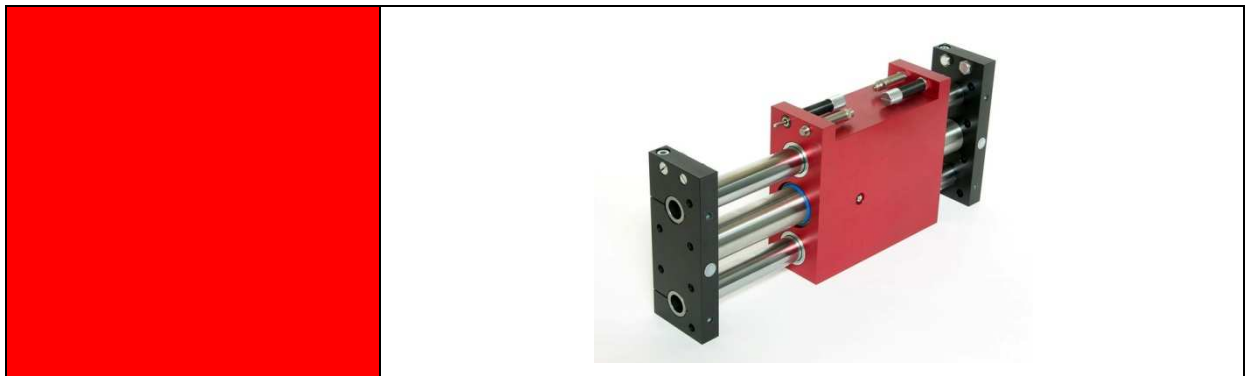


# Linear modules

## LM 40

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



„Translation“ of the Original Operating Instructions

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These operating instructions apply to:



Type	Order No.	Type	Order No.
LM 40/100	11001711	LM 40/600	11001716
LM 40/200	11001712	LM 40/800	11001717
LM 40/300	11001713	LM 40/1000	11001718
LM 40/400	11001714		
LM 40/500	11001715		


Version of this documentation: LM 40-OI-vers. 2.2 gb. 13.01.12

Symbols:

Assembly and initial start-up must be  
Carried out by qualified Personnel only  
And according to these operating  
instructions.

 <b>WARNING</b>	
	<p>Indicates a possible dangerous situation.</p> <p><b>Non-compliance with this information can result in death or serious personal injuries (invalidity).</b></p>

 <b>PRECAUTION</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>

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## 1.0.0 Declaration Installation for the incomplete machine

### 1.1.0 Declaration Installation 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 modules**  
Type: **LM 40/100; LM 40/200; LM 40/300; LM 40/400  
LM 40/500; LM 40/600; LM 40/800; LM 40/1000**

Sequential series No.50xxxxxx

meets the basic safety and health requirements of the Machinery Directive  
**2006/42/EC, Appendix II B.**

The incomplete machine further complies with the:

Applicable EC Directives: Machinery Directive 2006/42/EC

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.

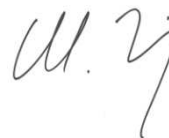
The authorized person for the compilation of the assembly-, operating and  
maintenance instructions was: Mr Beat Lanz

**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 presented.**

Place, Date Company: Afag Automation AG

Huttwil, 15. May 2009 Mathias Schütz

Marc Zingg





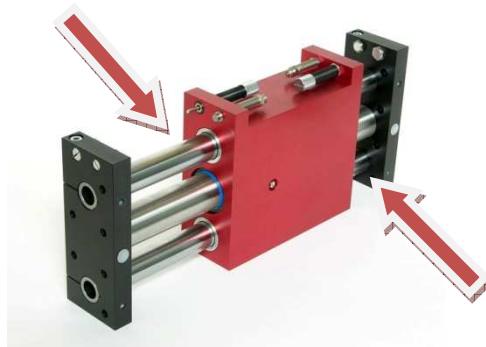
Product Manager  
Afag Automation AG


Managing Director  
Afag Automation AG

## 2.0.0 Assembly instructions

### 2.1.0 Transport and storage

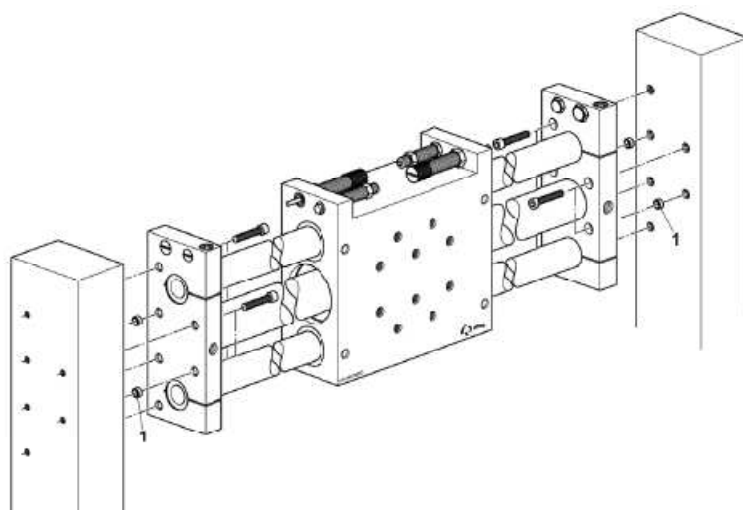
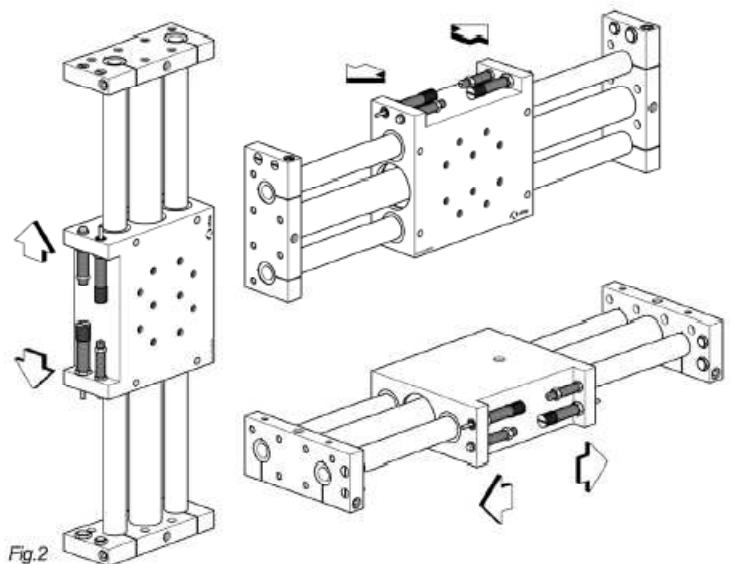
 <b>CAUTION</b>	
	<p>The LM 40 module sin not packed, with wrong use this could fall modul under it and limb measured or squeeze your fingers.</p>



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

### 2.1.1 Possibilities of fastening LM 40 Module

The LM 40 can be combined in any required position to all other Afag pick and place modules.



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.

### CAUTION



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

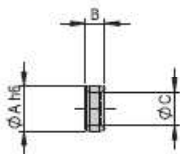
## 2.1.2 Centering sleeves and fixing grid

Hole matrix at the **LM 40**

<b>Linear module</b>	<b>LM 40</b>
Hole matrix	48x48mm 96x96mm
Thread / bore hole	M6
Centering bushings (H7)	9x4mm

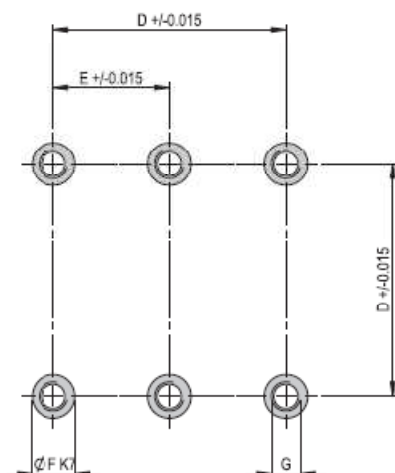
Use the centering bushings included in the scope of supply for positioning and insert these sleeves in the diagonally opposite bore holes of the mounting grid.

