

**High precision slide
PS 25 /32 and ZA**

- **Declaration of Incorporation**
- **Module Information**
- **Montage Instructions**
- **Maintenance Instructions**



„Translation“ of the Original Montage Instruction

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These Montage Instructions apply to:

Type	Order No.	Type	Order No.
PS 25/50	50076883	PS 32/150	50076907
PS 25/100	50076888	PS 32/200	50076909
PS 25/150	50076891	PS 32/250	50076911
PS 25/200	50076893	PS 32/300	50076913
PS 32/50	50076902		
PS 32/100	50076905		

Version of this documentation: PS25-32-OI-vers. 3.8 gb. 23.11.18

Formatiert: Schriftart: 11 Pt., Französisch (Frankreich)

Symbols: Assembly and initial start-up must be carried out by qualified personnel only and according to these Montage Instructions.

DANGER



Indique un danger immédiat.
Lorsque l'information n'est pas respectée, les conséquences peuvent être la mort ou des blessures corporelles graves (invalidité).

WARNING



Indique une situation potentiellement dangereuse.
Lorsque l'information n'est pas respectée, les conséquences peuvent être la mort ou des blessures corporelles graves (invalidité).

CAUTION



Indique une situation pouvant être dangereuse.
Lorsque l'information n'est pas respectée, les conséquences peuvent être des dommages matériels ainsi que des blessures corporelles de gravité légère ou moyenne.

NOTE



Indique une note à caractère General, des tours de main destinés à l'utilisateur ainsi que des conseils pour le travail; ceux-ci n'ayant aucune incidence sur la sécurité et la santé du personnel.

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1.0.0 EC Declaration for Incorporation (Document original)

1.1.0 According to: 2006/42/EC

Standard: EN ISO 12100:2010 (German Version)
hereby declares that the incomplete machine:

The manufacturer:
Afag Automation AG, Luzernstrasse 32, CH-6144 Zell

Designation: High precision slide (pneumatic)
Type: PS 25 / PS 32
Sequential series No. 50xxxxxx

Machinery Directive 2006/42/EG

- Safety of machinery General principles for risk assessment and risk reduction.
- The special technical documents shall be sent to a reasoned request by national authorities in printed documents or electronically (pdf).

Applied and fulfilled essential requirements:

- 1.1; 1.1.1; 1.1.2; 1.2.3; 1.2.4.4; 1.3; 1.3.5; 1.3.6; 1.3.7; 1.3.9; 1.4.1; 1.5; 1.5.3; 1.6; 1.6.1; 1.6.3; 1.6.4; 1.7; 1.7.4; 1.7.4.1; 1.7.4.2; 1.7.4.3
-
- Who installs this incomplete machine or assemble with other machines, a risk assessment for its resulting machine which must make the provisions of the
- **EC directive: 2006/42 / EC.**
- **Norme: EN ISO 12100:2010** (German Version)
-
- Agent:
- For the compilation of the technically relevant documents:
Niklaus Röthlisberger, Products Manager Afag Automation AG, CH-6144 Zell

Place, Date: Zell, 15.06 2021

Sigfried Egli



Managing Director
Afag Automation AG

Niklaus Röthlisberger



Producte Manager HT
Afag Automation AG

2.0.0 Module Information

2.1.0 Transport and storage (packing and unpacking)

CAUTION



The PS module is packed in the original cardboard boxe, 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.



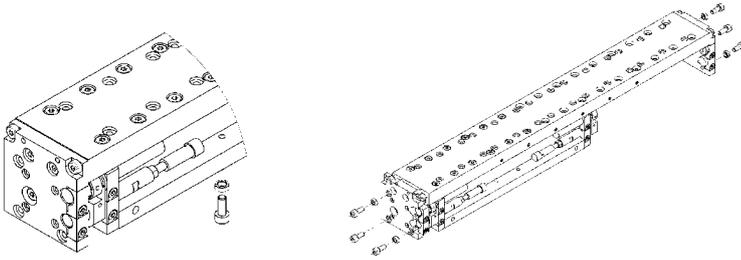
NOTE



Consider please! With each module security is settled a technical newspaper. This newspaper is to be reas busily by each person with the module.

2.1.1 Possibilities of fastening the PS 25/32

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



Installation of base body from below

Mounting of gantry model

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	
	In case of installation 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.

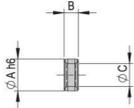
2.1.2 Hole matrix and centering bushings

Hole matrix at the PS 25/32 High precisions slide

PS 25/PS32	
Hole matrix	48x48 mm (30x30 mm)
Thread / bore hole	M6 (M4)
Centering bushings (H7)	Ø 9x4 mm (Ø 7x3 mm)

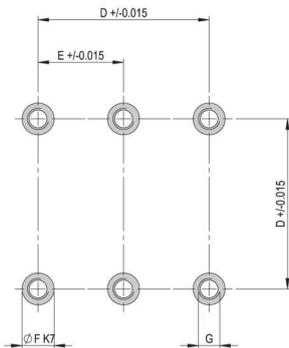
Use the centering bushings included in the scope of supply for positioning and insert these centering bushings in the diagonally opposite bore holes of the mounting grid.

Modul-Zentrierung	Centrage de module	Squaring of modules				
Zentrierhülse	Douilles de centrage	Centering bushings	4h6x2.0 mm	5h6x2.5 mm	7h6x3.0 mm	8h6x3.5 mm
Bestellnummer	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	8 mm	10 mm	15 mm	19 mm
Mass F	Dimension F	Dimension F	4x1.1 mm	7x1.6 mm	7x1.6 mm	8x3.5 mm
Mass G	Dimension G	Dimension G	M2.5	M3	M4	M5



48x48 mm	60x60 mm	75x75 mm	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 bolts

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 PS 25/32 high precision slide in a system

The series of the PS 25/32 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 PS 25/32 module can be installed in the horizontal or vertical position.

NOTE



These Montage Instructions should be read carefully before carrying out any activity on or with the PS 25/32 module. The PS 25/32 module may only be deployed in accordance with the intended use.

NOTE



Safety instructions

Modifications on the PS 25/32 module that are not described in these Montage 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.

2.1.4 Slide unit load factors PS 25

Verfahrzeit

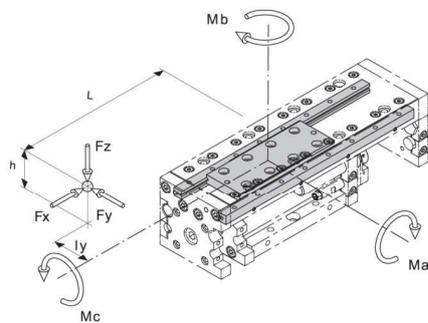
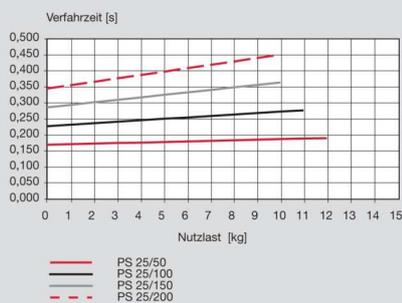
Messung bei 6 bar

