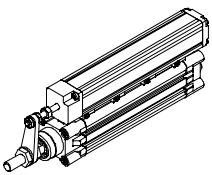
Soft Stop SPC11



FESTO

Supplementary description

Drive-specific supplement for the operation of the SPC11 in conjunction with the standard cylinder with built-on measuring system type DNCM-...-POT



Manual
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Author ..... S. Breuer

Editors ..... H.-J. Drung, M. Holder

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Internet: http://www.festo.com
E-Mail: service_international@festo.com

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Contents

Intended use V
Service VI
Target group VI
Important user instructions VII
Product-specific terms and abbreviations IX
Notes on the use of this manual X

1. Installation instructions for the DNCM-...-POT 1-1

1.1 General instructions 1-3
1.2 System structure with the DNCM-... 1-4
1.3 Notes on installing the pneumatic components 1-5

2. Parameters of the SPC11 for DNCM-..-POT 2-1

2.1 Parameters of the SPC11 2-3
2.2 Setting the parameters 2-5
2.3 Parameters for the DNCM-...-POT in horizontal operation 2-8
DNCM-32-100 to ...-32-200 in horizontal operation 2-8
DNCM-32-250 to ...-32-400 in horizontal operation 2-9
DNCM-32-500 in horizontal operation 2-10
DNCM-50-100 to ...-50-200 in horizontal operation 2-11
DNCM-50-250 to ...-50-400 in horizontal operation 2-12
DNCM-50-500 in horizontal operation 2-13
2.4 Parameters for the DNCM-...-POT in vertical operation 2-14
DNCM-32-100 to ...-32-200 in vertical operation 2-14
DNCM-32-250 to ...-32-400 in vertical operation 2-14
DNCM-32-500 in vertical operation 2-15
DNCM-50-100 to ...-50-200 in vertical operation 2-15
DNCM-50-250 to ...-50-400 in vertical operation 2-16
DNCM-50-500 in vertical operation 2-16

A. Technical appendix A-1

A.1 Repetition accuracy A-3
A.2 Index C-5

Intended use

The SPC11 has been designed for fitting into a machine or an automation device. In conjunction with permitted drives and measuring systems and a proportional directional control valve type MPYE-5-..., the SPC11 enables:

– fast movement into the mechanical end positions and one or two selectable mid-positions

– manual movement between the end positions.

Depending on the drive used, fixed stops are in some cases required for protecting the drive. The end positions can be set with fixed stops. The end position cushioning, movement into the intermediate positions and manual movement are controlled electronically. The SPC11 must only be used as follows:

– as intended

– in original condition

– without any modifications

– in faultless technical condition

– only in conjunction with permitted drives/measuring system combinations.

If used in conjunction with additional commercially-available components, such as sensors and actuators, the specific maximum values for pressures, temperatures, electrical data, torques, etc. must be observed. Please observe also national and local laws and regulations.

Service

If you have any technical problems, please contact your local Festo Service.

Target group

This manual is intended exclusively for personnel trained in control and automation technology.

Important user instructions

Danger categories

This manual contains instructions on the possible dangers which may occur if the product is not used correctly. These instructions are marked (Warning, Caution, etc.), printed on a shaded background and marked additionally with a pictogram. A distinction is made between the following danger warnings:



Warning
This means that failure to observe this instruction may result in serious personal injury or damage to property.



Caution
This means that failure to observe this instruction may result in personal injury or damage to property.



Please note
This means that failure to observe this instruction may result in damage to property.

The following pictogram marks passages in the text which describe activities with electrostatically sensitive components.



Electrostatically sensitive components may be damaged if they are not handled correctly.

Marking special information

The following pictograms mark passages in the text containing special information.

Pictograms



Information:
Recommendations, tips and references to other sources of information.



Accessories:
Information on necessary or sensible accessories for the Festo product.



Environment:
Information on environment-friendly use of Festo products.

Text markings

- The bullet indicates activities which may be carried out in any order.

1. Figures denote activities which must be carried out in the numerical order specified.

– Hyphens indicate general activities.