Zentrierhülse	Douilles de centrage	Centering bushings	4h6x2.0 mm	5h6x2.5 mm	7h6x3.0 mm	8h6x3.5 mm
Eestellnummer	Article No.	Order No.	50332257	50035831	11016850	50263565
Mass A	Dimension A	Dimension A	4 mm	5 mm	7 mm	8 mm
Mass B	Dimension B	Dimension B	2 mm	2.5 mm	3 mm	3.5 mm
Mass C	Dimension C	Dimension C	2.6 mm	3.2 mm	4.3 mm	5.4 mm



9h6x4.0 mm	12h6x5.0 mm	15h6x5.2 mm	19h6x5.8 mm
11004942	50187424		50189497
9 mm	12 mm	15 mm	19 mm
4 mm	4.8 mm	5.2 mm	5.8 mm
6.5 mm	8.5 mm	10.5 mm	13 mm

Befestigungsraster	Treme de fixation	Fixing grid	16x16 mm	20x20 mm	30x30 mm	38x38 mm
Mass D	Dimension D	Dimension D	16 mm	20 mm	30 mm	38 mm
Mass E	Dimension E	Dimension E	16 mm	20 mm	30 mm	38 mm
Mass F	Dimension F	Dimension F	4x1.1 mm	7x1.6 mm	7x1.6 mm	8x3.6 mm
Mass G	Dimension G	Dimension G	M2.5	M3	M4	M5



48x48 mm	60x60 mm	75x75mm	96x96 mm
48 mm	60 mm	75 mm	96 mm
24 mm	30 mm	75 mm	48 mm
9x2.1 mm	12x2.5 mm	15x2.7 mm	19x5.8 mm
M6	M8	M10	M12

### 2.1.3 Tightening torques for screws

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	Tightening moments
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

### This is an incomplete machine

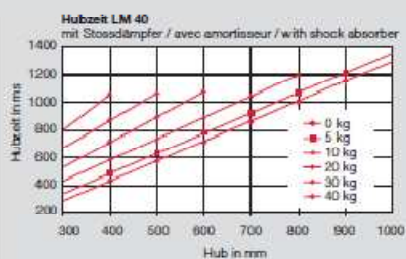
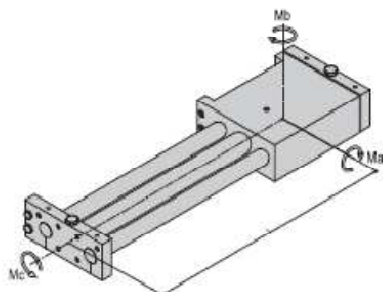
#### Assembly of the LM 40 in a system

The series of the LM 40 module 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 40 module can be installed in the horizontal or vertical position.

NOTE	
	<p>These operating instructions should be read carefully before carrying out any activity on or with the LM 40 module. The LM 40 module may only be deployed in accordance with the intended use.</p>

NOTE	
	<p><b>Safety instructions</b></p> <p>Modifications on the LM 40 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.</p>

## 2.1.4 Slide unit load factors LM 40



### Verfahrzeit

Messung bei 6 bar

### Durée du déplacement

Pression mesurer près 6 bar

### Traversing time

Measurement by 6 bar

Typ	Type	Type		LM 40/100 LM 40/500	LM 40/200 LM 40/600	LM 40/300 LM 40/800	LM 40/400 LM 40/1000	LM 40/1200
Max. zulässige statische Momente	Moments static max. autorisés	Max. permitted static torque	Ma	120 Nm	120 Nm	120 Nm	120 Nm	120 Nm
			Mb	120 Nm	120 Nm	120 Nm	120 Nm	120 Nm
			Mc	83 Nm	83 Nm	83 Nm	83 Nm	83 Nm
Max. zulässige dynamische Momente	Moments dynamique max. autorisés	Max. permitted dynamic torque	Ma	54 Nm	54 Nm	54 Nm	54 Nm	54 Nm
			Mb	54 Nm	54 Nm	54 Nm	54 Nm	54 Nm
			Mc	37 Nm	37 Nm	37 Nm	37 Nm	37 Nm
Wirkabstand	Distance active	Active distance	L	207 mm	207 mm	207 mm	207 mm	207 mm

## 2.1.5 Preferred combinations LM 40

Typ	Type	Type	LM 40/100	LM 40/200	LM 40/300	LM 40/400
Bestellnummer	Article No.	Order No.	<b>11001711</b>	<b>11001712</b>	<b>11001713</b>	<b>11001714</b>
Hub = H	Course = H	Stroke = H	100 mm	200 mm	300 mm	400 mm
Hubbegrenzung	Limitation de course	Stroke limiter	2 x 35 mm	2 x 35 mm	2 x 35 mm	2 x 35 mm
Zylinder	Cylindre	Cylindre	40 mm	40 mm	40 mm	40 mm
*max. Nutzlast = M	*Charge utile max. = M	*Max. ef. weight = M	40 kg	40 kg	40 kg	40 kg
Kolbenkraft einfahren	Force du piston entrer	Piston force retract	754 N	754 N	754 N	754 N
Kolbenkraft ausfahren	Force du piston sortir	Piston force extrend	754 N	754 N	754 N	754 N
Betriebsdruck	Pression d'alimentation	Operating pressure	6 bar +/-2	6 bar +/-2	6 bar +/-2	6 bar +/-2
Luftanschluss = P	Raccords d'air = P	Air connections = P	G $\frac{1}{4}$ "	G $\frac{1}{4}$ "	G $\frac{1}{4}$ "	G $\frac{1}{4}$ "
Luftverbrauch / Zyklus	Consomation d'air / cycle	Air consumption / cycle	2.4 NI	3.6 NI	4.8 NI	6.0 NI
Einbaulage	Position de montage	Mounting position	+	+	+	+
Modulgewicht	Poids du module	Weight of module	8.2 kg	10.0 kg	11.8 kg	13.6 kg
Typ	Type	Type	LM 40/500	LM 40/600	LM 40/800	LM 40/1000
Bestellnummer	Article No.	Order No.	<b>11001715</b>	<b>11001716</b>	<b>11001717</b>	<b>11001718</b>
Hub = H	Course = H	Stroke = H	500 mm	600 mm	800 mm	1000 mm
Hubbegrenzung	Limitation de course	Stroke limiter	2 x 35 mm	2 x 35 mm	2 x 35 mm	2 x 35 mm
Zylinder	Cylindre	Cylindre	40 mm	40 mm	40 mm	40 mm
*max. Nutzlast = M	*Charge utile max. = M	*Max. ef. weight = M	40 kg	20 kg	10 kg	5 kg
Kolbenkraft einfahren	Force du piston entrer	Piston force retract	754 N	754 N	754 N	754 N
Kolbenkraft ausfahren	Force du piston sortir	Piston force extrend	754 N	754 N	754 N	754 N
Betriebsdruck	Pression d'alimentation	Operating pressure	6 bar +/-2	6 bar +/-2	6 bar +/-2	6 bar +/-2
Luftanschluss = P	Raccords d'air = P	Air connections = P	G $\frac{1}{4}$ "	G $\frac{1}{4}$ "	G $\frac{1}{4}$ "	G $\frac{1}{4}$ "
Luftverbrauch / Zyklus	Consomation d'air / cycle	Air consumption / cycle	2.4 NI	3.6 NI	4.8 NI	6.0 NI
Einbaulage	Position de montage	Mounting position	+	+	+	+
Modulgewicht	Poids du module	Weight of module	14.5 kg	15.4 kg	17.2 kg	19.0 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)	65 dB (A)
Befestigungsraster	Trama de fixation	Fixing grid	48 x 48 + 96 x 96 mm M6	48 x 48 + 96 x 96 mm M6	48 x 48 + 96 x 96 mm M6	48 x 48 + 96 x 96 mm M6
Befestigungsgewinde	Filet de montage	Mounting thread	M6	M6	M6	M6
Temperatur: - Lager - Betrieb	Température: - de Stockage - d'utilisation	Temperature: - Storage - 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
Luftfeuchtigkeit (nicht kondensierend)	Humidité (sans condensation)	Humidity (non condensing)	< 90%	< 90%	< 90%	< 90%
Medium: gefilterte Druckluft	Fluide: air comprimé filtré	Medium: filtered compressed air	10...40 µm	10...40 µm	10...40 µm	10...40 µm
Wiederholgenauigkeit	Précision de répétition	Repeating precision	+/- 0.03 mm	+/- 0.03 mm	+/- 0.05 mm	+/- 0.05 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 12/60  
2 Stossdämpfer SD M14x1-2  
2 Zentrierhülsen Ø9x4 mm

Das LM 40 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 diagr. de noter.