Durée du déplacement

Pression mesurer près 6 bar

Traversing time

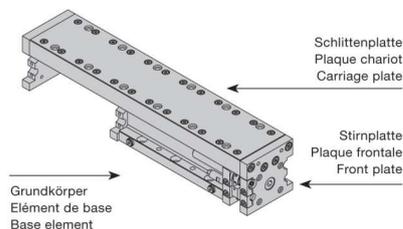
Measurement by 6 bar



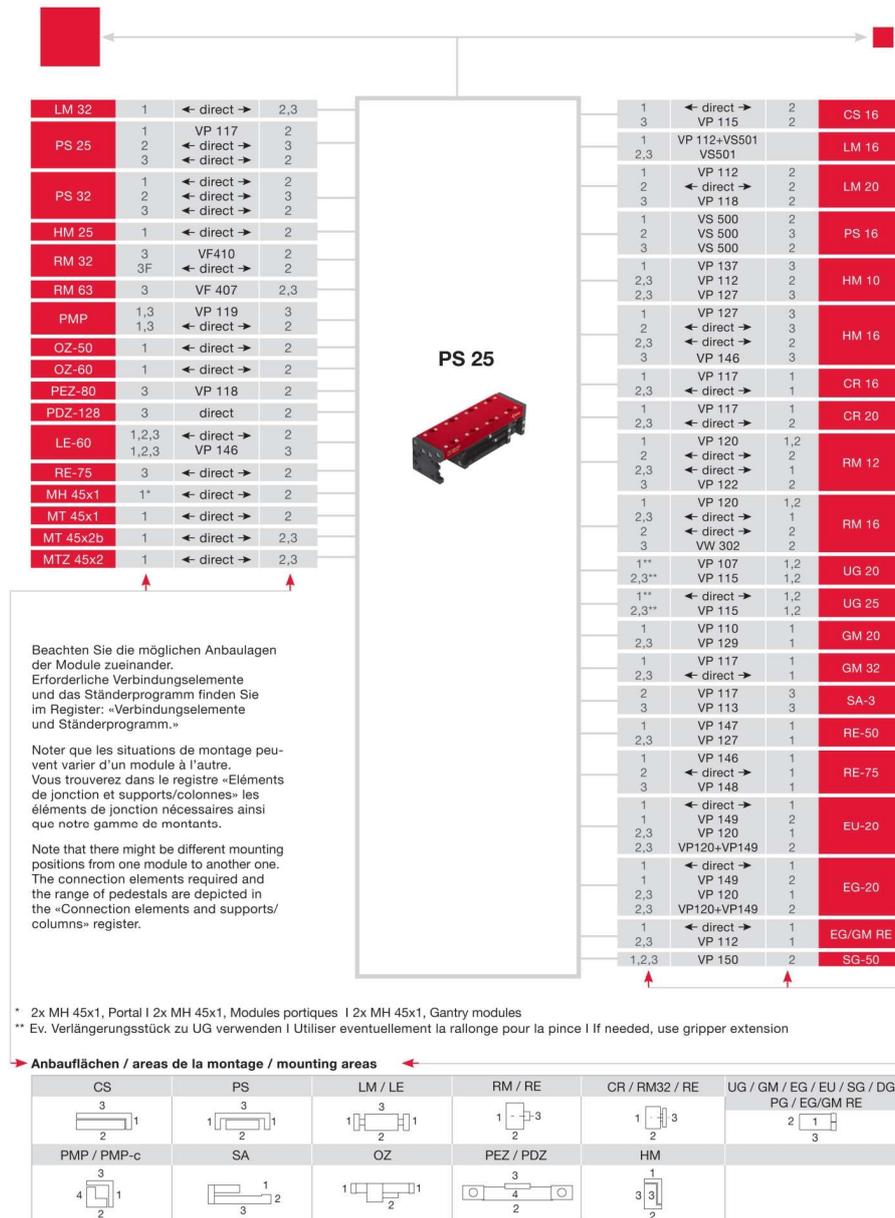
Typ	Type	Type		PS 25/50	PS 25/100	PS 25/150	PS 25/200
Max. zulässige statische Momente	Moments static max. autorisés	Max. permittet static torque	Ma	65.9 Nm	89.6 Nm	113.2 Nm	136.8 Nm
			Mb	37.4 Nm	48.0 Nm	58.9 Nm	69.3 Nm
			Mc	60.7 Nm	87.7 Nm	105.2 Nm	131.6 Nm
Max. zulässige dynamische Momente	Moments dynamique max. autorisés	Max. permittet dynamic torque	Ma	25.3 Nm	34.5 Nm	43.5 Nm	52.6 Nm
			Mb	14.4 Nm	18.5 Nm	22.7 Nm	26.7 Nm
			Mc	23.3 Nm	33.7 Nm	40.5 Nm	50.6 Nm
Wirkabstand Hub eingefahren	Distance active Course derrière	Active distance Behind stroke	h	16 mm	16 mm	16 mm	16 mm
			L	85 mm	110 mm	135 mm	160 mm

MAX. GEWINDETIEFE BEI MONTAGE - MAX.
FILET PROFOND MAX. PRÈS DE MONTAGE
THREAD DEPTH FOR THE ASSEMBLY - MAX.

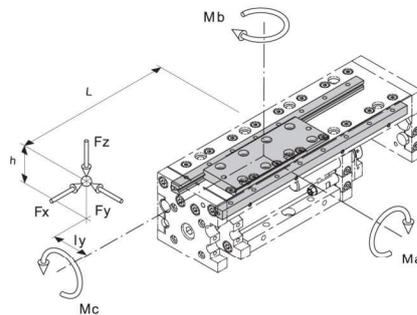
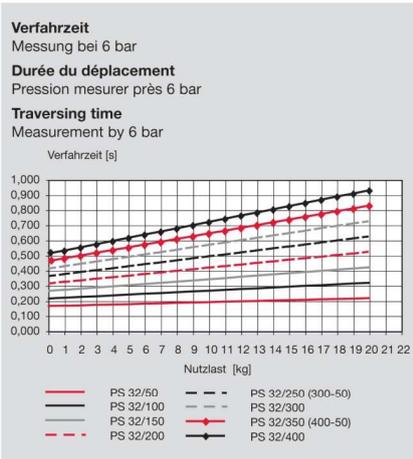
Position	Gewinde	Schraubtiefe
Position	Filetage	Filet profond
Position	Thread	Thread depth
Stirnplatte Plaque frontale Front plate	4xM4	8 mm
Schlittenplatte Plaque chariot Carriage plate	M6	6 mm
Grundkörper Élément de base Base element	M6	12 mm