Product-specific terms and abbreviations

The following product-specific abbreviations are used in this manual:

Term/ abbreviation	Meaning
0-signal	Input or output supplies 0 V
1-signal	Input or output supplies 24 V
Drive	In this manual the term ”Drive” represents the terms ”linear unit” (DGP(I)(L)-...), ”cylinder” (DNC-...) or ”rotary drive” (DSMI).
O	Digital output
Cushioning stage	The positioning behaviour is determined by the amplification and cushioning stages. The cushioning stage serves for optimizing the starting behaviour when movement is made towards the end positions.
I	Digital input
PLC, IPC	Programmable logic controller/industrial PC
System parameter	Characteristic value which describes both the system structure as well as the features and components of the drive used.
Parameter	Parameters which must be set for operating the system. This includes the cushioning stage, the amplification stage and the system parameters.
Teach procedure	In the Teach procedure, the SPC11 checks the set parameters, learns the position of the mechanical fixed stops as well as various characteristic system values and saves these in the integrated EEPROM.
Amplification stage	The amplification stage influences e.g. the acceleration behaviour of the drive. The amplification stage should usually be set in accordance with the specifications in the manual “Drive-specific supplement”. If it is necessary to optimize the positioning behaviour, only the cushioning stage should be modified.

Notes on the use of this manual

This manual contains special information on installing and commissioning the SPC11 in conjunction with drive type DNCM-...-POT.

The SPC11 is available in different designs. In this manual the SPC11 with multipin connection is described as an example. Detailed information on the different designs can be found in the relevant system manual for the SPC11.

General information on the method of operation, fitting, installing and commissioning pneumatic drives with the SPC11 can be found in the system manual P.BE-SPC11-SYS-... .

Manuals for the SPC11

Manual	Title	Contents
System manual Soft Stop SPC11 electronics/ pneumatics	P.BE-SPC11-SYS...	General instructions on installing and commissioning
Drive-specific supplement for operating the SPC11 with a certain drive, e.g. with the DNC-... (e.g. this manual)	P.BE-SPC11-...-...	Special installation and commissioning instructions as well as parameter settings for the appropriate drive [1)]

1) These manuals contain the permitted drive-valve combinations, drive diameters and mass loads as well as the parameter settings valid here for the SPC11.

Please note
For installation and commissioning you will require the system manual as well as the manual “Drive-specific supplement” for the drive used.

Installation instructions for the DNCM-...-POT

Chapter 1

Contents

1. Installation instructions for the DNCM-...-POT 1-1

1.1 General instructions 1-3
1.2 System structure with the DNCM-... 1-4
1.3 Notes on installing the pneumatic components 1-5

1.1 General instructions

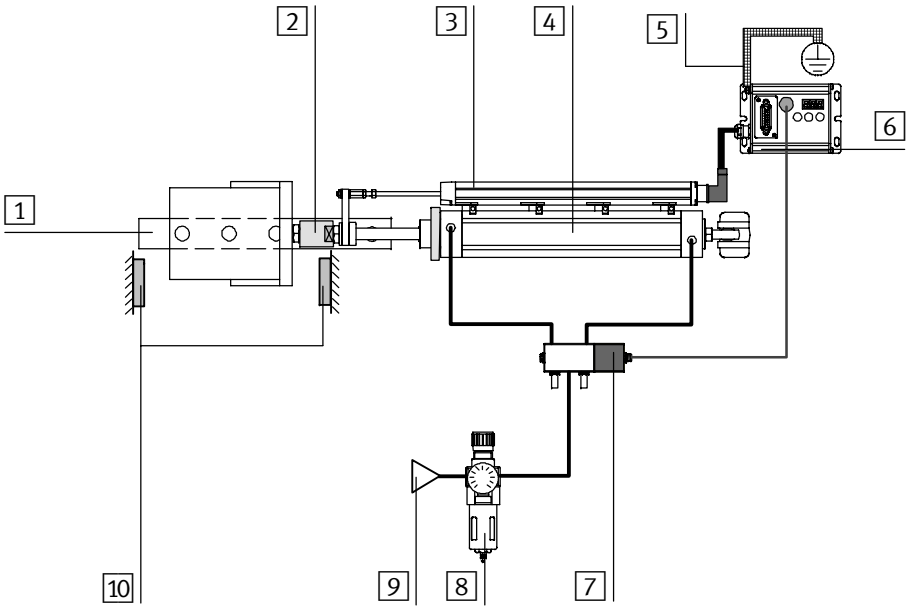


Warning
Faults in the system structure and incorrect parameters can cause the piston to move to an end position uncushioned. The fixed stop or the drive may then be damaged. You must observe the following instructions in order to prevent such damage.

