# End-position controllers SPC11

FESTO

# End-position controllers SPC11

Key features

## At a glance

Fast travel between two fixed stops with electronic end-position cushioning and up to two freely selectable intermediate positions.

- Up to 30% faster cycle rate
- Significantly reduced system vibration
- Fast problem-free commissioning, no specialists required
- Simple conversion of existing systems
- Optimum operating behaviour is maintained even with changes in weight/load of up to 30% of the total moving mass
- Less expensive than electromechanical drives
- Reduced noise level

## Individual components

### End-position controller

Integrated functions:
- Determining system characteristic values of the connected components.
- Storage of the desired end positions or intermediate positions.
- Comparison of setpoint and actual position, and position control through appropriate actuation of the proportional 5/3-way valve (status control).
- Internal or external teach-in function.

SPC11

### Analogue displacement encoders

Analogue position encoder based on a conductive-plastic linear potentiometer. The system measures absolute values. It is connected alongside a pneumatic drive. Mounting kits are available as accessories for the mechanical coupling. The displacement encoder is available in fixed stroke lengths graduated from 100 ... 2000 mm.

MLO-POT...-TLF

MLO-POT...-LWG

### Digital displacement encoders

Digital displacement encoders, magnetostrictive, contactless method of measurement. The system measures absolute values. It is connected alongside a pneumatic drive. Mounting kits are available as accessories for the mechanical coupling. The displacement encoder is available in fixed stroke lengths graduated from 100 ... 2000 mm.

MME-MTS-...-AIF

### Pneumatic drives

Pneumatic drives ensure an easy-to-operate system. The stroke length operating range depends on the selected drive. It is in the range from 225 ... 2000 mm. The swivel angle with the DSMI ranges from 0° ... 270°.

**Note**

Above a cylinder working stroke of 600 mm, drives DGCI with supply port (D2) on both sides must be used.

DGCI

DDLI

DNC

DNCI

DSMI

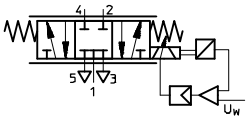
### Proportional 5/3-way valves

Valve actuation is via the end-position controller. The valve controls the volume of air supplied to the drive. The extremely short switching time of the valve makes the Soft Stop solution package highly dynamic.

**Note**

Use a 5 µm filter for air preparation. The compressed air supply must be unlubricated.