2.1.5 Preferred combinations PS 25



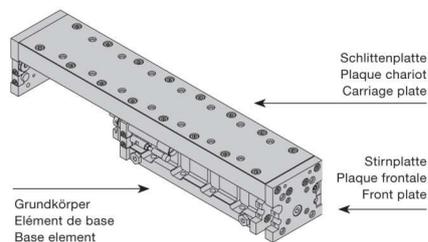
2.1.6 Slide unit load factors PS 32



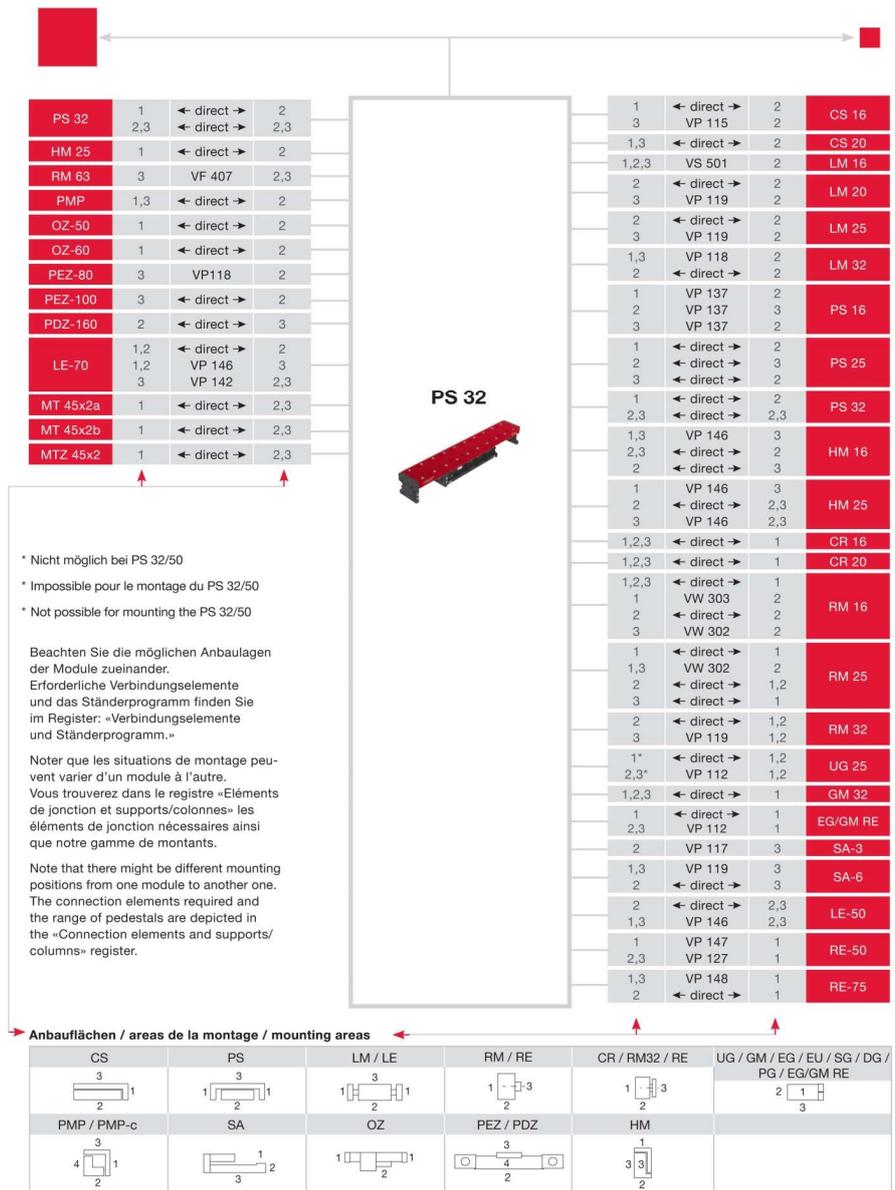
Typ	Type	Type		PS 32/50	PS 32/100	PS 32/150
Max. zulässige statische Momente	Moments static max. autorisés	Max. permettet static torque	Ma	152.0 Nm	217.0 Nm	282.1 Nm
			Mb	92.2 Nm	120.4 Nm	150.4 Nm
			Mc	104.7 Nm	130.8 Nm	183.2 Nm
Max. zulässige dynamische Momente	Moments dynamique max. autorisés	Max. permitted dynamic torque	Ma	58.5 Nm	83.5 Nm	108.5 Nm
			Mb	35.5 Nm	46.3 Nm	57.9 Nm
			Mc	40.3 Nm	50.3 Nm	70.5 Nm
Wirkabstand Hub eingefahren	Distance active Course derrière	Active distance Behind stroke	h	18.5 mm	18.5 mm	18.5 mm
			L	87 mm	112 mm	137 mm
Typ	Type	Type		PS 32/200	PS 32/250	PS 32/300
Max. zulässige statische Momente	Moments static max. autorisés	Max. permettet static torque	Ma	347.2 Nm	412.2 Nm	477.3 Nm
			Mb	181.3 Nm	211.7 Nm	244.3 Nm
			Mc	209.2 Nm	261.7 Nm	287.8 Nm
Max. zulässige dynamische Momente	Moments dynamique max. autorisés	Max. permitted dynamic torque	Ma	133.5 Nm	158.5 Nm	183.6 Nm
			Mb	69.7 Nm	81.2 Nm	94.0 Nm
			Mc	80.5 Nm	100.6 Nm	110.7 Nm
Wirkabstand Hub eingefahren	Distance active Course derrière	Active distance Behind stroke	h	18.5 mm	18.5 mm	18.5 mm
			L	162 mm	187 mm	212 mm

MAX. GEWINDETIEFE BEI MONTAGE - MAX.
FILET PROFOND MAX. PRÈS DE MONTAGE
THREAD DEPTH FOR THE ASSEMBLY - MAX.

Position Position Position	Gewinde Filetage Thread	Schraubtiefe Filet profond Thread depth
Stirnplatte Plaque frontale Front plate	4xM4 4xM6	12 mm 12 mm
Schlitzenplatte Plaque chariot Carriage plate	M6	11 mm
Grundkörper Élément de base Base element	M6	15 mm



2.1.7 Preferred combinations PS 32





3.0.0 Montage Instructions

3.1.0 Manufacturer address:

Afag Automation AG
Luzernstrasse 32
CH-6144 Zell

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

These operating instructions apply to:

Product name: High precision slide (pneumatic)
Types: PS 25/50; PS 25/100; PS 25/150; PS 25/200
PS 32/50; PS 32/100; PS 32/150; PS 32/200;
PS 32/250; PS 32/300
Sequential series No. 50xxxxxx

This is an incomplete machine

Who installs this incomplete machine or assemble with other machines, a risk assessment for its resulting machine which must make the provisions of the **EC directive: 2006/42/EC**
Standard: EN ISO 12100:2010 (German version)

Agent:

For the compilation of the technically relevant documents:
Niklaus Röthlisberger, Product Manager Afag Automation AG, CH-6144 Zell

3.1.1 Symbols

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

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

NOTE	
	<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

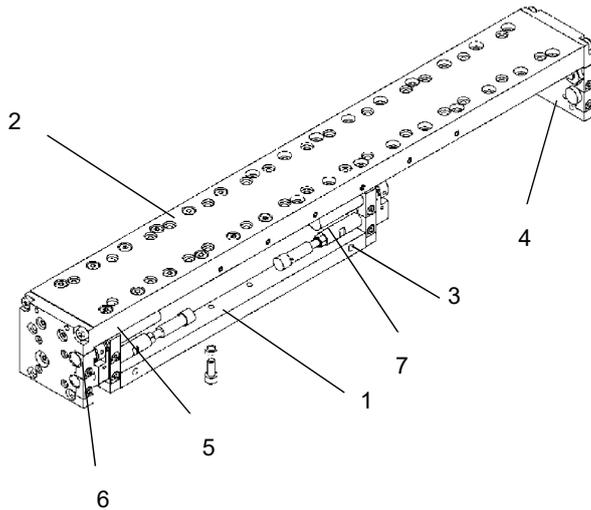
This is an incomplete machine

The series of the PS 25/32 High precision slide is used for the linear, smooth movement of rigidly mounted loads under the ambient and operating conditions defined, see Technical data.

The PS 25/32 High precision slide can be installed in the horizontal or vertical position.

Modifications on the PS 25/32 High precision slide that are not described in these Montage 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 | Body base | 4 | Counterpart (IProximity switch) |
| 2 | Slids | 5 | Shock absorber |
| 3 | Proximity switch holder | 6 | Counterpart (Shock absorber) |
| | | 7 | Adjusting stop screw |

The PS 25/32 consists of the base body (1) with pneumatic connections and cylinder and the slide (2).

The limit positions are set by a proximity switch holder (3) and the corresponding counterpart (8). To query the limit positions an inductive sensor with a diameter of 4 mm (not included in the scope of delivery) can be fixed in the Stop screws.

The movement at the limit positions is absorbed by a hydraulic shock absorber (5) and its counterpart (6). Stop screws and shock absorbers can be installed at the base body or the slide.

Thus there are various design possibilities so that the PS 25/32 can be adapted to the space conditions within your system in the best possible way.

3.1.4 Scope of supply

Quantit.	Description
1	Module PS 25; (PS 32)
2	Proximity switch holder
2	Shock absorber ASSD M12x1-1 (PS 25)
2	Shock absorber ASSD M14x1-1 (PS 32)
4	Mounting screw M6x16 mm, (PS 25); M6x20 mm, (PS 32)
2	Centering bushings Ø 7x3 mm
2	Centering bushings Ø 9x4 mm

3.1.5 Designated use

The series of the high-precision slides PS 25/32 is used for the linear movement of rigidly mounted loads in non-explosion hazardous ambient and operating conditions that are specified for this module; see catalogue technical.

NOTE

	<p>Safety Instructions</p> <p>These Montage 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 the intended purpose.</p> <p>Modifications on the module that are not described in these Montage 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>
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CAUTION

	<p>Connection of compressed air and operation of pneumatic systems may cause unpredictable movements which may result in personal injury or damage to property.</p>
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When connecting compressed air for the first time make sure that all air chokes are closed. Ventilate the system slowly.



3.1.6 Warranty

The term of the warranty on Afag handling components and systems is:

- 24 months following commissioning, but a maximum of 27 months following delivery.
- Wear parts (e.g. shock absorbers) are not covered by the warranty. *

The warranty covers the replacement or repair of defective Afag parts. No further claims will be accepted.