- Pay special attention to the design of the system. Always observe the safety instructions and information in this manual as well as in the system manual for type P.BE-SPC11-SYS... .
- Use only the special matching components from Festo for setting up and connecting the system. Only in this way can you guarantee the correct functioning of the system.

1.2 System structure with the DNCM-...

The following diagram shows the basic layout of a drive with the SPC11 and the standard cylinder with built-on measuring system type DNCM-... .



1 Guide

2 Coupling

3 Built-on measuring system

4 Drive with built-on measuring system (here type DNCM-...)

5 Mass strap

6 SPC11 (here type SPC11-POT-TLF-...)

7 Proportional directional control valve type MPYE-5-...-010B

8 Service unit with 5 µm filter without lubricator

9 Compressed air supply (5 to 7 bar)

10 Fixed stop

Fig. 1/1: System structure of the SPC11 with drive type DNCM-...-POT

1.3 Notes on installing the pneumatic components



Caution
If the operating voltage is switched off while the compressed air supply is still switched on, the actuators may be triggered, resulting in unexpected movements which may cause damage. Switch off the operating voltage and the compressed air supply at the same time or in the following sequence:

1. the compressed air supply
2. the operating voltage.



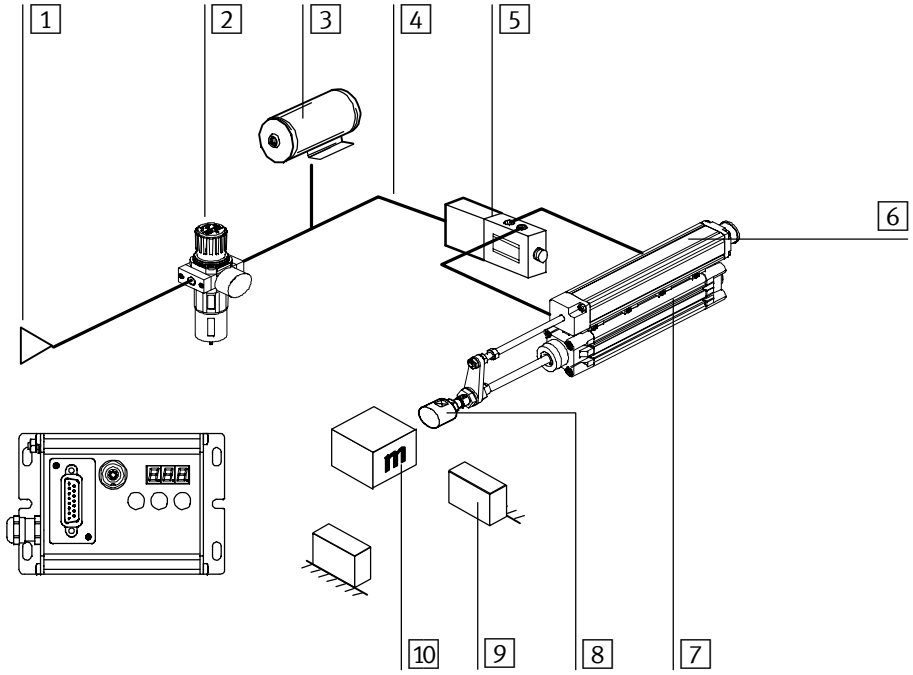
Please note
Make sure that the compressed air supply and the operating voltage are switched off before starting installation and maintenance work.



General rules for building up the system can be found in the relevant system manual type P.BE-SPC11-SYS... . The following sections contain special instructions on operation in conjunction with the standard cylinder with built-on measuring system type DNCM-...-POT.



Please note
Observe the following instructions on installing the pneumatic components. Only then can you guarantee faultless operation.



1 ... 10 Notes on installation see the following pages

Fig. 1/2: Overview of pneumatic installation

Compressed air supply (1)

See system manual type P.BE-SPC11-SYS...

Service unit (2)

See system manual type P.BE-SPC11-SYS...

Compressed air reservoir (3)

See system manual type P.BE-SPC11-SYS...

Compressed air tubing and screw connectors (4)

See also system manual type P.BE-SPC11-SYS...