### La livraison comprend:

2 Vis d'arrêt AS 12/60  
2 Amortisseurs SD M14x1-2  
2 Douilles de centrage Ø9x4 mm

Pour la commande du module LM 40 on peut utiliser aussi bien de l'air huilé que de l'air exempt d'huile. Classe de sal- le blanche: 10 000 (Federal Standard 209E)

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

Les caractéristiques techniques se basent sur une pression de consigne de 6 bar et les tests standard Afag.  
\*Traversing time diagramm note.

### Included in the delivery:

2 Adjusting stop screw AS 12/60  
2 Shock absorbers SD M14x1-2  
2 Centering bushings Ø9x4 mm

The LM 40 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**

### 3.0.0 Operating instructions

**3.1.0 Manufacturer address:** Afag Automation AG  
Fiechtenstrasse 32  
CH - 4950 Huttwil (Switzerland)

Sales Handling:  
Tel. +41 (0)62 959 87 02  
[www.afag.com](http://www.afag.com)

**These operating instructions apply to:**



Product name: **Linear modules**  
Types: **LM 40 / 100/200/300/400/500/600/800/1000**


This documentation was written according to: the applicable EC Directive  
2006/42/EC

Responsible person for the documentation: Lanz Beat, PM & Marketing-Services  
Afag Automation AG  
Fiechtenstrasse 32  
4950 Huttwil, Switzerland

### 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

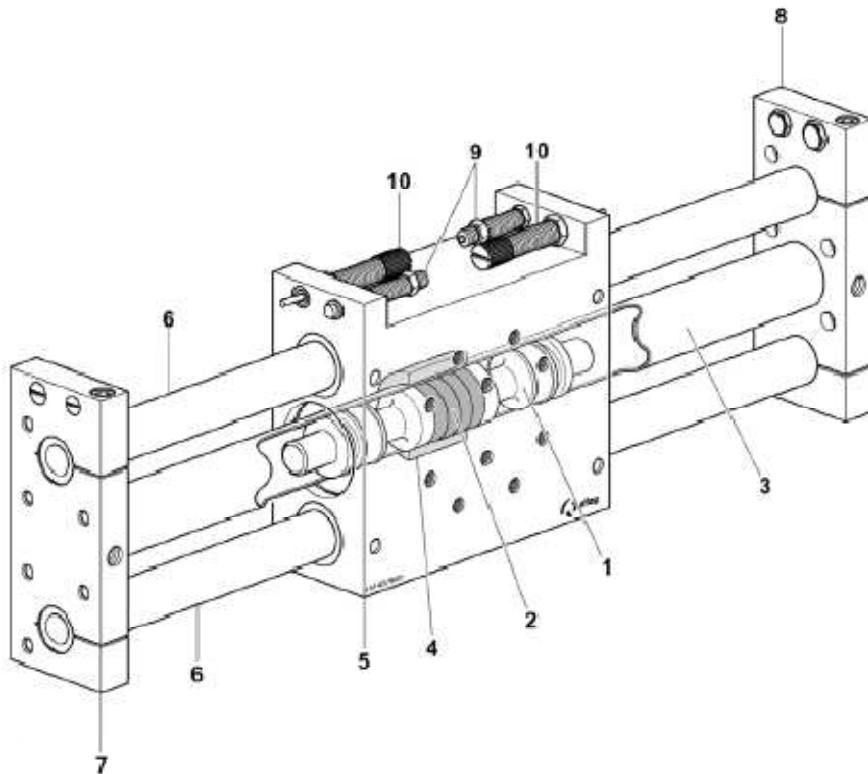
#### [This is an incomplete machine](#)

The series of the LM 40 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 40 Linear module can be installed in the horizontal or vertical position.

Modifications on the LM 40 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 module



1	Piston	6	Guide shaft
2	Permanent magnet	7	Front plate
3	Cylinder tube	8	Back plate
4	Permanent magnet	9	Stop screw AS 12/60
5	Housing	10	Afag shock absorber SD M14x1-1

#### Functional description LM 40

The LM 40 linear module is a pneumatically driven application for longitudinal motions of 0 to 1000 mm stroke.

All modules are delivered ready for installation according to customer order.

A double acting piston (1) with an integrated permanent magnet (2) applies an a second magnet (4) inside the housing (5) and forces the housing to move as well.

Two guide shafts (6) led through the housing (5) by lifetime lubricated bearing bushes, connect the front (7) and back (8) plates. The infinitely variable stops (9) limit the stroke. Afag shock absorbers (10) buffer the end motion.


### 3.1.4 Scope of supply



Item	Quantit	Description
1	1	Module LM 40
2	2	Stop screw AS 12/60
3	2	Shock absorber SD M14x1-2
4	2	Centering bushings Ø 9x4mm

### 3.1.5 Intended use

The series of the LM 40 Linear module is used for the linear movement of rigidly mounted loads under the ambient and operating conditions defined for this module; see Technical catalogue.

### 3.1.6 Safety Instructions

NOTE	
	<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 deployed in accordance with the intended use.</p> <p>Modifications 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 improper changes or 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 injury or damage to property.</b></p>

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

### 3.1.7 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.

### 3.1.7 Areas of application

The LM 40 Linear module are exclusively designed for the linear movement of load capacities of up to 5-40 kg in any position, the load capacities should not affect persons, property or the environment. They can also be used in combination with other modules than Pick&Place machines, the permissible load capacities should, however, not be exceeded.