The warranty will be voided in event of the following:

- Use for other than the intended purpose
- Failure to observe the notes on installation, commissioning, operation and maintenance in the operating manual
- Improper installation, commissioning, operation and maintenance
- Independent repairs and constructional changes without prior instruction by Afag Automation AG
- Removal of the serial number on the product
- Using the module without shock absorbers, or with defective shock absorbers
- Inadequate monitoring of wear parts

*A customer has the right to a defect-free product. This is also applicable for accessories and wear parts, if they are defective. However, wear does not fall within the scope of the warranty.

3.1.7 Areas of application

The PS 25/32 High precision slides are exclusively designed for the linear movement of load capacities of up to 10 – 12 kg, (PS 32 = 20 kg) in any position on the slide and maximum 5-6 kg, (PS 32 = 12 kg) at the face side of the module; 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.

NOTE



The manufacturer does not accept any liability for damage resulting from such use. The risk is that of the user alone.

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

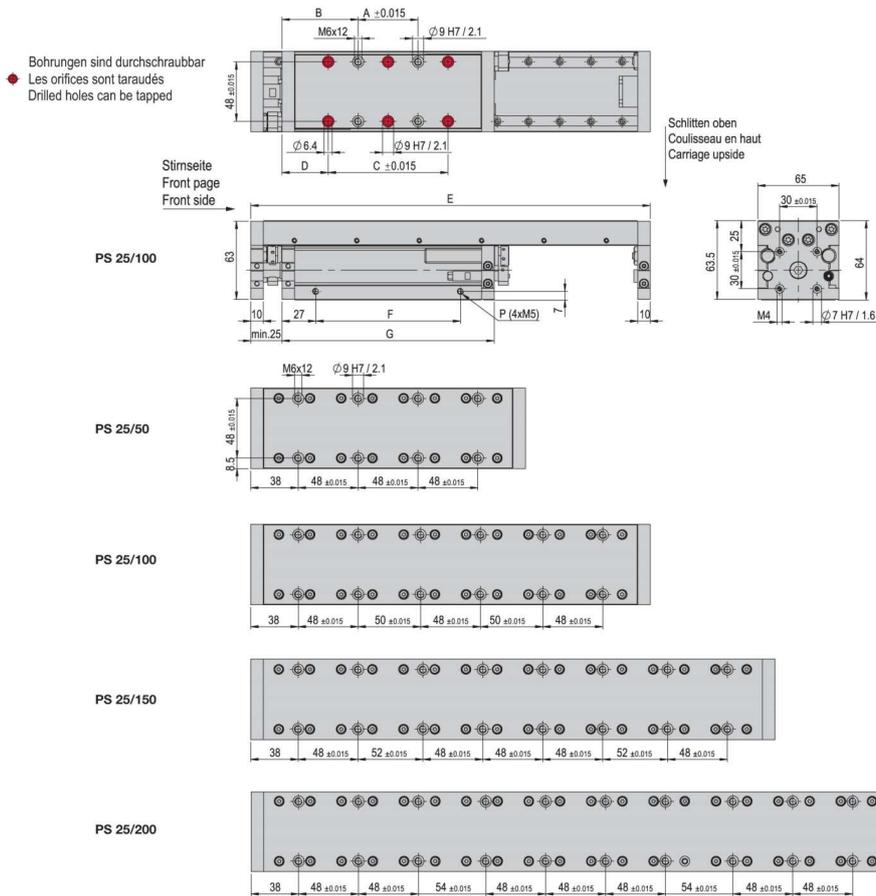
The PS 25/32 module may only be operated and serviced by correspondingly trained personnel who have also profound knowledge of the dangers.

CAUTION



The applicable regulations for prevention of accidents and the other generally accepted safety-relevant and occupational safety and health regulations are to be followed.

3.1.8 Dimensions drawing PS 25



Typ	Type	PS 25/50	PS 25/100	PS 25/150	PS 25/200
Mass A	Dim. A	1 x 48 mm	1 x 48 mm	3 x 48 mm	3 x 48 mm
Mass B	Dim. B	36 mm	61 mm	38 mm	63 mm
Mass C	Dim. C	---	2 x 48 mm	2 x 48 mm	4 x 48 mm
Mass D	Dim. D	60 mm	37 mm	62 mm	39 mm
Mass E	Dim. E	220 mm	320 mm	420 mm	520 mm
Mass F	Dim. F	66 mm	116 mm	166 mm	216 mm
Mass G	Dim. G	120 mm	170 mm	220 mm	270 mm



3.1.9 Technical data of the PS 25

Typ	Type	Type	PS 25/50	PS 25/100	PS 25/150	PS 25/200
Bestellnummer	Article No.	Order no.	50076883	50076888	50076891	50076893
Hub = H	Course = H	Stroke = H	50 mm	100 mm	150 mm	200 mm
Hubbegrenzung	Limitation de course	Stroke limiter	2 x 25 mm			
Zylinder Ø	Cylindre Ø	Cylindre Ø	25 mm	25 mm	25 mm	25 mm
*max. Nutzlast (Schlitten oben)	*Charge utile max. (coulisseau en haut)	*Max. ef. weight (carriage upside)	12 kg	11 kg	10 kg	10 kg
*max. Nutzlast (Stirnseite)	*Charge utile max. (front page)	*Max. ef. weight (front side)	6 kg	5.5 kg	5 kg	5 kg
Kolbenkraft einfahren	Force du piston entrer	Piston force retract	227 N	227 N	227 N	227 N
Kolbenkraft ausfahren	Force du piston sortir	Piston force extend	295 N	295 N	295 N	295 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 connect = P	M5	M5	M5	M5
Luftverbrauch/ Zyklus	Consommation d'air/cycle	Air consumption / cycle	0.2 NL	0.4 NL	0.6 NL	0.8 NL
Einbaulage	Position de montage	Mounting position	+	+	+	+
Modulgewicht	Poids du module	Weight of module	2.54 kg	3.16 kg	3.91 kg	4.58 kg
Maximalgeschwindigkeit	Vitesse maximum	Maximum speed	0.2 m/s	0.3 m/s	0.4 m/s	0.4 m/s
Minimalgeschwindigkeit	Vitesse minimum	Minimum speed	0.05 m/s	0.05 m/s	0.05 m/s	0.05 m/s
Stossdämpfer	Amortisseur	Shock absorber	ASSD	ASSD	ASSD	ASSD
Anschlagschraube	Vis d'arrêt	Adjusting stop screw	M12x1-1 AS 08/16	M12x1-1 AS 08/16	M12x1-1 AS 08/16	M12x1-1 AS 08/16
Lärmpegel bei 6 bar max. Nutzlast	Niveau de bruit à 6 bar sous charge utile max.	Decibel level, at 6 bar at max. effective weight	60 dB (A)	60 dB (A)	60 dB (A)	60 dB (A)
Befestigungsraaster	Trame de fixation	Fixing grid	48 x 48 mm (30 x 30 mm)			
Befestigungsgewinde	Filet de montage	Mounting thread	M6 (M4)	M6 (M4)	M6 (M4)	M6 (M4)
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: gefüllt. 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	+/- 0.01 mm	+/- 0.01 mm	+/- 0.01 mm	+/- 0.01 mm

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

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

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

*Verfahrzeit-Diagramm beachten.

*Durée du déplacement diagr. de noter.

*Traversing time diagramm note.