- Arrange the tubing between the valve (MPYE-5-...) and the cylinder (DNCM-...) symmetrically.
  Recommendation: Tubing length = cylinder length + 50 mm
- Select the tubing and the connectors as shown in the following table.

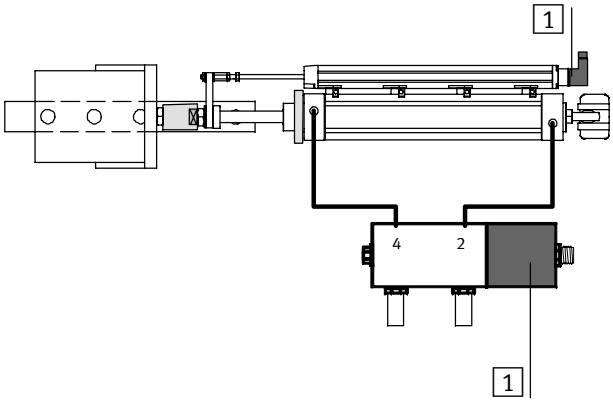
Horizontal fitting position

Stroke length in mm	Valve type MPYE-...	Screw connectors for		Tubing type PUN
		MPYE-...	DNC-...	
DNCM-32-...-POT				
100...400	MPYE-5-1/8-LF-010B	QS-1/8-8	QS-1/8-8	PUN-8x1.25
500	MPYE-5-1/8-HF-010B	QS-1/8-8	QS-1/8-8	PUN-8x1.25
DNCM-50-...-POT				
100...250	MPYE-5-1/8-LF-010B	QS-1/8-8	QS-1/4-8	PUN-8x1.25
320...400	MPYE-5-1/8-HF-010B	QS-1/8-8	QS-1/4-8	PUN-8x1.25
500	MPYE-5-1/4-010B	QS-1/4-10	QS-1/4-10	PUN-10x1.5

Proportional directional control valve (5)

See also system manual type P.BE-SPC11-SYS...

Work port 2 of the proportional directional control valve must be connected to the cylinder port which is on the side with the electrical connection for the potentiometer.



1 Electrical connection

Fig. 1/3: Tubing connection for slide mode

Standard cylinder with built-on measuring system type DNCM-...-POT (6)

The standard cylinder and measuring system are fitted symmetrically at the factory. The parameters listed in chapter 2 are matched to this symmetrical fitting.

Caution
Even slight deviations from the necessary symmetry between the measuring system and the standard cylinder can lead to bad positioning during operation. In extreme cases the measuring system can be damaged. Do **not** loosen the mechanical connections between the standard cylinder housing and the measuring system housing. When fitting the coupling plate observe the instructions in the operating instructions for the DNCM-...-POT.

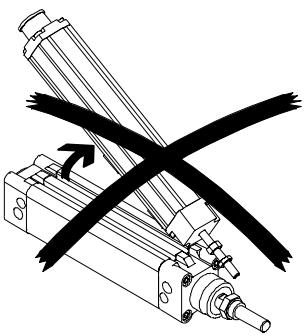


Fig. 1/4: Do **not** loosen the mechanical connection

Use only:

– Permitted combinations of drives, valves and mass loads see “Parameters for the DNCM-...” in chapter 2.

• Fit the drive horizontally or vertically.

Parameters for the DNCM-...-POT in vertical operation are available on request.

- Use fastening elements which will permanently resist the acceleration forces.

Recommendation: Use the following fastening elements from Festo:

Fastening elements	Type
Foot fastening	HNC-...
Flange fastening	FN-...

- Avoid installing restrictors in the supply line.
- If necessary, provide a sufficiently large supply of energy in order to minimize the effects of transverse forces on the positioning behaviour.
- Use a suitable guide for withstanding transverse forces.
- Grease the external guide at suitable maintenance intervals (see manufacturer's instructions).
- Connect the drive, the guide and the load free of play in the direction of movement and flush with each other.

Coupling (8)

Recommendation: Use coupling type KSZ-M... from Festo.

If a coupling is required between the piston rod and the guide:

- Check the play of the coupling.
  The following applies: coupling play ≤ 0.05 mm
- Set the play of the coupling accordingly.