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

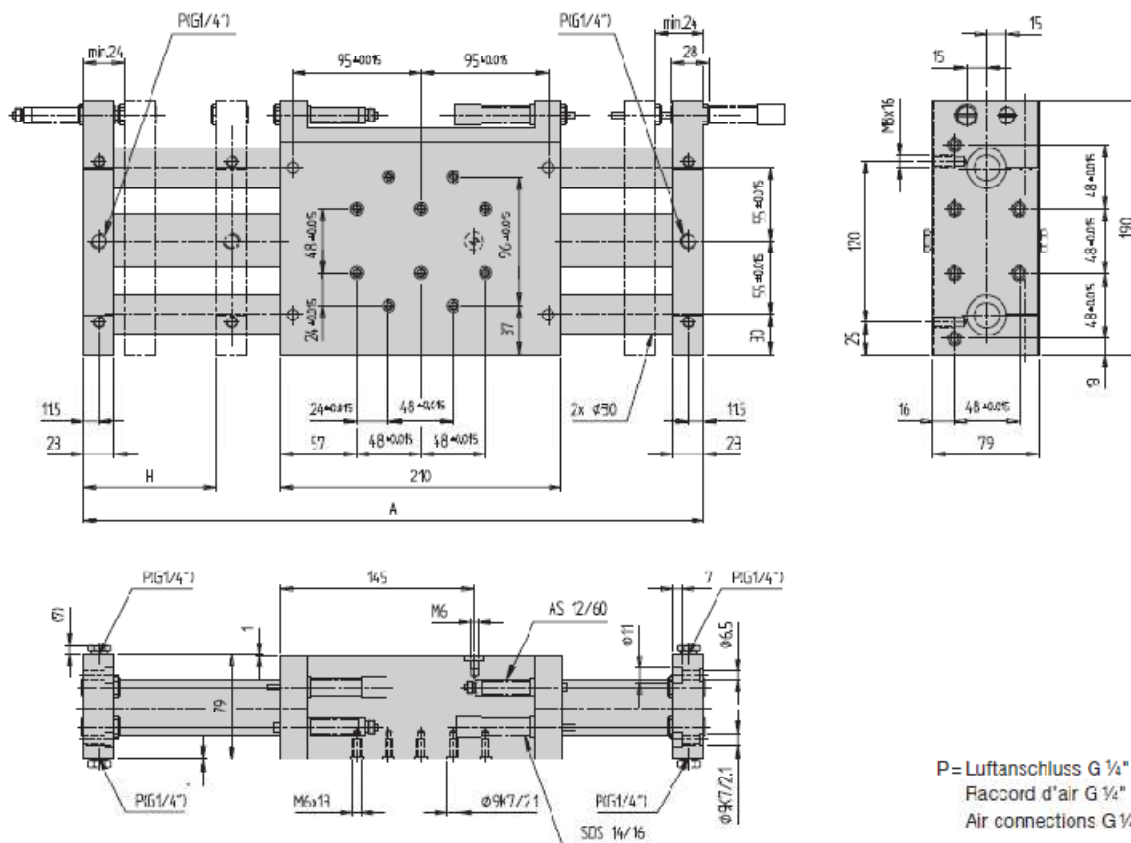
<b>NOTE</b>	
	<p>The manufacturer does not accept any liability for damage resulting from such use. The risk is that of the user alone.</p>

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

The LM 40 module 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>

### 3.1.9 Dimension LM 40



<b>Typ</b>	<b>Type</b>	<b>LM 40/100</b>	<b>LM 40/200</b>	<b>LM 40/300</b>
Mass A	Dimension A	360 mm	460 mm	560 mm
<b>Typ</b>	<b>Type</b>	<b>LM 40/400</b>	<b>LM 40/500</b>	<b>LM 40/600</b>
Mass A	Dimension A	660 mm	760 mm	860 mm
<b>Typ</b>	<b>Type</b>	<b>LM 40/800</b>	<b>LM 40/1000</b>	
Mass A	Dimension A	1060 mm	1260 mm	

### 3.2.0 Technical data LM 40

Typ	Type	Type	LM 40/100	LM 40/200	LM 40/300	LM 40/400
Bestellnummer	Article No.	Order No.	<b>11001711</b>	<b>11001712</b>	<b>11001713</b>	<b>11001714</b>
Hub = H	Course = H	Stroke = H	100 mm	200 mm	300 mm	400 mm
Hubbegrenzung	Limitation de course	Stroke limiter	2 x 35 mm	2 x 35 mm	2 x 35 mm	2 x 35 mm
Zylinder	Cylindre	Cylindre	40 mm	40 mm	40 mm	40 mm
*max. Nutzlast = M	*Charge utile max. = M	*Max. ef. weight = M	40 kg	40 kg	40 kg	40 kg
Kolbenkraft einfahren	Force du piston entrer	Piston force retract	754 N	754 N	754 N	754 N
Kolbenkraft ausfahren	Force du piston sortir	Piston force extrend	754 N	754 N	754 N	754 N
Betriebsdruck	Pression d'alimentation	Operating pressure	6 bar +/- 2 G¼"	6 bar +/- 2 G¼"	6 bar +/- 2 G¼"	6 bar +/- 2 G¼"
Luftanschluss = P	Raccords d'air = P	Air connections = P				
Luftverbrauch / Zyklus	Consomation d'air/cycle	Air consumption/cycle	2.4 NI	3.6 NI	4.8 NI	6.0 NI
Einbaulage	Position de montage	Mounting position	+	+	+	+
Modulgewicht	Poids du module	Weight of module	8.2 kg	10.0 kg	11.8 kg	13.6 kg
Typ	Type	Type	LM 40/500	LM 40/600	LM 40/800	LM 40/1000
Bestellnummer	Article No.	Order No.	<b>11001715</b>	<b>11001716</b>	<b>11001717</b>	<b>11001718</b>
Hub = H	Course = H	Stroke = H	500 mm	600 mm	800 mm	1000 mm
Hubbegrenzung	Limitation de course	Stroke limiter	2 x 35 mm	2 x 35 mm	2 x 35 mm	2 x 35 mm
Zylinder	Cylindre	Cylindre	40 mm	40 mm	40 mm	40 mm
*max. Nutzlast = M	*Charge utile max. = M	*Max. ef. weight = M	40 kg	20 kg	10 kg	5 kg
Kolbenkraft einfahren	Force du piston entrer	Piston force retract	754 N	754 N	754 N	754 N
Kolbenkraft ausfahren	Force du piston sortir	Piston force extrend	754 N	754 N	754 N	754 N
Betriebsdruck	Pression d'alimentation	Operating pressure	6 bar +/- 2 G¼"	6 bar +/- 2 G¼"	6 bar +/- 2 G¼"	6 bar +/- 2 G¼"
Luftanschluss = P	Raccords d'air = P	Air connections = P				
Luftverbrauch / Zyklus	Consomation d'air/cycle	Air consumption/cycle	2.4 NI	3.6 NI	4.8 NI	6.0 NI
Einbaulage	Position de montage	Mounting position	+	+	+	+
Modulgewicht	Poids du module	Weight of module	14.5 kg	15.4 kg	17.2 kg	19.0 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)	65 dB (A)
Befestigungsraster	Trame de fixation	Fixing grid	48 x 48 + 96 x 96 mm M6	48 x 48 + 96 x 96 mm M6	48 x 48 + 96 x 96 mm M6	48 x 48 + 96 x 96 mm M6
Befestigungsgewinde	Filet de montage	Mounting thread				
Temperatur: - Lager - Betrieb	Température: - de Stockage - d'utilisation	Temperature: - Storage - 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
Luftfeuchtigkeit (nicht kondensierend)	Humidité (sans condensation)	Humidity (non condensing)	< 90%	< 90%	< 90%	< 90%
Medium: gefilterte Druckluft	Fluide: air comprimé filtré	Medium: filtered compressed air	10...40 µm	10...40 µm	10...40 µm	10...40 µm
Wiederholgenauigkeit	Précision de répétition	Repeating precision	+/- 0.03 mm	+/- 0.03 mm	+/- 0.05 mm	+/- 0.05 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 12/60  
2 Stossdämpfer SD M14x1-2  
2 Zentrierhülsen Ø9 x 4 mm

Das LM 40 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 12/60  
2 Amortisseurs SD M14x1-2  
2 Douilles de centrage Ø9 x 4 mm

Pour la commande du module LM 40 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**

Les caractéristiques techniques se basent sur une pression de consigne de 6 bar et les tests standard Afag.  
\*Traversing time diagramm note.

#### Included in the delivery:

2 Adjusting stop screw AS 12/60  
2 Shock absorbers SD M14x1-2  
2 Centering bushings Ø9 x 4 mm

The LM 40 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**

### 3.2.1 Pneumatic connection LM 40

The pneumatic connection to upside the module (2x G1/4")

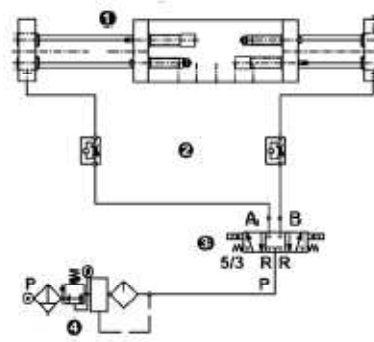
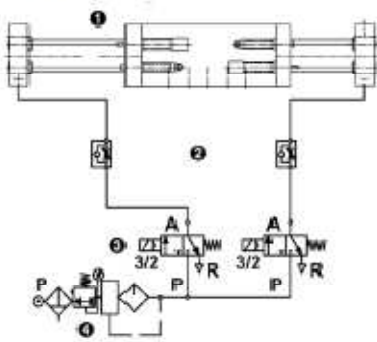
1 Module LM 40

P = Air supply

2 Throttle valve

4 Service unit

3 Control air valve



### 3.2.2 Adjusting the module LM 40

Afag AG achieves the following delivery conditions for the LM 40.

