterwards under operating conditions.



## 4.0.0 Maintenance instructions

### 4.1.0 Maintenance and servicing of the LM 20/25 linear module compact

 <b>CAUTION</b>	
	<p>The module may only be disassembled when the system is aerated and deactivated. If pneumatic connections are disconnected when they are under pressure, this may result in serious personal injury due to fast movements of moving parts.</p>

Maintenance interval	Service measures
As required	<ul style="list-style-type: none"> <li>▪ Clean the module with a dry, lint-free cloth. The module must not be washed down; do not use any aggressive cleaners.</li> </ul>
1 Montly	<ul style="list-style-type: none"> <li>▪ Check the safety labels for damage, readability and clienless.</li> </ul>

#### Further maintenance

Under the following conditions is the LM-linear module maintenance free:

- Clean workshop atmosphere
- No splash water
- No dust and fumes caused by abraision or processes
- Ambient conditions according the technical cataloge

### 4.1.1 Servicing

The LM linear module is lubricated for-life and can be operated with oiled and unoiled air.

 <b>CAUTION</b>	
	<b>Under no circumstances must the LM be operated with oiled air before operating with oil-free air!</b>

#### Air specification:

- Dry (free of condensation)
- Filtered (40um filter for oiled air)
- Filtered (5 um filter oil-free air)

If the LM is to be operated with oiled air, then we recommend the following oils::

- 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



Amount of oil: 5-10 drops of oil per 1000 l air

Viscosity range:

9 to 11 mm<sup>2</sup>/s (= cST) at 40°C, ISO-classe VG 10 according to ISO 3448

Apart from normal machine cleaning work, no further measures are necessary for maintenance.

#### Special Operations Module

 <b>CAUTION</b>	
	<b>Module inserts for ionized air environments (e.g. in case of high-voltage procedure such as corona processes).</b>
	<b>Open guides and pistons should be covered with a grease layer to avoid any rust.</b>

Open guides and pistons should be covered with a grease layer to avoid any rust.

- Afag standard:
- Staburax NBU8EP (lat guides)
  - Blasolube 301 (piston rods)

#### 4.1.2 Accessories to the LM-linear modules

##### Accessories to LM 20

Article	Order No.
Base plate	See catalogue technical
3rd. position	11001623 catalogue technical
Zwischenanschlag	11011366 catalogue technical
Proximity switch INI d6.5x44-Sn1.5-PNP-NO-M8x1	11005439
Proximity switch INI 8x8x38.5-Sn1.5-PNP-NO-M8x1	50338170
Base plate for intermediate position	See catalogue technical

##### Accessories LM 25

Article	Order No.
Base plate	See catalogue technical
Intermediate stop	11011366 catalogue technical
Proximity switch INI d6.5x44-Sn1.5-PNP-NO-M8x1	11005439
Proximity switch INI 8x8x38.5-Sn2.0-PNP-No-M8x1	50338170



### 4.1.3 Troubleshooting

Breakdowns caused by defective components must only be rectified by replacing these components.

<b>Fault</b>	<b>Possible</b>	<b>Rectifying action</b>
<b>Moule does not travel in/out</b>	No compressed	Check compressed air connections
	Module pneumatic connecting wrong	Check pneumatic links
<b>End of travel signal not available</b>	Stop screw wrongly adjusted	Readjust stop screw
	Proximity switch faulty Break in sensor cable	Replace proximity switch Replace proximity switch cable
<b>The module impacts in stop positions</b>	Shock absorber badly adjusted	Readjust the shock absorber to the stop screw
	Shock absorber faulty	Replace shock absorber
	Exhaust air throttle faulty	Replace exhaust air throttle
	No shock absorbers installed	Install shock absorbers
	Stroke speed to high	Adjust exhaust air throttle
<b>Pay load swings in stop position</b>	Stroke speed to high	Adjust exhaust air throttle
	Damping is not optimum	Optimise the shock absorbers type, stroke
	Unvavourable installation position	Optimise the construction
	Unvavourable LM type	Use larger LM type


#### 4.1.4 Disassembly and repair

When the module is damaged it can be returned to Afag AG for repair.

 <b>CAUTION</b>	
	<b>The module may only be disassembled when the system is ventilated and deactivated. If pneumatic connections are disconnected when they are under pressure, this may result in serious personal injury owing to fast movements of moving parts.</b>


#### When can the modules be repaired by the customer?

Wearing parts can be exchanged by the customer itself when the guarantee has expired.

<b>NOTE</b>	
	All the other faulty parts must exclusively be replaced by company Afag AG!

#### When the customer detects that the respective module is still under guarantee:?

- He returns the module to company Afag AG for repair.
- If the guarantee has already expired, the customer must decide whether he repairs the module himself and orders the wearing parts kit or whether he returns the module to company Afag AG for repair.

<b>NOTE</b>	
	The Afag offers a reliable repair service. Note that Afag no guarantee of modules can take over what the company does not furch Afag Automation AG have been repaired.