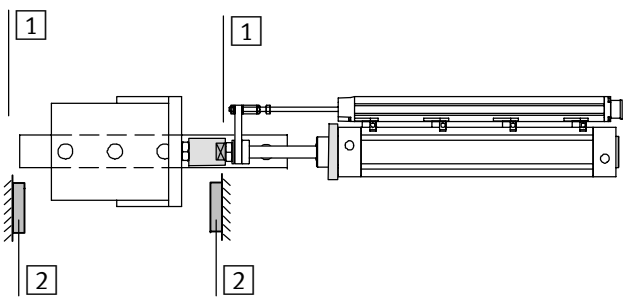
Please note
If the coupling play is too large, it may not be possible to carry out the teach procedure successfully. Excessive coupling play can lead to:
– noise caused by knocks against the coupling
– high wear of the coupling
– deterioration in running behaviour.
Make sure that the coupling play does not exceed 0.05 mm.

Fixed stops (9)

Caution
The use of the whole length of the drive can cause faults.
Fit the fixed stops at 0.5 mm from the drive end position.

If the DNCM-...-POT is operated in conjunction with the SPC11, external fixed stops will be required. By means of the fixed stops, the end positions can be set as desired.

Please note
During the teach procedure, a work load is pressed against the fixed stops at a pressure up to the level of the operating pressure. Make sure that the fixed stops can withstand this pressure, in order that the SPC11 can ascertain exactly the end positions during the teach procedure.



1 Cylinder end position

2 Fixed stops

Fig. 1/5: Fixed stops

Mass load (10)

Fit the mass load free of play.



Warning
Transverse loadings will falsify the measuring results and possibly damage the measuring system.

- Use an external guide for the work load in order to prevent transverse loadings on the connecting rod of the measuring system.

Possible moveable mass loads see “Parameters for the DNCM-...-POT” in chapter 2. The tables listed there contain all the combinations of drives, valves and mass loads permitted for operation with the SPC11 type SPC11-POT-TLF.

Parameters of the SPC11 for DNCM-..-POT

Chapter 2

Contents

2.	**Parameters of the SPC11 for DNCM-..-POT**	**2-1**
2.1	Parameters of the SPC11	2-3
2.2	Setting the parameters	2-5
2.3	Parameters for the DNCM-...-POT in horizontal operation	2-8
	DNCM-32-100 to ...-32-200 in horizontal operation	2-8
	DNCM-32-250 to ...-32-400 in horizontal operation	2-9
	DNCM-32-500 in horizontal operation	2-10
	DNCM-50-100 to ...-50-200 in horizontal operation	2-11
	DNCM-50-250 to ...-50-400 in horizontal operation	2-12
	DNCM-50-500 in horizontal operation	2-13
2.4	Parameters for the DNCM-...-POT in vertical operation	2-14
	DNCM-32-100 to ...-32-200 in vertical operation	2-14
	NCM-32-250 to ...-32-400 in vertical operation	2-14
	NCM-32-500 in vertical operation	2-15
	NCM-50-100 to ...-50-200 in vertical operation	2-15
	DNCM-50-250 to ...-50-400 in vertical operation	2-16
	DNCM-50-500 in vertical operation	2-16

2.1 Parameters of the SPC11



Warning
Incorrectly set parameters can damage the fixed stops and the drive.

Be very careful when setting the parameters.

The SPC11 must be familiar with certain conditions of use. These conditions of use are described by the three following parameters:

Parameters	Manual
Amplification stage (amplification stage)	Influences the acceleration behaviour of the drive
Cushioning stage (cushioning stage)	Influences the retracting behaviour when moving to the end positions and intermediate positions.
System parameters (system parameters)	Characteristic value for the structure of the drive

Valid parameters for operating the SPC11 with drive type DNCM-...-POT can be found in section 2.3. These parameters are matched exactly to the specified combinations of drives, valves and mass loads for horizontal operation.

Specifications for setting the parameters

In order to set the parameters, you will require the following specifications:

– the cylinder stroke length (see type plate on the drive used)

– the valve type (see type plate on proportional directional control valve used)

– the maximum mass load with which the slide may be loaded.

Mass load

If you wish to position with different masses:

– Positioning with a mass up to 30 % less is usually no problem. Further reduction of the mass can lead to a deterioration in positioning behaviour and make optimization necessary (see system manual).

– If necessary, place a basic load on the drive, in order to set a higher mass. Positioning can then be made with a higher difference of mass.

– Always set the amplification and cushioning stages for the maximum mass load used.