#### Linear modul (Fig.12)

The standard outfit includes two stop screws AS 12/60 (1) and two shock absorbers SD M14x1-2 (2) for limit stop adjustment.

#### Connecting plate LM 40 – LM 32 (Fig.13)

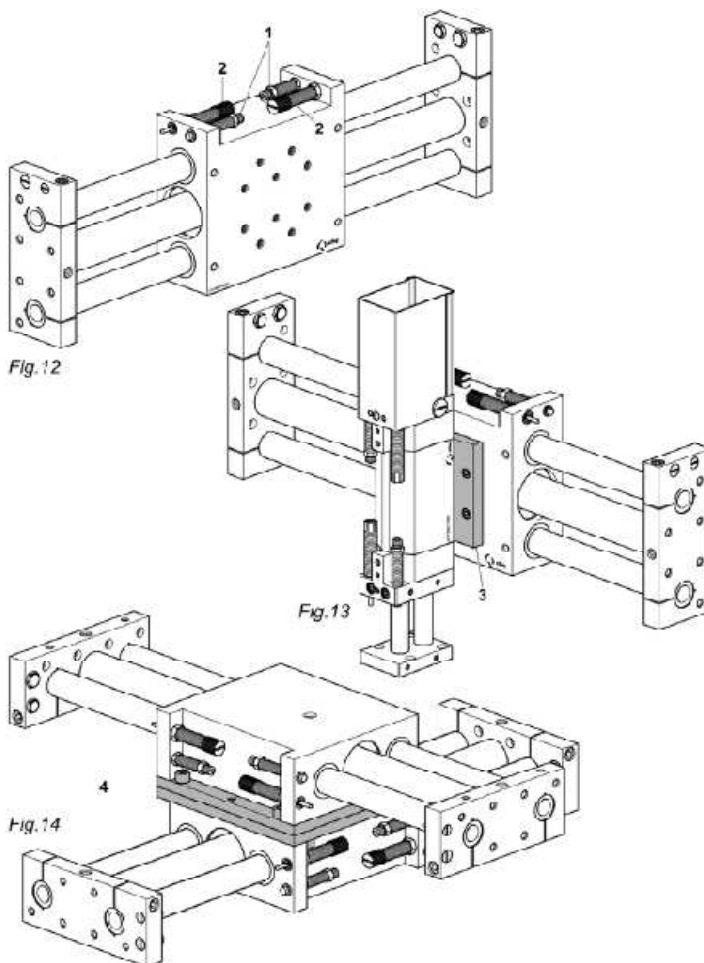
The connecting plate (3) enables the combination of a LM 32 with an LM 40.

#### Connection plate LM 40 – LM 40 (Fig.14)

This connecting plate (4) enables an X-Y table construction with LM 40 modules or it can also be used for individual solutions.

#### Stroke limiter (Fig.15)

With the stroke limiters (5), the stroke end of the LM 40 and the stroke length can be redefined.



### 3.2.3 Stroke limiter for LM 40 (Fig.15)

With the stroke limiters (5), the stroke end of the LM 40 and the stroke length can be redefined.

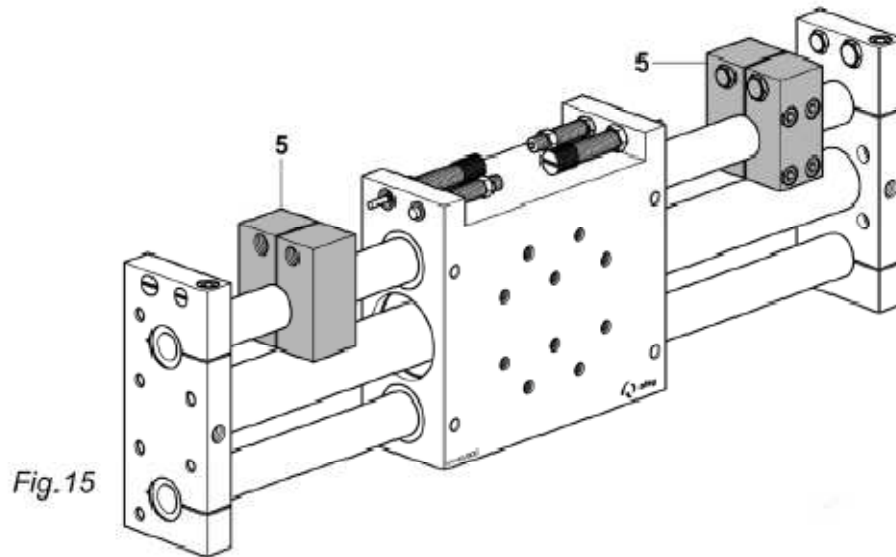




Fig.15

### 3.2.4 Stroke adjustment

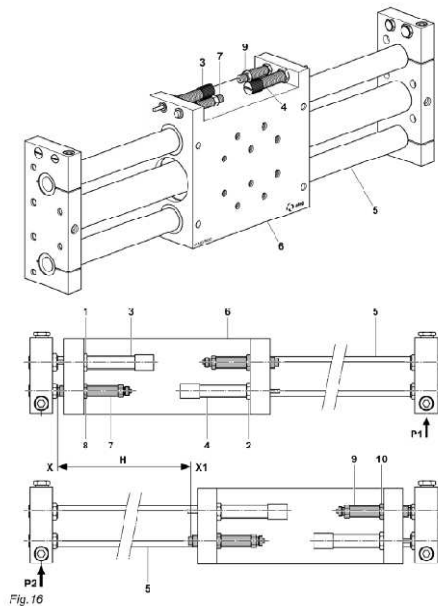
The stroke length of the LM can be adjusted with stop screws.

 <b>CAUTION</b>	
	<p><b>Moving parts can cause injuries when stroke adjustments are made while module is pneumatically pressurised!</b></p>

#### Stop screws AS 12/60

These stop screws can be combined with a proximity switch holder and proximity switch 6.5 mm or with an angle proximity switch for end of travel interrogation.

1. Loosen the conternut (1,2) and screw out both shock absorbers (3,4) 5 turns in anti-clockwise direction.
2. Apply compressed air to (P1). The carriage (5,6) slides as far as the limit determined by the stop screw (7).
3. Loosen the conternut (8). Set the rear position (X) of the stroke (H) by adjusting the stop screw (7) and secure with conternut (8). (one turn = 1mm stroke)
4. Apply compressed air to (P2). The carriage (5,6) slides as far as the limit determined by the stop screw (9).
5. Loosen the conternut (10). Set the front position (X1) of the stroke (H) by adjusting the stop screw (9) and secure with conternut (10) (Fig.16).



### 3.2.5 Adjusting shock absorber

To maintain a smooth stroke movement H of the LM the stroke against the stop screws (1,2) is absorbed by means of Afag shock absorbers (3,4).