Im Lieferumfang inbegriffen:

4 Montageschrauben M6 x 14 mm
4 Montageschrauben M6 x 16 mm
2 Zentrierhülsen Ø7 x 3 mm
2 Zentrierhülsen Ø9 x 4 mm

La livraison comprend:

4 Vis montage M6 x 14 mm
4 Vis montage M6 x 16 mm
2 Douilles de centrage Ø7 x 3 mm
2 Douilles de centrage Ø9 x 4 mm

Includes in the delivery:

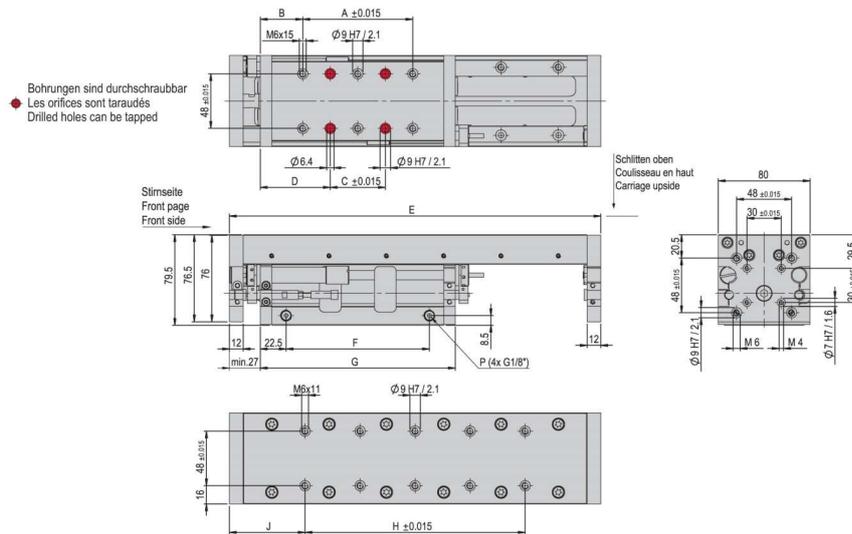
4 Mounting screw M6 x 14 mm
4 Mounting screw M6 x 16 mm
2 Centering bushings Ø7 x 3 mm
2 Centering bushings Ø9 x 4 mm

Der Präzisionsschlitten kann mit geölter oder ölfreier Luft betrieben werden.
Reinraumklasse:
10000 (Federal Standard 209E)

Pour les chariots de précision PS on peut utiliser aussi bien de l'air huilé que de l'air exempt d'huile.
Classe de salle blanche:
10000 (Federal Standard 209E)

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

3.2.0 Dimensions drawing PS 32



Typ	Type	PS 32/50	PS 32/100	PS 32/150	PS 32/200	PS 32/250	PS 32/300
Mass A	Dim. A	1 x 48 mm	2 x 48 mm	2 x 48 mm	4 x 48 mm	4 x 48 mm	6 x 48 mm
Mass B	Dim. B	36 mm	37 mm	62 mm	39 mm	64 mm	41 mm
Mass C	Dim. C	---	1 x 48 mm	3 x 48 mm	3 x 48 mm	5 x 48 mm	5 x 48 mm
Mass D	Dim. D	60 mm	61 mm	38 mm	63 mm	40 mm	65 mm
Mass E	Dim. E	224 mm	324 mm	424 mm	524 mm	624 mm	724 mm
Mass F	Dim. F	75 mm	125 mm	175 mm	225 mm	275 mm	325 mm
Mass G	Dim. G	120 mm	170 mm	220 mm	270 mm	320 mm	370 mm
Mass H	Dim. H	2 x 48 mm	4 x 48 mm	6 x 48 mm	8 x 48 mm	10 x 48 mm	12 x 48 mm
Mass J	Dim. J	64 mm	66 mm	68 mm	70 mm	72 mm	74 mm

3.2.1 Technical data of the PS 32

Typ	Type	Type	PS 32/50	PS 32/100	PS 32/150	PS 32/200
Bestellnummer	Article No.	Order no.	50076902	50076905	50076907	50076909
Hub = H	Course = H	Stroke = H	50 mm	100 mm	150 mm	200 mm
Hubbegrenzung	Limitation de course	Stroke limiter	2 x 25 mm			
Zylinder Ø	Cylindre Ø	Cylindre Ø	32 mm	32 mm	32 mm	32 mm
*max. Nutzlast (Schlitten oben)	*Charge utile max. (coulisseau en haut)	*Max. ef. weight (carriage upside)	20 kg	20 kg	20 kg	20 kg
*max. Nutzlast (Stirnseite)	*Charge utile max. (front page)	*Max. ef. weight (front side)	12 kg	12 kg	12 kg	12 kg
Kolbenkraft einfahren	Force du piston entrer	Piston force retract	415 N	415 N	415 N	415 N
Kolbenkraft ausfahren	Force du piston sortir	Piston force extend	483 N	483 N	483 N	483 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 connect = P	G 1/8'	G 1/8'	G 1/8'	G 1/8'
Luftverbrauch/Zyklus	Consommation d'air/cycle	Air consumption/cycle	0.34 NL	0.69 NL	1.03 NL	1.38 NL
Einbaulage	Position de montage	Mounting position	+	+	+	+
Modulgewicht	Poids du module	Weight of module	4.21 kg	5.24 kg	6.29 kg	7.37 kg
Maximalgeschwindigkeit	Vitesse maximum	Maximum speed	0.2 m/s	0.3 m/s	0.3 m/s	0.3 m/s
Minimalgeschwindigkeit	Vitesse minimum	Minimum speed	0.05 m/s	0.05 m/s	0.05 m/s	0.05 m/s
Stossdämpfer	Amortisseur	Shock absorber	ASSD	ASSD	ASSD	ASSD
Anschlagschraube	Vis d'arrêt	Adjusting stop screw	M14x1-1 AS 08/18	M14x1-1 AS 08/18	M14x1-1 AS 08/18	M14x1-1 AS 08/18
Lärmpegel bei 6 bar max. Nutzlast	Niveau de bruit à 6 bar sous charge utile max.	Decibel level, at 6 bar at max. effective weight	60 dB (A)	60 dB (A)	60 dB (A)	60 dB (A)
Befestigungsraaster	Trame de fixation	Fixing grid	48 x 48 mm (30 x 30 mm)			
Befestigungsgewinde	Filet de montage	Mounting thread	M6 (M4)	M6 (M4)	M6 (M4)	M6 (M4)
Temperatur: - Lager - Betrieb	Température: - de stockage - d'utilisation	Temperature: - Storage - Operation	0 °C..+50 °C 0 °C..+50 °C			
Luftfeuchtigkeit (nicht kondensierend)	Humidité (sans condensation)	Humidity (non condensing)	< 90 %	< 90 %	< 90 %	< 90 %
Medium: gefilit. 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	+/- 0.01 mm	+/- 0.01 mm	+/- 0.01 mm	+/- 0.01 mm

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

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

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

*Verfahrzeit-Diagramm beachten.

*Durée du déplacement diagr. de noter.

*Traversing time diagram note.

Im Lieferumfang inbegriffen:

- 4 Montageschrauben M6 x 20 mm
- 2 Zentrierhülsen Ø7 x 3 mm
- 2 Zentrierhülsen Ø9 x 4 mm

La livraison comprend:

- 4 Vis montage M6 x 20 mm
- 2 Douilles de centrage Ø7 x 3 mm
- 2 Douilles de centrage Ø9 x 4 mm

Includes in the delivery:

- 4 Mounting screw M6 x 20 mm
- 2 Centering bushings Ø7 x 3 mm
- 2 Centering bushings Ø9 x 4 mm

Der Präzisionschlitten kann mit geölter oder ölfreier Luft betrieben werden.
Reinraumklasse:
10000 (Federal Standard 209E)

Pour les chariots de précision PS on peut utiliser aussi bien de l'air huilé que de l'air exempt d'huile.
Classe de salle blanche:
10000 (Federal Standard 209E)