-

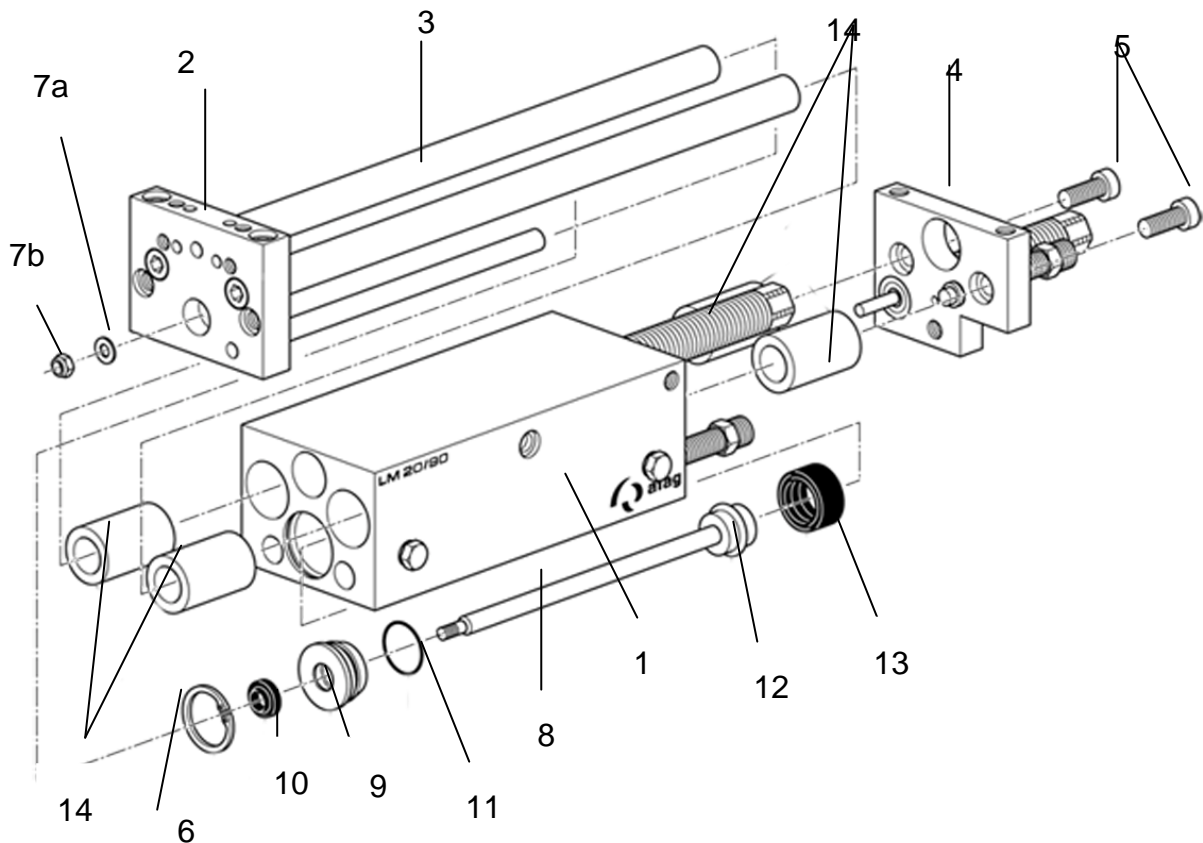
## 4.1.5 Exchangable parts

### Wearing parts-set LM 20

Module type	LM 20 /30	LM 20 /60	LM 20 /90	LM 20 /120	LM 20 /150	LM 20 /200
Order No.	11002502	11002502	11002502	11002502	11002502	11002502

### Wearing parts-set LM 25

Module type	LM 25 /60	LM 25 /120	LM 25 /200
Order No.	11011243	11011243	11011243



- |                       |                 |                      |
|-----------------------|-----------------|----------------------|
| 1. Housing            | 6. Circlip Ring | 10 Scraper           |
| 2. Mounting plate     | 7a U-Disc       | 11 O-Ring            |
| 3. Guide rods         | 7b Stop Nut     | 12 Piston            |
| 4. Stop carrier plate | 8 Piston rod    | 13 Piston seal       |
| 5. Screws             | 9 Cylindre head | 14 Ball-type nipples |