#### Adjusting shock absorbers

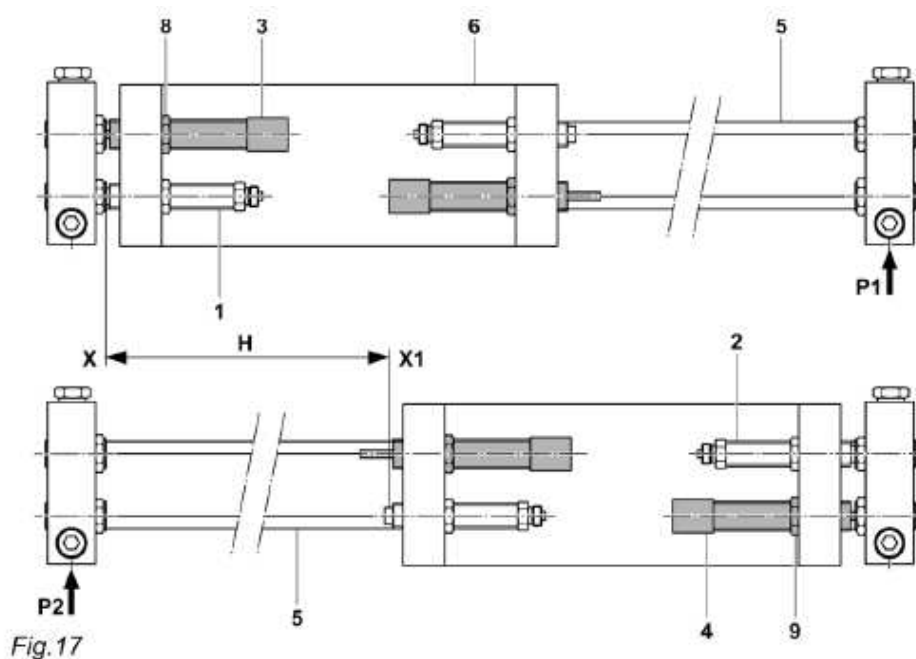
1. Adjust the stroke (H) according.
2. Apply compressed air to (P1). The carriage (5,6) slides as far as the limit determined by the stop screw (1) in position (X).
3. Screw in the shock absorber (3) in clockwise direction until the carriage (5,6) begins to move. (The shock absorber pin (7) is pushed into the shock absorber).
4. Screw out the shock absorber (3) two turns in anticlockwise direction and secure with counternut (8). (one turn = 1mm stroke)
5. Apply compressed air to (P2). The carriage (5,6) slides as far as the limit determined by the stop screw (2) in position (X1).
6. Repeat the adjustments according point 3-4 with shock absorber (3,4) must limit the stroke (H)!

#### CAUTION

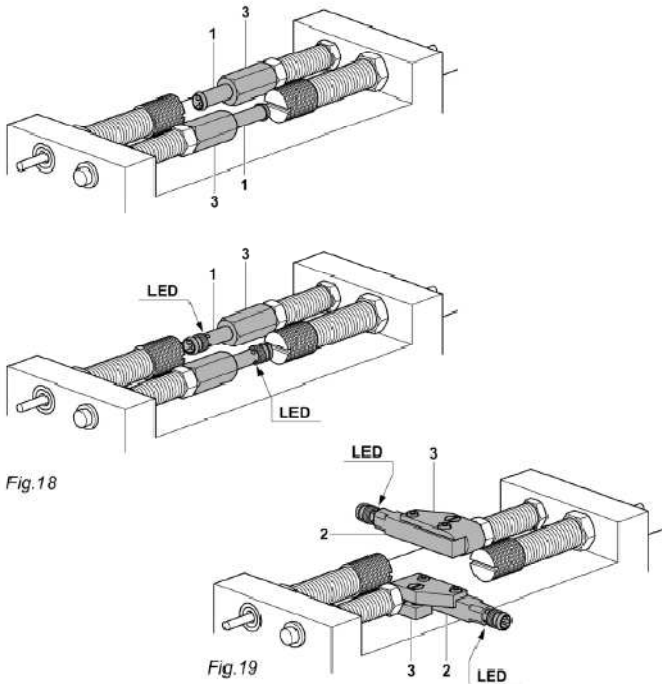


The stop screws (1,2) and not the shock absorber (3,4) must limit the stroke (H)!

If the shock absorbers are used as stops, they may be damaged and become unusable.



### 3.2.6 Adjusting for proximity switch




Plug-in and screw-in 6.5mm (1) or 8x8mm (2) proximity switches with proximity switch holders (3) (Fig.18+19) are used for interrogation of the end of travel.


## ⚠ CAUTION

	<p><b>LM's and proximity switches <u>must not be used</u> in an explosive environment!</b></p>
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## NOTE

	<p>Proximity switches and holders are not included in the LM scope of delivery (see sales material).</p>
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## ⚠ CAUTION

	<p><b>The 6.5mm and 8x8mm proximity switches can only be used with series AS stop screws.</b></p>
---	---

### Mounting proximity switch 6,5 mm (Fig.21)

1. Screw the proximity switch holder (1) onto the stop screw.
2. Insert the proximity switch (2,3) as far as it will go into the proximity switch holder.
3. Slightly tighten the proximity switch holder (1).
4. Mount the plug.
5. Functional check

### Mounting proximity switch 8x8 mm (Fig.22)

1. Screw the proximity switch (5) onto the proximity switch holder (7) with screws (6).
2. Plug the proximity switch holder (7) with proximity switch as far as it will go onto the stop screw (8) and lock with screw (9).
3. Mount the plug (4).
4. Functional check.

 <b>VORSICHT</b>	
	<b>The switching point of the proximity switch must cover the drill hole of the proximity switch holder! (see arrow)</b>

Depending on the type of control, define switch type PNP or NPN for the proximity switches (Fig.20).

An LED on the proximity switch serves function monitoring on end of travel interrogation. If it does not change its switching condition on end of travel interrogation, then the proximity switch is faulty and must be replaced!

### Technical data

- Operating voltage range                      10-30 VDC
- Switching interval                                1,5 mm
- Protected against short-circuit and polarity reversal.