MPYE-5-...-010B

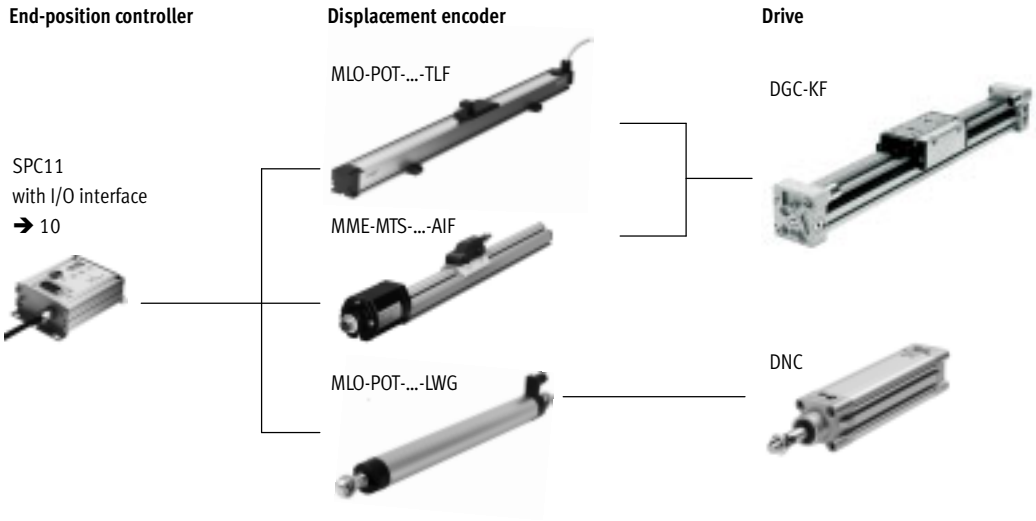


# End-position controllers SPC11

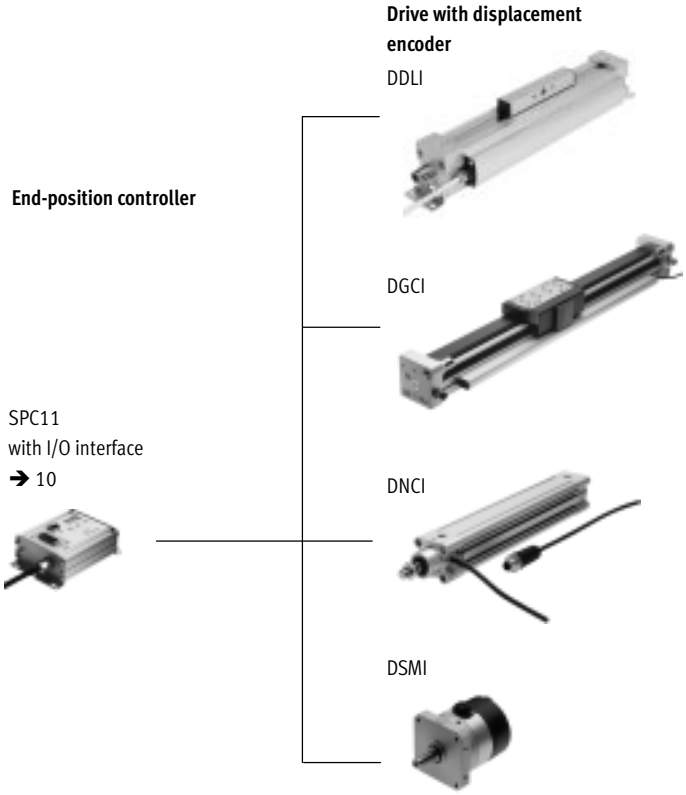
Key features

**Possible combinations**

With external displacement encoder




With external/integrated displacement encoder



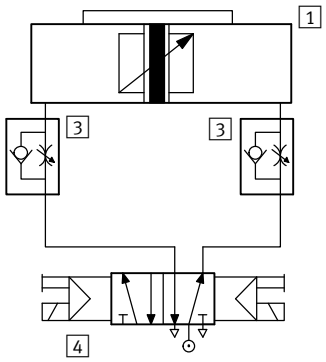
# End-position controllers SPC11

Key features

**Conventional solution**

Previously you needed to

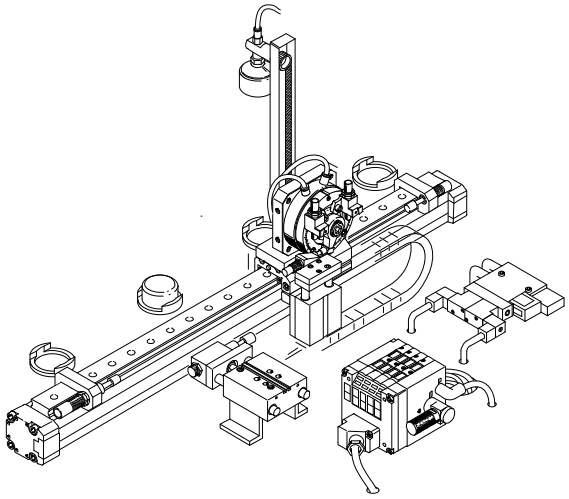
- Harmonise individual components.
- Install additional shock absorbers and possibly replace/exchange existing shock absorbers.
- Fit proximity sensors for position detection.
- Adjust the compressed air supply by means of flow control valves in order to optimise the system.




1 Pneumatic drives DGCI, DDLI, DNC or DSM
2 Shock absorber YSR
3 One-way flow control valves GRLA
4 Double solenoid valve JMFH

Previously, to create intermediate positions you had to

- Construct a complex mechanical solution yourself using stopper cylinders, for example.
- Harmonise a large number of individual components.
- Carry out extensive programming.