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

3.2.2 Technical data of the PS 32

Typ	Type	Type	PS 32/250	PS 32/300
Bestellnummer	Article No.	Order no.	50076911	50076913
Hub = H	Course = H	Stroke = H	250 mm	300 mm
Hubbegrenzung	Limitation de course	Stroke limiter	2 x 25 mm	2 x 25 mm
Zylinder Ø	Cylindre Ø	Cylindre Ø	32 mm	32 mm
*max. Nutzlast (Schlitten oben)	*Charge utile max. (coulisseau en haut)	*Max. ef. weight (carriage upside)	20 kg	20 kg
*max. Nutzlast (Stirnseite)	*Charge utile max. (front page)	*Max. ef. weight (front side)	12 kg	12 kg
Kolbenkraft einfahren	Force du piston entrer	Piston force retract	415 N	415 N
Kolbenkraft ausfahren	Force du piston sortir	Piston force extend	483 N	483 N
Betriebsdruck	Pression d'alimentation	Operating pressure	6 bar +/-2	6 bar +/-2
Luftanschluss = P	Raccords d'air = P	Air connect = P	G 1/8"	G 1/8"
Luftverbrauch / Zyklus	Consommation d'air / cycle	Air consumption / cycle	1.72 NL	2.06 NL
Einbaulage	Position de montage	Mounting position	+	+
Modulgewicht	Poids du module	Weight of module	8.4 kg	9.46 kg
Maximalgeschwindigkeit	Vitesse maximum	Maximum speed	0.4 m/s	0.4 m/s
Minimalgeschwindigkeit	Vitesse minimum	Minimum speed	0.05 m/s	0.05 m/s
Stoßdämpfer	Amortisseur	Shock absorber	ASSD	ASSD
Anschlagschraube	Vis d'arrêt	Adjusting stop screw	M14x1-1 AS 08/18	M14x1-1 AS 08/18
Lärmpegel bei 6 bar max. Nutzlast	Niveau de bruit à 6 bar sous charge utile max.	Decibel level, at 6 bar at max. effective weight	60 dB (A)	60 dB (A)
Befestigungsraaster	Trame de fixation	Fixing grid	48 x 48 mm (30 x 30 mm)	48 x 48 mm (30 x 30 mm)
Befestigungsgewinde	Filet de montage	Mounting thread	M6 (M4)	M6 (M4)
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
Luftfeuchtigkeit (nicht kondensierend)	Humidité (sans condensation)	Humidity (non condensing)	< 90 %	< 90 %
Medium: gefilt. Druckluft	Fluide: air comprimé filtré	Medium: filtered compressed air	10...40 µm	10...40 µm
Wiederholgenauigkeit	Précision de répétition	Repeating precision	+/- 0.01 mm	+/- 0.01 mm

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

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

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

*Verfahrzeit-Diagramm beachten.

*Durée du déplacement diagr. de noter.

*Traversing time diagramm note.

Im Lieferumfang inbegriffen:

4 Montageschrauben M6 x 20 mm
2 Zentrierhülsen Ø7 x 3 mm
2 Zentrierhülsen Ø9 x 4 mm

La livraison comprend:

4 Vis montage M6 x 20 mm
2 Douilles de centrage Ø7 x 3 mm
2 Douilles de centrage Ø9 x 4 mm

Includes in the delivery:

4 Mounting screw M6 x 20 mm
2 Centering bushings Ø7 x 3 mm
2 Centering bushings Ø9 x 4 mm

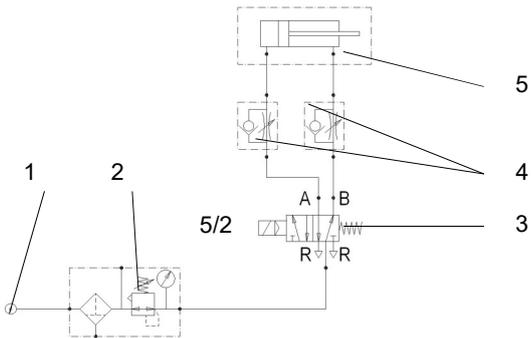
Der Präzisionsschlitten kann mit geölter oder ölfreier Luft betrieben werden.
Reinraumklasse:
10 000 (Federal Standard 209E)

Pour les chariots de précision PS on peut utiliser aussi bien de l'air huilé que de l'air exempt d'huile.
Classe de salle blanche:
10 000 (Federal Standard 209E)

The PS-modul may be operated with oil-containing or oil-free air.
Clean room class:
10 000 (Federal Standard 209E)

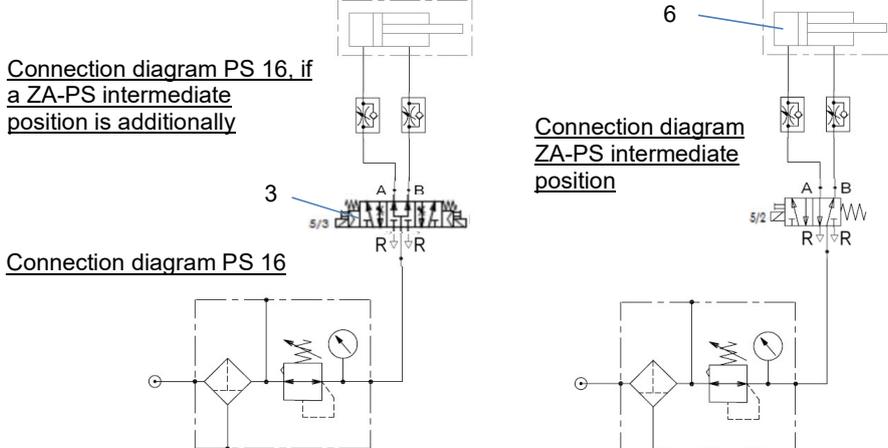
3.2.3 Pneumatic connection PS Module

The pneumatic connection PS 25 = M5; (PS 32 = G 1/8") are located on the left and right side of the base body. Pneumatic connections that are not used must be closed airtight with the locking screws included in the scope of supply.



- | | | | |
|---|---|---|---------------------------------|
| 1 | Compressed air connection | 4 | One-way restrictor |
| 2 | Maintenance unit | 5 | High-precision slides PS 25/32 |
| 3 | Directional valve
(Standard 5/2, if ZA-PS 5/3) | 6 | Intermediate positions cylinder |

Pneumatic connection the intermediate position ZA



Connection diagram PS 16, if a ZA-PS intermediate position is additionally

Connection diagram ZA-PS intermediate position

Connection diagram PS 16

NOTE



Minimal compressed air quality according to ISO 8573-1; 2010 (7-4-4)

3.2.4 Preparation for start-up

Before commissioning the shock absorber with stopper and the initiator holder must be set in such a way that the stroke provided is attenuated correctly.

Commissioning

- Ventilate the total system slowly.
- Note the permissible values (see catalogue) regarding:
 - useful load
 - motion frequency
 - moment loads on the guide system
 -

 CAUTION	
	Limbs may be squeezed by moving components.

- 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.

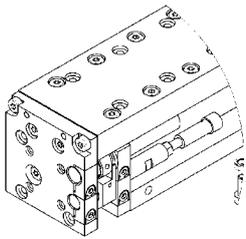
Maintenance and Upkeep

Under the following conditions the PS 25 / 32 is maintenance-free:

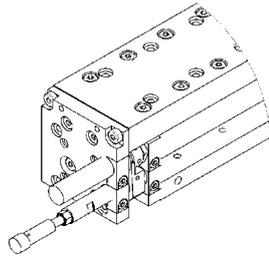
- clean workshop atmosphere
- no splash water
- no dust and fumes caused by abrasion or processes
- ambient conditions according to the technical catalogue



3.2.5 Setting the shock absorbers and the stop screw



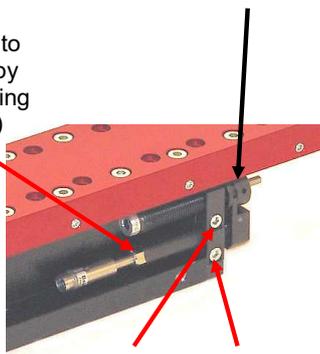
Inside installation



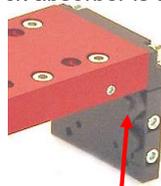
Outside installation
(by stroke 100 mm)

The sensor holder is pulled along when the shock absorber is adjusted

Sensor is fastened to the circumference by means of a tensioning nut (no grub screw)



Shock absorber and sensor can be exchanged separately while maintaining their position



Fine adjustment of the shock absorber via the clamping screw on the stopper bolt

CAUTION



The PS module must not be operated without shock absorbers installed as it may be damaged due to missing damping.

3.2.6 Inquiry of the sensor

Clamping proximity switches are used to query the PS 25/32 stop positions.

Polling of the stop positions is monitored by an LED on the initiator. If the LED switch status does not change during inquiry of the stop positions the sensor is faulty and must be replaced.

CAUTION	
	The PS 25/32 with proximity switch and initiators must not be used in an explosion-hazardous area.