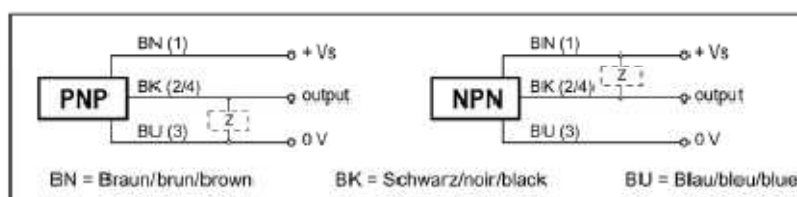


Fig. 20

### 3.2.7 Connecting the proximity switch cable

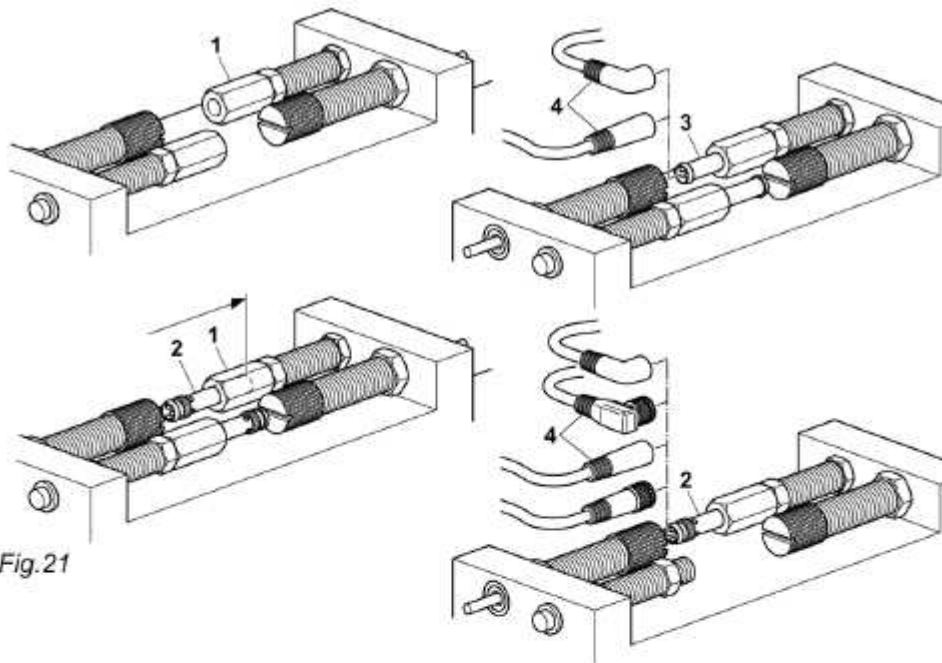


Fig.21

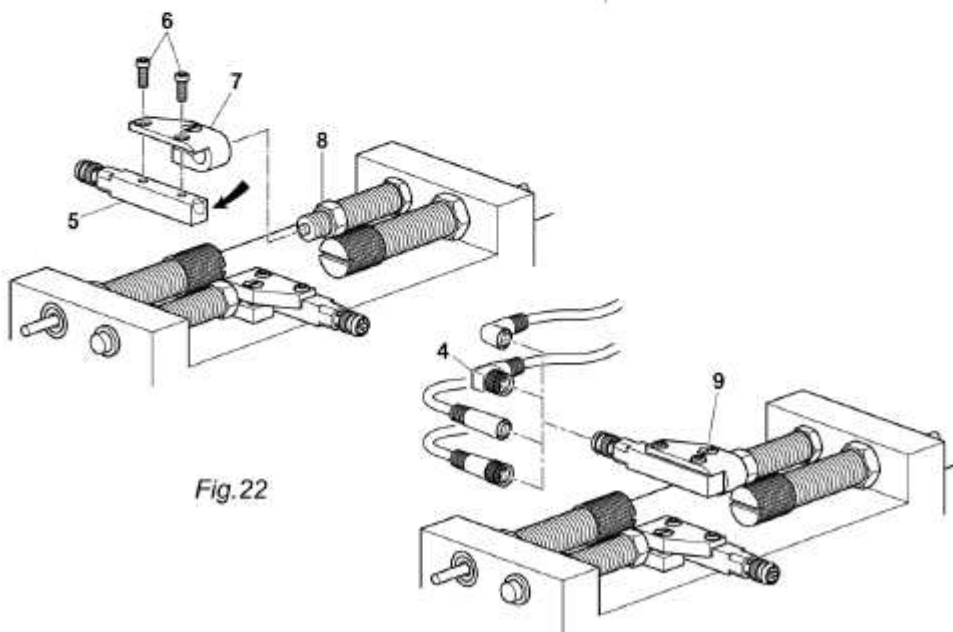


Fig.22

### 3.2.8 Accessories LM 40

The LM 40 can be individually upgraded for many applications by means of additionally available accessories (Fig.3-6)

**Connecting plate (VP 123) LM 40 – LM32 (1)**

**Connecting plate (VP 124) LM 40 – LM 40 (2)**

**Stroke limiter (3)**

**Hydraulic shock absorber SDS 14/16 (4)**

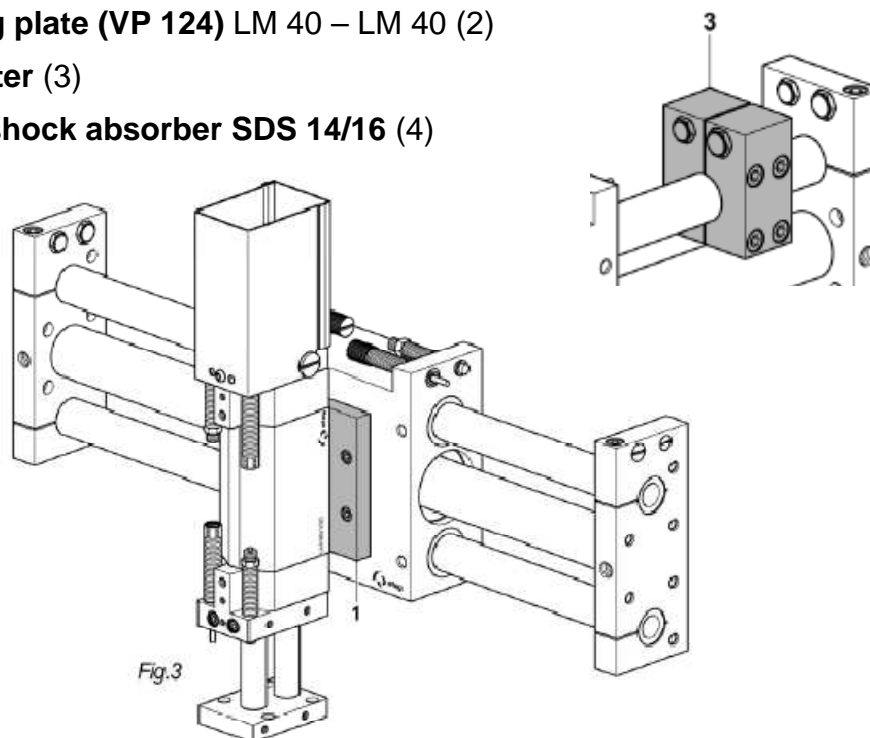


Fig.3

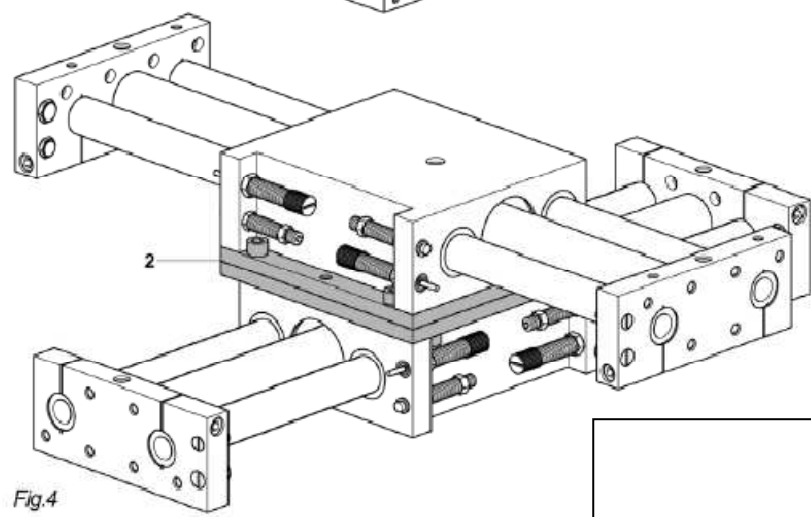


Fig.4

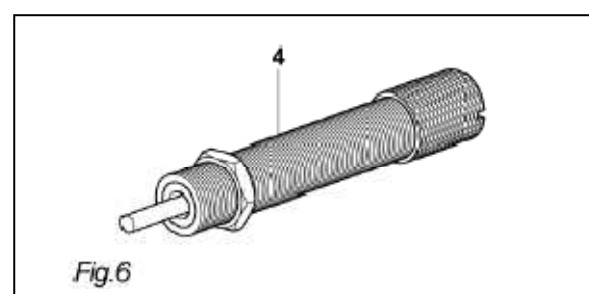




Fig.6

### 3.2.9 Preparation for start-up

The stop screws (1,2) and not the shock absorber (3,4) must limit the stroke H.  
If the shock absorbers are used as stops, they may be damaged and become unusable.

### 3.3.0 Initial start-up



- Ventilate the total system slowly.
- Note the permissible values (see catalogue) regarding:
  - Useful load
  - 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 40 linear module

 <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 cleanliness.</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 40 linear module is lubricated for-life and can be operated with oiled and unoiled air.