**Solution with end-position controller SPC11**

Fast travel between two fixed stops with up to two freely selectable intermediate positions

The Soft Stop system with end-position controller SPC11 facilitates travel to up to two freely selectable intermediate positions as well as travel between two fixed mechanical stops. The accuracy of the intermediate positions is ±0.25% of the length of the displacement encoder, with the minimum being ±2 mm. In the case of the semi-rotary drive DSMI, the accuracy of the intermediate positions is ±2%. Typical applications for the intermediate positions are wait or ejector positions, where a low-cost solution is more important than achieving high levels of accuracy. The mid-positions also have sensor functionality. In other words, if the respective mid-position is overshot, a 1 signal is supplied to the corresponding output for 50 ms.

# End-position controllers SPC11

Key features

**The Festo solution package**

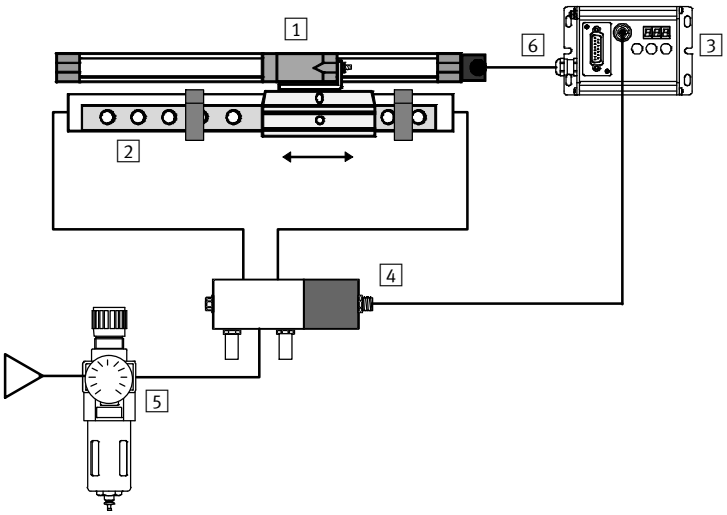
Soft Stop with end-position controller SPC11

In an application with up to two intermediate positions you can now:

- Use the Festo solution package with a small number of harmonised components.
- Dispense with complex constructions using stopper cylinders.
- Approach the intermediate positions from both sides.
- Let optimisation be carried out by the learning system itself.

The Soft Stop system with SPC11 has a remote input which allows all 3 buttons to be positioned on a higher-order controller:

- All system parameters can be defined and changed externally.
- A 1 signal at the remote input locks all buttons on the end-position controller SPC11.




1 Displacement encoder
Digital:
– MME-MTS-...-AIF
– integrated in DNCI
Analogue:
– MLO-POT-...-TLF
– MLO-POT-...-LWG
– integrated in DSMI

2 Pneumatic drives
DGCI, DGC-KF, DNC, DNCI, DDLI or DSMI

3 End-position controller
SPC11-POT-TLF,
SPC11-POT-LWG or
SPC11-MTS-AIF
SPC11-INC

4 Proportional 5/3-way valve
MPYE-5-...-010B

5 Service unit (without lubricator, with 5 µm filter); supply pressure 5 to 7 bar

6 Operating voltage port and higher-order controller

# End-position controllers SPC11

Key features

## The solution package

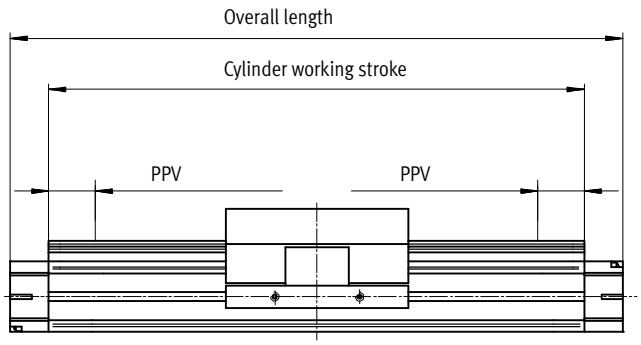
### Individual components

- Pneumatic drives DGCI, DGC-KF, DNC, DNCI, DDLI or DSMI
- Proportional 5/3-way valve MPYE-5-...-010B
- Displacement encoder MLO-POT-...-TLF, MLO-POT-...-LWG or MME-MTS-...-AIF
- End-position controller SPC11
- Valve cable KMPYE
- Controller cable KMPV-...
- Manual