NOTE	
	<p>Initiators and proximity switches are not included in the scope of supply (please see "Accessories" in the Technical Catalogue).</p> <p>Only the specified proximity switches and initiators are to be used.</p>

3.2.7 Accessories of the sensor

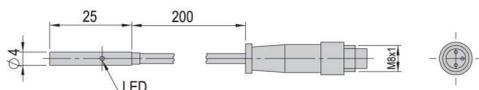
INI Ø 4x25-Sa1.0-PNP-close-M8x1

Best.Nr.11016714

(Alternative) INI Ø 4/6.5x45-Sn1.0-PNP-close-M8x1

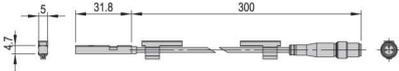
Best.Nr.11009034

INI d4x25-Sn1.0-PNP-NO-M8x1			
Initiator (SCHLIESSER)	Détecteur (FERMETURE)	Proximity switch (CLOSING)	
Bestellnummer	Article No.	Order No.	11016714
Betriebsspannung	Tension d'emploi	Normal voltage	10 - 30 VDC
Schaltabstand	Connecter distance	Distance to connect	1.0 mm



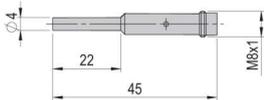
Einsetzbar bei / Poser près / Insert prep:
CS 12, CS 16, CS 20, CS 25 (alternativ)
UG 20, UG 25 (alternativ)
PS 16, PS 25, PS 32

Zylindersensor ZA-PS	Capteur de cylindre ZA-PS	Cylinder sensor ZA-PS	
Initiator (SCHLIESSER)	Détecteur (FERMETURE)	Proximity switch (CLOSING)	
Bestellnummer	Article No.	Order No.	50253315
Betriebsspannung	Tension d'emploi	Normal voltage	10 - 30 VDC
Schaltabstand	Connecter distance	Distance to connect	0.8 mm



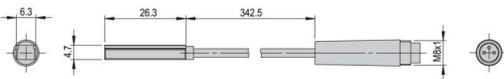
Einsetzbar bei / Poser prés / Insert prep:
ZA-PS

INI d4/6.5x45-Sn1.0-PNP-NO-M8x1	Détecteur (FERMETURE)	Proximity switch (CLOSING)	
Initiator (SCHLIESSER)	Détecteur (FERMETURE)	Proximity switch (CLOSING)	
Bestellnummer	Article No.	Order No.	11009034
Betriebsspannung	Tension d'emploi	Normal voltage	10 - 30 VDC
Schaltabstand	Connecter distance	Distance to connect	0.8 mm



Einsetzbar bei / Poser prés / Insert prep:
PS 16, PS 25, PS 32 (alternativ)

INI 6.3x4.7x26.3-Em-PNP-NO-M8x1	Interrupteur à pos. intermédiaire	Initiator prep intermediate pos.	
Initiator zu Zwischenposition	Interrupteur à pos. intermédiaire	Initiator prep intermediate pos.	
Bestellnummer	Article No.	Order No.	11010759
Betriebsspannung	Tension d'emploi	Normal voltage	10 - 30 VDC



Einsetzbar bei / Poser prés / Insert prep:
ZA-PS 16, ZA-PS 25, ZA-PS 32, (ZA axial)

3.2.8 Optional module with intermediate stop ZA-PS

The precision slides PS 25 / 32 can be retrofitted with the ZA-PS 25 / 32.

The ZA intermediate positions for the PS modules distinguish themselves through their compact size and their design which is adapted to the module.

This intermediate stop can be fitted onto the slide plate for extending and retracting depending on the module stroke length. The intermediate positions can thus be freely selected and offer the great benefit of a continued movement in the moving direction after an intermediate position and without return stroke.



Example: ZA

Typ:	ZA-PS 25	ZA-PS 32
Order No.	50222737	50222738
Weight of module:	0,9 kg	1,4 kg
Operating Pressure:	4-8 bar	4-8 bar
Air connect :	M5	M5
Damping traverse:	Hydr.	Hydr.

Included in the delivery scope:

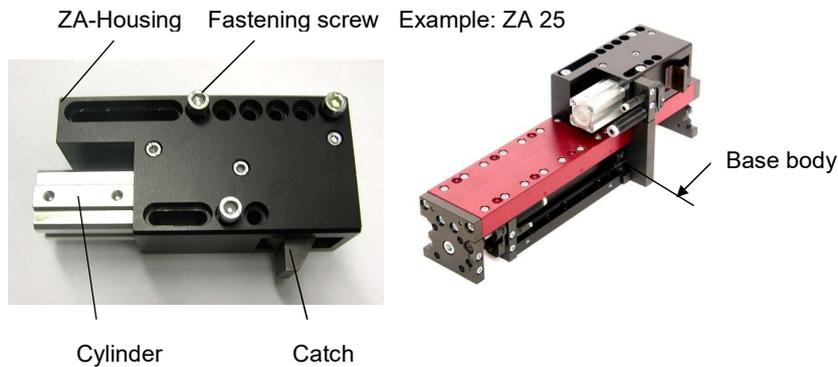
- ZA module with fastening screws
- Stopper angle plate with shock absorber, stop screw and fastening screws

Mounting ZA on the PS module (effective for the extension stroke)

The ZA is mounted in an intermediate position for an extension stroke and is fine adjusted by adjusting the shock absorber and the stop screw (range of adjustment: PS 25 / 32 (20 mm))

- 1 ZAs can be fitted for module strokes from 100 mm onward (1x for the extension stroke and 1x for the retraction stroke). The stopper angle plate can be mounted at the front or rear base body plate, please ensure, however, that the intermediate stop bounds in the direction of the base body.

2



3.2.9 Mounting the stopper angle

Undo the 4 Torx screw at the front (rear) base body plate, as these threaded holes are required for mounting the stopper angle!



Stopper angle with accessories



3.3.0 Mounting procedure for the ZA intermediate stop (effective for the extension stroke)

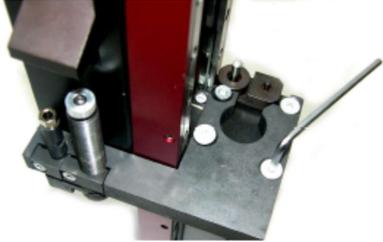
- Determine the intermediate position on the module slide plate
- Fasten the ZA with screws on the module slide plate



Example: ZA 25

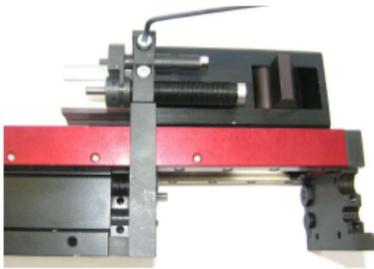
The stopper angle of contact

Insert the 4 allen screw for the stopper angle included in the accessories and tighten screw.



ZA-shock absorber and stop screw

Turn shock absorber and stop screw through 180° so that they act on the catch of the intermediate stop. (Undo screws, invert shock absorber and stop screw, tighten screws).

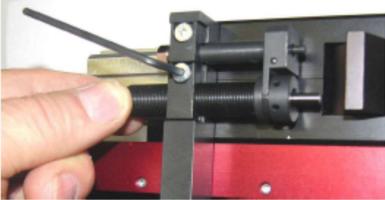


Position for effective action on the catch



3.3.1 Fine adjustment of the stop screw with shock absorber

Range of adjustment for shock absorber and stop screw 20 mm
(PS 25/32)



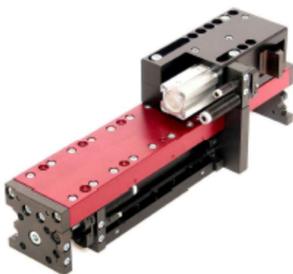
Rotating the ZA cylinder (Air connection upside)

Undo the 4 screws at the cylinder and pull cylinder backward until it can rotated through 180°. (afterwards push cylinder back and tighten the 4 screws again).