 <b>CAUTION</b>	
	<b>Never operate the LM 40 linear module with unoiled air after it was operated with oiled air!</b>

#### Air characteristics:

- Dry (free from condensation water)
- Filtered (40µm filter for oiled air)
- Filtered (5µm filter for unoiled air)


If the LM 40 linear module is operated with oiled air, the oil types listed below should be used:

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

Oil quantity: 5 – 10 oil drops per 1000 l air

Viscosity range:

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

<b>NOTE</b>	
	<p>Module inserts for ionized air environments (e.g. in case of high-voltage procedures such as corona processes)</p> <p>Open guides and piston rods should be covered with a grease layer to avoid formation of rust.</p> <p>Recommendation: Clean and grease once a month!</p> <p>Afag standard:       - Staburax NBU8EP (flat guides)                               - Blasolube 301 (piston rods)</p>

#### 4.1.2. Faults during operation

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



<b>Fault</b>	<b>Possible cause</b>	<b>Rectifying action</b>
<b>Module does not travel in/out</b>	No compressed air	Check compressed air connections
	Module pneumatic connection wrong	Check pneumatic links
<b>End of travel signal not available</b>	Stop screw wrongly adjusted	Readjust stop screw
	Proximity switch faulty	Replace proximity switch
	Break in sensor cable	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
	No shock absorbers installed	Install shock absorbers
	Exhaust air throttle faulty	Replace exhaust air throttle
<b>Pay load swings in stop positions</b>	Stroke speed too high	Adjust exhaust air throttle
	Damping is not optimum	Optimize the shock absorbers type, stroke
	Unfavourable installation pos.	Optimize the construction
	Unfavourable LM type	Use larger LM type

### 4.1.3 Accessoires to LM 40

Article	Order No.
Stroke limiter	11001710
Connection plates	See Catalog technical
Initiator INI d6.5x44-Sn-1.5-PNP-NO-M8x1	11005439
Proximity switch holder	11004995
Initiator INI 8x8x38.5-Sn2.0-PNP-NO-M8x1	50338170
Proximity switch holder	11004997
Shock absorber SD M14x1-2	11004988


#### 4.1.4 Disassembly and repair

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

 <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>


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

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

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

<b>NOTE</b>	
	<p>Afag offers a reliable repair service. <b>Please note that Afag does not guarantee for parts which were not repaired by Afag Automation AG.</b></p>

#### 4.1.5 Spare parts to LM 40

If you replace wearing parts you should exchange all wearing parts simultaneously and carefully in order to avoid damaging functional parts.

##### **Disassembly:**

1. Disconnect the power- and air supply to the module and remove the module
2. Remove the stop screws (9) and the shock absorber (10) out of the housing (5)
3. Loosen the clamping screws at the faceplate (7)
4. Remove the faceplate (7)
5. Remove the rear plate (8) and the guide shafts (6) out of the housing (5)
6. Measure the cylinder tube (3) using a meter rule, (determine the distance between the cylinder tube and the piston); then cut up a piece of wood so that it fits in the pipe insert and that the cylinder tube (3) and the piston (1) can be pressed out of the housing (5) simultaneously (this is important because of the magnetic tensions)!
7. Now the piston (1) can be pushed out of the cylinder tube (3)
8. Remove the Seeger circlip ring (13) out of the housing (5)
9. Remove the sleeve (12) facing to the Seeger circlip ring out of the housing (5)
10. Remove the scraper and the sliding ring carefully out of the sleeve (12)
11. Repeat this procedure on the other side of the housing (5)
12. Remove the scraper and sliding rings carefully from the piston (1)
13. Carefully remove the O-rings in the faceplate (7) and the rear plate (8)

##### **Cleaning:**

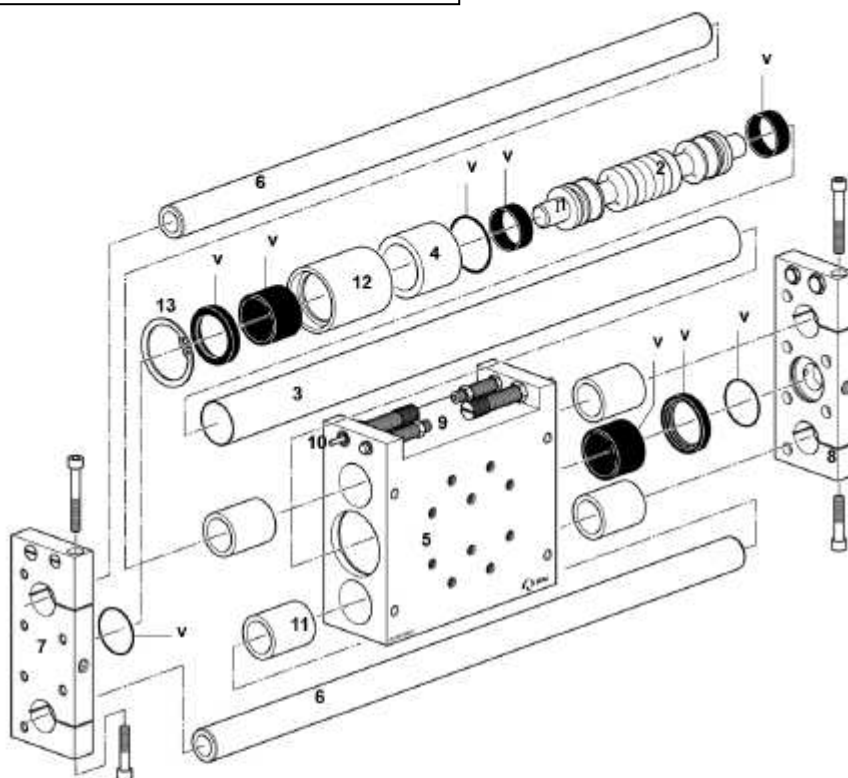
Clean and dry all components removed.

##### **Replacing wearing parts:**

1. Carefully insert new O-rings in the faceplate (7) and the rear plate (8)
2. Fit the sliding rings on the piston (1)
3. Fit the scraper (sealing lip facing outward) carefully on the piston (1)
4. Grease the piston (1) with Blasolube 306
5. Grease the inside of the cylinder tube (3) with Blasolube 306
6. Push the piston (centrally) (1) in the cylinder tube (3)
7. Press the sliding ring and the scraper carefully in the sleeve (12) (sealing lip facing outward)

## Spare parts to LM 40

Exendable parts (Order No: 11002511)



1	Piston	v	=Expendable parts
2	Permanent magnet	v	*O-Ring 42x2.0 mm (2)
3	Cylindre tube	v	*Rod wiper 42x52 h=7/10 (2)
4	Permanent magnet	v	*O-Ring 50x3.5 mm (1)
5	Housing	v	*Guide ring
6	Guide shaft	v	*Piston ring (2)
7	Front plate		
8	Back plate		
9	Stop screw		
10	Afag shock absorber		
11	Ball-types nipples		
12	Guide		
13	Clamping ring		

8. Grease the holes in the housing (5)
9. Press the cylinder tube (3) with piston (1) and wood insert carefully in the housing (5) (centrally)


10. Press the cylinder tube (3) with piston (1) and wood insert carefully in the housing (5) (centrally)
11. Grease the guide shafts (6) with Blasolube 306 and push the guide shafts together with the rear plate (8) in the housing (5)
12. Fit the faceplate (7) on the guide shafts (6) in such a way that the guide shafts are slightly set back from the front side
13. Push the housing (5) towards the faceplate (7) until the magnet engages and repeat this procedure on the opposite side
14. Press in grease (Blasolube 306) at the lubrication nipples until the grease comes out of the guide shafts (6)
15. Push the housing (5) regularly back and forth on the guide shafts: you shouldn't notice a high resistance
16. Fit the stop screws and the shock absorber in the housing (5)

**Final check:** Functional test before installing the module:

Push the housing (5) back and forth on the guide shafts (6). If the housing (5) can be moved without any resistance, then the module is operational again.

***Before installation carefully carry out a leak test with compressed air!***

### 5.0.0 Disposal

NOTE	
	LM's 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. Material which cannot be recycled should be correctly disposed of.









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