2.2 Setting the parameters

Warning
Incorrectly set parameters can damage the fixed stops and the drive.
Always select the amplification and cushioning stages for the maximum mass load. In case of doubt, set first the amplification and cushioning stages for the larger mass load.

The positioning times specified in section 2.3 as well as optimum system behaviour can only be achieved if the installation instructions described in the previous section are observed. The resulting positioning times depend on the stroke length actually used and can vary depending on the direction of stroke.

Further instructions on the amplification and cushioning stages can be found in the system manual.

Set the parameters as follows:

1. Use the tables in section 2.3 and in section 2.4 to ascertain the parameters valid for your application (amplification stage, cushioning stage and system parameters).
2. Then set the parameters accordingly. Proceed here as described in the chapter “Commissioning” in the system manual (type P.BE-SPC11-SYS...).

The following diagram explains the tables:

In individual cases it may be necessary to optimize the positioning behaviour (see system manual) in order to achieve the specified average positioning times.

DNCM-32-100 to ...-32-160

	DNCM-32-100				DNCM-32-160			
	MPYE-5-1/8-LF-010B				MPYE-5-1/8-LF-010B			
Mass [kg]	Amplification stage	Cushioning stage	System parameter	Time [s]	Amplification stage	Cushioning stage	System parameter	Time [s]
3	3	12	41	0.40	7	14	22	0.47
6	6	16	41	0.45	10	17	22	0.51

[1] Drive

[2] Valve type required

[3] Maximum permitted mass load for the adjacent parameter setting

[4] Average positioning time in seconds for maximum permitted cylinder stroke length; deviations normally lie within ± 70 ms.

Fig. 2/1: Explanation of table structure

The parameters listed in the following tables match exactly the specified combinations of valves, drives, mass loads and mounting positions.



Please note
Faultless operation can only be guaranteed if all components are fitted correctly.

- Use only the specified combinations of valves, drives and mass loads.
- Observe the installation instructions in chapter 1 as well as in the system manual.
- Do **not** loosen the mechanical connections betweeen the standard cylinder housing and the measuring system housing. When fitting the coupling plate observe the instructions in the operating instructions for the DNCM-...-POT.

2.3 Parameters for the DNCM-...-POT in horizontal operation

DNCM-32-100 to ...-32-200 in horizontal operation

Mass [kg]	DNCM-32-100				DNCM-32-160				DNCM-32-200			
	MPYE-5-1/8-LF-010B				MPYE-5-1/8-LF-010B				MPYE-5-1/8-LF-010B			
	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]
3	3	12	41	0.40	7	14	22	0.47	10	15	33	0.56
6	6	16	41	0.45	10	17	22	0.51	12	18	33	0.60
9	8	18	41	0.45	11	19	22	0.51	14	20	33	0.57
12	9	21	41	0.48	13	21	22	0.57	15	22	33	0.58
15	10	21	41	0.49	13	22	22	0.59	16	23	33	0.62
18	11	22	41	0.51	14	23	22	0.63	17	24	33	0.63
21	11	22	41	0.52	15	24	22	0.61	18	24	33	0.65
24	12	23	41	0.52	15	24	22	0.66	18	25	33	0.62
27	12	24	41	0.55	16	25	22	0.63	19	26	33	0.64
30	13	24	41	0.50	16	26	22	0.61	19	26	33	0.71
33	13	25	41	0.56	17	26	22	0.64	20	27	33	0.62
36	14	25	41	0.54	17	28	22	0.70	20	28	33	0.69
39	14	26	41	0.61	18	29	22	0.67	20	29	33	0.72
42	14	26	41	0.56	18	29	22	0.69	20	31	33	0.78
45	15	28	41	0.61	18	30	22	0.76	21	30	33	0.74