Example: ZA 25

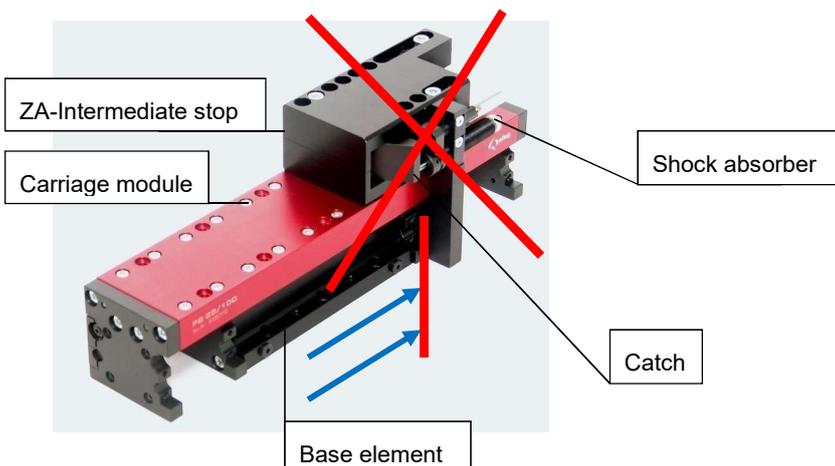
The module is retrofitted with the ZA



This application is not permitted

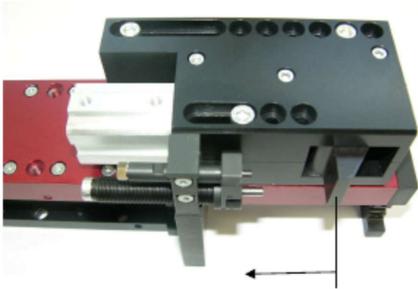
 CAUTION	
	<p>The ZA intermediate stop must not be mounted in such a way that the ZA catch on the module slide moves away from the base body. In the case of a failure of the shock absorber the screws would be overloaded after some 10'000 cycles and would break.</p> <p>Please note the following picture This application is not permitted!</p>

ZA acts on the stopper angle when retracted (not permitted)!





Stop position on the intermediate stop



Example: ZA 25

Position of the intermediate stop on the ZA catch



Final position with retracted ZA catch

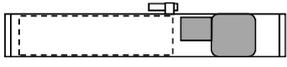
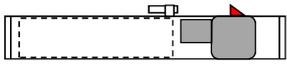
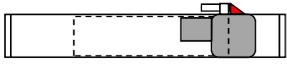
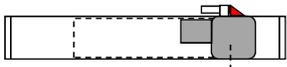
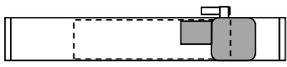
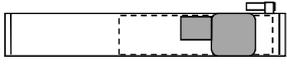
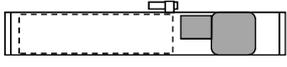


3.3.2 Operating sequence of the intermediate position with axial intermediate Stop cylinder mounted on right-hand side.

1. Pressure on P1 (left module) and pressure on P3 (rear intermediate position cylinder)
2. Pressure on P2 (module moves to the right) and pressure on P3 (rear intermediate position cylinder)
3. Pressure on P4 (intermediate position cylinder moves to the front) and pressure left on P2 Module moves to intermediate position
4. Pressure on P1 (module moves to the left)
5. Pressure on P3 (intermediate position cylinder moves back)

Attention: If the intermediate position cylinder is moved to directly from one side, module damage must be expected.

Operating sequence of the intermediate position using intermediate stop

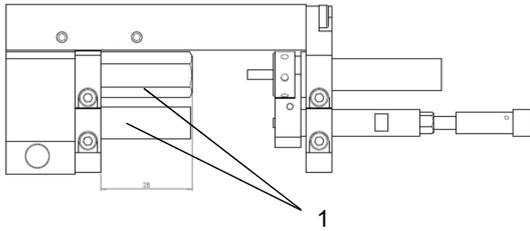
	Positiond	Pressure on	Description
1		P2 P3	Slide completely right Catch of the ZA on
2		P2 P4	Slide completely right Catch of the ZA on
3		P1 P4	Slide moves to intermediate position Catch of the ZA on
4		P1 Pulse on P2 (approx.0.2sec veting)	Before starting from the middle position, both air chambers must absolutely be vented so that the employ air chambers are not moved to and the exhaust air flow control can function. Otherwise module damage must be expected.
5		P3	Catch of the ZA off
6		P1 P3	Slide moves to the left Catch of the ZA off
7		P2 P3	Slide returns to the home position (slide completely right) Catch of the ZA off



Set stop position with extension to Module PS

Stop position with extension

Procedure: Disconnect compressed air from module, loosen and remove the two stop pins (1), screw in and tighten new stop pins.



4.0.0 Maintenance instructions

The shock absorbers and stop screws must undergo regular functionality checks, and be replaced if required. We recommend replacing the shock absorber after a maximum of 5 million load cycles. If shock absorbers are missing, defective or incorrectly set up, the functionality of the module will be compromised and may lead to its destruction!

4.1.0 Maintenance and servicing of the PS 25/32 High-precision slide

 CAUTION	
	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.

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

Further maintenance

Under the following conditions is the PS 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 PS 25/32 High-precision slide is lubricated for-life and can be operated with oiled and unoiled air.

 CAUTION	
	Never operate the PS high-precision slide with unoiled air after it was operated with oiled air!

Air characteristics:

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

If the PS 25/32 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 mm²/s (= cST) at 40°C, ISO-class VG 10 according to ISO 3448

NOTE	
	<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>Afag standard greasing:</p> <ul style="list-style-type: none">- Staburax NBU8EP (flat guides)- Blasolube 301 (piston rods)

4.1.2 Accessories for PS 25 / PS 32 Module

Accessories PS 25

Types	Order No.
Shock absorber ASSD M12x1-1	50105234
Intermediate stop ZA-PS 25	50222737
Set stop position with extension	50138771
Adjusting stop screw AS 08/16	50138579
INI Ø 4X25-Sn1.0-PNP-close-M8x1	11016714
INI Ø 4/6.5x45-Sn1.0-PNP-close-M8x1	11009034
*Intermediate position ZA (Position 2)	50100321
*Intermediate position ZA (Position 4)	50100325
* see cataloge technical	

Accessories PS 32

Types	Order No.
Shock absorber ASSD M14x1-1	50105235
Intermediate stop ZA-PS 32	50222738
Set stop position with extension	50138842
Adjusting stop screw AS 08/18	50138592
INI Ø 4X25-Sn1.0-PNP-close-M8x1	11016714
INI Ø 4/6.5x45-Sn1.0-PNP-close-M8x1	11009034
*Intermediate position ZA (Position 2)	50100321
*Intermediate position ZA (Position 4)	50100325
* see cataloge technical	

NOTE



They find other accessories in the technical catalogue or in the WEB.
www.afag.com



4.1.3 Trouble-shooting

You will find detailed instructions on how to replace individual subsystems of the PS 25 / PS 32

Fault	Possible cause	Fault clearance
Side moves to hard too the final position	Useful load too high	Reduce useful load
	Pressure too low	Increase pressure to max. 8 bar
	Module wrongly connected	Check pneumatic connection
	One-way restrictor completely closed	Open one-way restrictor
Slide moves too hard to the final position	Module defective	Return module to Afag
	Shock absorber wrongly adjusted	Readjust shock absorber
	Shock absorber faulty	Replace shock absorber
	Max. useful load exceeded	Reduce useful load
Air escapes from module	Slide speed to high	Reduce speed by means of one-way restrictor
	Compressed air connection leaky	Check seals of all air connections and tighten if necessary
	Cylinder leaky	Replace seal set

4.1.4 Disassembly and repair

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

 CAUTION	
	<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.

NOTE	
	<p>All the other faulty parts must exclusively be replaced by company Afag automation 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.

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

4.1.5 Expendable parts

PS 25 PS 32

Types	Order No.	Order No.
Shock absorber ASSD M12x1-1; (ASSD M14x1-1)	50105234	(50105235)
Clamping support SD	50138588	(50138595)
Screw clamping support M4x12	50189496	(50189496)
Clamping support the proximity switch	50138590	(50138597)
Initiator holder incl. spring pliers 6Kt. Mu.	50138579	(50138592)
Shock attachment	50138584	(50138594)
Contact pin	50138564	(50138564)
Seal set	50111822	(50111823)

Contact pin



Initiator holder incl. spring pliers



Initiator holder incl. spring

Shock absorber ASSD



Clamping support SD

5.0.0 Disposal

NOTE



PS modules which cannot be used any more must not be disposed of as a complete unit, but must be disassembled and recycled according to the type of material. Materials than cannot be recycled must be disposed of in accordance with the legal regulations.





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