The solution packages are clearly defined, i.e. all components are precisely matched to one another. For a clear overview, please see ➔ 27 or Soft Stop engineering software: ➔ www.festo.com

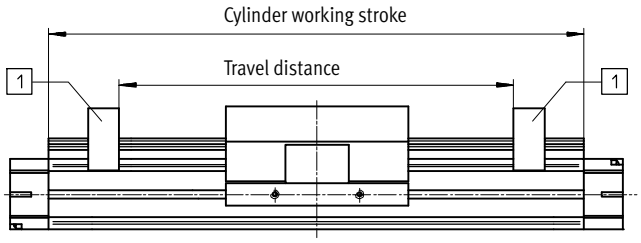
Accessories available to order separately (fittings, tubing, etc.) can be found in the respective solution packages. The order examples ➔ 26 are for explanatory purposes.

PPV = Open the internal cushioning 100%




### Symmetric

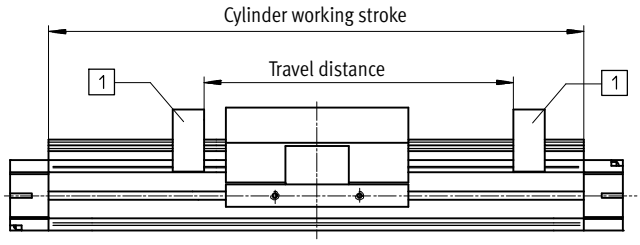
The desired travel distance should not therefore exceed the relevant cylinder working stroke.
The following thus applies:
**travel distance ≤ cylinder working stroke.**




1 Fixed stops, mounted on drive or external

### Asymmetrical

The desired travel distance within the cylinder working stroke must be limited by means of fixed stops.




1 Fixed stops, mounted on drive or external

Note

In order to achieve the working stroke when using the pneumatic drive DDLI together with the Soft Stop system, external stop elements are required.

# End-position controllers SPC11

Key features

## The solution package

Benefits

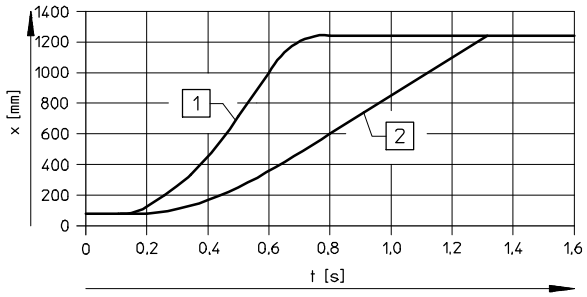
- Up to 30% faster cycle rate
- Significantly reduced system vibration
- Optimum operating behaviour is maintained even with changes in weight/load of up to 30% of the total moving mass
- Simple conversion of existing systems
- Considerably reduced noise level
- Fast problem-free commissioning, no specialists required
- Less expensive than electromechanical drives

The graphs apply to the following example:

- DGCI-25-1250-KF-Q,
- moving mass 12 kg,
- horizontal mounting position

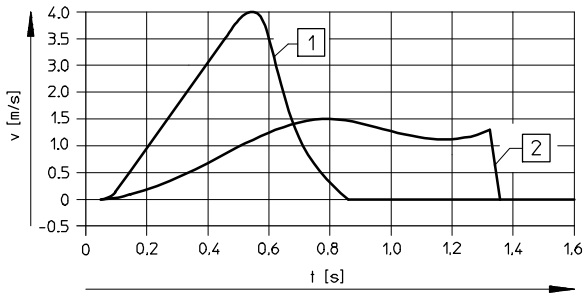
Note

The course of the curve is identical for pneumatic drives DGC-K, DNC, DNCI, DDLI and DSMI.