DNCM-32-250 to ...-32-400 in horizontal operation

	DNCM-32-250				DNCM-32-320				DNCM-32-400			
	MPYE-5-1/8-LF-010B				MPYE-5-1/8-LF-010B				MPYE-5-1/8-LF-010B			
Mass [kg]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]
3	12	15	33	0.55	15	16	44	0.65	17	17	35	0.74
6	15	19	33	0.59	18	20	44	0.66	20	20	35	0.70
9	16	21	33	0.70	19	22	44	0.69	21	22	35	0.72
12	18	22	33	0.63	21	23	44	0.75	23	24	35	0.78
15	18	23	33	0.63	21	24	44	0.77	23	25	35	0.77
18	19	24	33	0.62	22	26	44	0.73	24	26	35	0.81
21	20	25	33	0.64	23	26	44	0.73	25	27	35	0.81
24	20	26	33	0.66	23	28	44	0.78	24	29	35	0.93
27	21	28	33	0.76	24	28	44	0.81	26	28	35	0.81
30	21	27	33	0.72	24	30	44	0.86	26	30	35	0.85
33	22	29	33	0.76	25	30	44	0.84	27	30	35	0.83
36	22	29	33	0.75	25	30	44	0.84	27	31	35	0.89
39	23	30	33	0.76	26	29	44	0.78	28	30	35	0.83
42	23	30	33	0.79	26	31	44	0.86	28	31	35	0.89
45	23	30	33	0.84	26	31	44	0.90	28	32	35	0.87

DNCM-32-500 in horizontal operation

Mass [kg]	DNCM-32-500											
	MPYE-5-1/8-HF-010B											
	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]
3	16	19	43	0.64								
6	18	22	43	0.68								
9	20	24	43	0.71								
12	21	26	43	0.76								
15	22	27	43	0.76								
18	23	28	43	0.80								
21	23	29	43	0.82								
24	24	29	43	0.80								
27	24	30	43	0.79								
30	25	31	43	0.79								
33	25	31	43	0.85								
36	25	32	43	0.79								
39	26	32	43	0.84								
42	26	33	43	0.91								
45	26	33	43	0.90								

DNCM-50-100 to ...-50-200 in horizontal operation

	DNCM-50-100				DNCM-50-160				DNCM-50-200			
	MPYE-5-1/8-LF-010B				MPYE-5-1/8-LF-010B				MPYE-5-1/8-LF-010B			
Mass [kg]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]
8	8	10	54	0.57	12	12	35	0.69	15	13	46	0.77
16	11	15	54	0.62	15	17	35	0.72	18	17	46	0.73
24	13	18	54	0.60	17	19	35	0.71	19	20	46	0.77
32	14	19	54	0.63	18	20	35	0.73	21	21	46	0.83
40	15	20	54	0.60	19	22	35	0.69	21	22	46	0.83
48	16	21	54	0.66	19	23	35	0.77	22	23	46	0.81
56	17	22	54	0.63	20	23	35	0.70	23	24	46	0.81
64	17	23	54	0.65	21	24	35	0.76	23	25	46	0.93
72	18	24	54	0.66	21	25	35	0.81	24	25	46	0.79
80	18	24	54	0.62	22	25	35	0.74	24	26	46	0.86
88	18	25	54	0.71	22	26	35	0.82	25	27	46	0.88
96	19	25	54	0.64	22	26	35	0.80	25	27	46	0.82
104	19	26	54	0.72	23	27	35	0.77	26	28	46	0.79
112	19	26	54	0.75	23	27	35	0.81	26	28	46	0.92
120	20	26	54	0.70	23	28	35	0.81	26	28	46	0.90

DNCM-50-250 to ...-50-400 in horizontal operation

Mass [kg]	DNCM-50-250				DNCM-50-320				DNCM-50-400			
	MPYE-5-1/8-LF-010B				MPYE-5-1/8-HF-010B				MPYE-5-1/8-HF-010B			
	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]
8	17	14	47	0.85	16	18	55	0.85	18	18	46	0.92
16	20	18	47	0.83	18	20	55	0.82	21	21	46	0.89
24	22	20	47	0.81	20	22	55	0.82	22	23	46	0.93
32	23	22	47	0.82	21	24	55	0.86	23	24	46	0.91
40	24	23	47	0.84	22	25	55	0.86	24	26	46	0.96
48	25	24	47	0.83	23	26	55	0.87	25	27	46	0.95
56	25	25	47	0.94	24	27	55	0.93	26	27	46	0.96
64	26	26	47	0.86	24	27	55	0.92	26	28	46	0.93
72	26	26	47	0.90	25	28	55	0.92	27	29	46	1.00
80	27	27	47	0.91	25	29	55	0.94	27	29	46	0.95
88	27	27	47	0.91	26	29	55	0.92	28	30	46	0.98
96	27	28	47	0.97	26	30	55	0.95	28	30	46	0.97
104	28	28	47	0.91	26	30	55	0.99	28	31	46	1.04
112	28	29	47	1.00	27	31	55	0.98	29	31	46	1.01
120	28	30	47	0.95	27	31	55	0.98	29	32	46	1.02