## Exchanging wearing parts on the LM 20 and LM 25

### Disassembly:

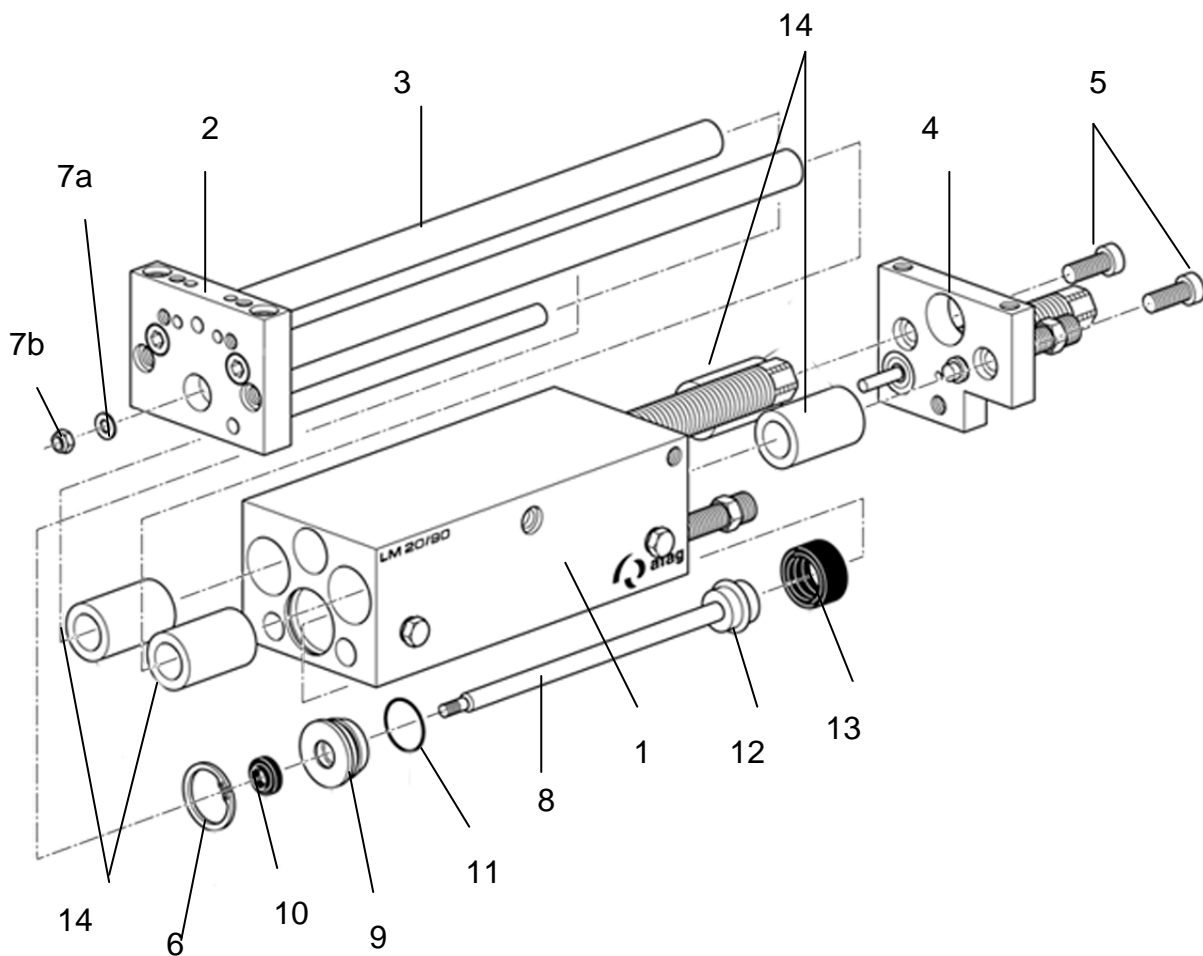
1. Loosen screw (5) at the stop carrier plate (4).
2. Remove circlip Ring (6) at the front of the base body (1).
3. Extend mounting plate (2) with guide rods (3) and piston rod (8).
4. Loosen stop nut (7b) at the piston rod, hold piston rod with an aluminium tongs, then remove piston rod.
5. Remove cylinder head (9) with O-ring (11) and scraper (10).
6. Press out piston rod (8) on the hand-operated press out the base body (1).
7. Push recirculating ball bushings on the hand-operated press out of the
8. Clean guides on the base body.
9. Clean piston rod (8).
10. Clean guide rods (3).

### Assembly:

1. Lubricate recirculating ball bushing (14) with (Blasolupe 301) and press the  
**Caution:** the scrapers of the recirculating ball bushings (14) must always be on the outside!
2. Press the piston rod (8) carefully and flush into the preassembled piston (12).
3. The scraper (10), the circlip Ring (11) and the cylinder head are preassembled; push these parts in the correct position (scraper facing the thread) onto the piston rod (8).
4. Lubricate cylinder head (9) and circlip Ring using (Blasolupe 301)
5. Insert the lubricate and preassembled piston rod (8) in the piston boring at the base body (1).
6. Push in the mounting plate (2) with guide rods (3) in the recirculating ball bushings at the base body (1).
7. Place stop carrier plate (4) onto the guide rods (3) and tighten with screws (5) (8,5 bis 9,9 Nm).
8. Fit piston rod (8) in faceplate (2).
9. U-Disc (7a) on piston rod (8) and tighten with screws (5) (8.5 Nm to 9.9 Nm).


**Final control:** Prior to the functional test module mounted

The basic body (1) on the guide rod back and forth move when the body can move without resistance, the module re-use. With air leakage test run.



All information without warranty repair manual, because the Afag with special mounting tool works.

## 5.0.0 Disposal

NOTE	
	<p>LMs which are of no further use should not be disposed of as a complete unit but dismantled into individual parts according to the type of material and recycled should be correctly disposed of.</p> <p>Non-recyclable materials, animal waste.</p>







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