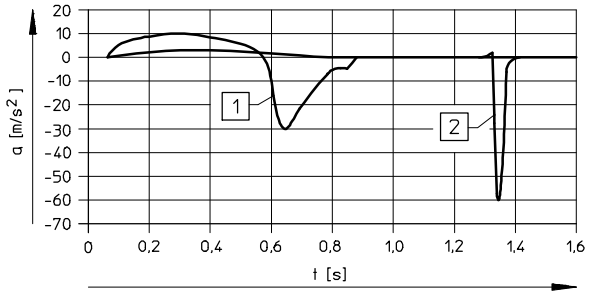

1 = Drive with electronic end-position controller SPC11
2 = Drive with shock absorber

x = Travel distance
t = Time




1 = Drive with electronic end-position controller SPC11
2 = Drive with shock absorber

v = Speed
t = Time




1 = Drive with electronic end-position controller SPC11
2 = Drive with shock absorber

a = Acceleration
t = Time

## Festo plug & work = Commissioning in just a few steps

1 Mount system components: Moving mass must be installed without backlash.

2 Set up the pneumatic and electrical system connections.

3 Switch on the compressed air and supply voltage.

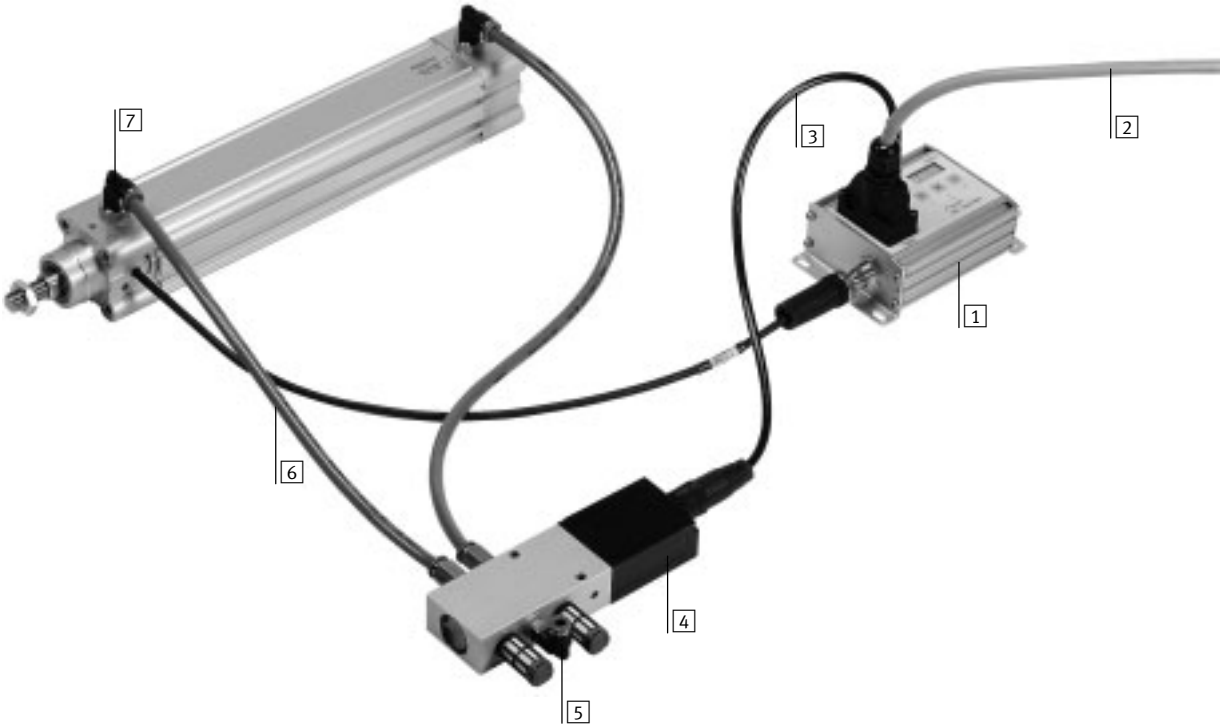
4 Press a button to start the teach-in process. The system learns autonomously and is ready for operation after 3 minutes.