DNCM-50-500 in horizontal operation

	DNCM-50-500											
	MPYE-5-1/4-010B											
Mass [kg]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]
8	17	19	44	0.73								
16	19	23	44	0.76								
24	21	25	44	0.83								
32	22	26	44	0.79								
40	23	27	44	0.86								
48	24	28	44	0.85								
56	24	29	44	0.88								
64	25	31	44	0.89								
72	25	31	44	0.90								
80	26	31	44	0.91								
88	25	32	44	0.94								
96	27	32	44	0.87								
104	27	33	44	1.00								
112	27	33	44	0.94								
120	27	34	44	1.00								

2.4 Parameters for the DNCM-...-POT in vertical operation

Parameters for the DNCM-...-POT in vertical operation are available on request.

DNCM-32-100 to ...-32-200 in vertical operation

Mass [kg]	DNCM-32-100				DNCM-32-160				DNCM-32-200			
	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]
On request												

DNCM-32-250 to ...-32-400 in vertical operation

Mass [kg]	DNCM-32-250				DNCM-32-320				DNCM-32-400			
	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]
On request												

DNCM-32-500 in vertical operation

Mass [kg]	DNCM-32-500											
	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]
On request												

DNCM-50-100 to ...-50-200 in vertical operation

Mass [kg]	DNCM-50-100				DNCM-50-160				DNCM-50-200			
	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]
On request												

DNCM-50-250 to ...-50-400 in vertical operation

Mass [kg]	DNCM-50-250				DNCM-50-320				DNCM-50-400			
	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]
On request												

DNCM-50-500 in vertical operation

Mass [kg]	DNCM-50-500											
	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]	Amplification stage (A)	Cushioning stage (C)	System parameters (S)	Time [s]
On request												

Technical appendix

Appendix A

Contents

A. Technical appendix A-1

A.1 Repetition accuracy A-3
A.2 Index C-5

A.1 Repetition accuracy

The repetition accuracy when appproaching the mid-positions is ± 0.25 % of the rated length of the measuring system, but not more accurate than ± 2 mm.



Please note
Observe the instructions on repetition accuracy in the system manual in order to achieve good positioning behaviour and the repetition accuracy specified.

A.2 Index

0-signal IX
1-signal IX

A

Abbreviations IX
Amplification stage ..... IX, 2-3

C

Compressed air reservoir 1-6
Compressed air supply 1-6
Compressed air tubing 1-7
Coupling 1-11
Coupling play 1-11
Cushioning stage ..... IX, 2-3

D

Drive IX

F

Fixed stops 1-12
Flange fastening 1-10
Foot fastening 1-10

I

Important user instructions VII
Installation instructions
Compressed air reservoir 1-6
Compressed air supply 1-6
Compressed air tubing and screw connectors 1-7
Drive 1-9
Fixed stops 1-12
Mass load 1-13
Proportional directional control valve 1-8
Service unit 1-6
Intended use V

M

Manuals for the SPC11 X
Drive-specific supplement X
System manual X
Mass load 2-4

P

Parameters 2-3
DNCM-32-100 to ...-32-200 (horizontal) 2-8
DNCM-32-100 to ...-32-200 (vertical) 2-14
DNCM-32-250 to ...-32-400 (horizontal) 2-9
DNCM-32-250 to ...-32-400 (vertical) 2-14
DNCM-32-500 (horizontal) 2-10
DNCM-32-500 (vertical) 2-15
DNCM-50-100 to ...-50-200 (horizontal) 2-11
DNCM-50-100 to ...-50-200 (vertical) 2-15
DNCM-50-250 to ...-50-400 (horizontal) 2-12
DNCM-50-250 to ...-50-400 (vertical) 2-16
DNCM-50-500 (horizontal) 2-13
DNCM-50-500 (vertical) 2-16
Pictograms VIII
Proportional directional control valve 1-8

R

Repetition accuracy A-3

S

Screw connectors 1-7
Service VI
Service unit 1-6
Setting the parameters 2-5
Slide mode 1-8
System parameter 2-3

T

Teach procedure IX
Text markings VIII