5 Approach and save intermediate positions by using the buttons.

# End-position controllers SPC11

Peripherals overview

**Variant with drive DNCI**



# End-position controllers SPC11

Peripherals overview

| Individual components | | | | | |
|---|---|---|---|---|---|
| | **Description** | **Pneumatic drives** | | | |
| | | DGCI/DDLI | DNC | DNCI | DSMI |
| 1 | End-position controller SPC11 | ■ | ■ | ■ | ■ |
| 2 | Connecting cable to controller | ■ | ■ | ■ | ■ |
| 3 | Connecting cable KMPYE to proportional 5/3-way valve | ■ | ■ | ■ | ■ |
| 4 | Proportional 5/3-way valve MPYE | ■ | ■ | ■ | ■ |
| 5 | Compressed air supply | ■ | ■ | ■ | ■ |
| 6 | Tubing | ■ | ■ | ■ | ■ |
| 7 | Fitting QS | ■ | ■ | ■ | ■ |
| – | Fixed stop | ■ | 1) | 1) | ■ |
| | Analogue displacement encoder MLO-POT-...-LWG | – | ■ | – | – |
| | Solution packages ➔ | 12 | 18 | 22 | 26 |

1) For DNC and DNCI, external stop elements are required in order to limit the travel distance within the working stroke.

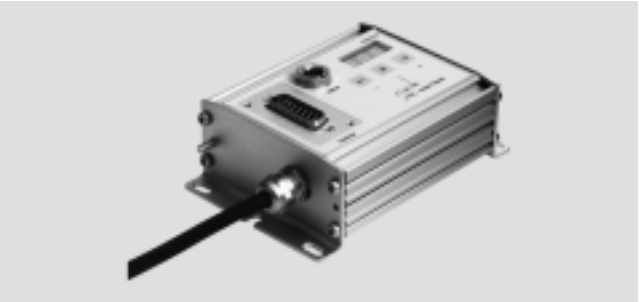
| Allocation of end-position controller SPC11 to drive and displacement encoder | | | | | |
|---|---|---|---|---|---|
| End-position controller | SPC11-POT-TLF | SPC11-POT-LWG | SPC11-MTS-AIF | SPC11-INC | SPC11-MTS-AIF-2 |
| Drive | | | | | |
| DGCI/DDLI | – | – | – | – | ■ |
| DNCI | – | – | – | ■ | – |
| DSMI | – | ■ | – | – | – |
| | | | | | |
| Displacement encoder | | | | | |
| MLO-POT-TLF | ■ | – | – | – | – |
| MLO-POT-LWG | – | ■ | – | – | – |
| MME-MTS-AIF | – | – | ■ | – | – |

# End-position controllers SPC11

Technical data

**Teach-in function**
SPC11-POT-TLF
SPC11-POT-LWG
SPC11-MTS-AIF
SPC11-INC
SPC11-MTS-AIF-2

Teach-in travel to determine the system characteristic values and end positions can be started either using a button on the end-position controller SPC11 or via an output (e.g. of the PLC) externally routed via the control cable.

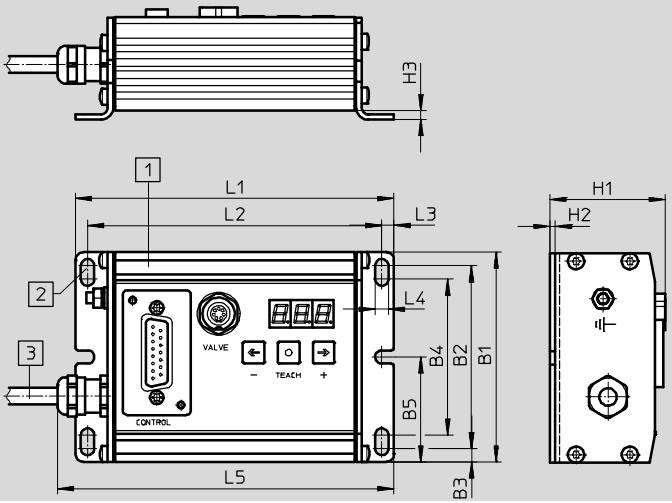


| General technical data | | | | | | | |
|---|---|---|---|---|---|---|---|
| End-position controllers SPC11-... | | Type | ...-POT-TLF | ...-POT-LWG | ...-MTS-AIF | ...-INC | ...-MTS-AIF-2 |
| Operating voltage | | [V DC] | 24 (–25 ... +25%) | | | | |
| Current consumption | with valve | [A] | 1.3 | | | | 1.1 |
| | without valve | [mA] | 70 | | 170 | 80 | 70 |
| Residual ripple | | [%] | Max. 5 | | | | |
| Digital inputs | Number | | 8 | | | | |
| | Input voltage | [V DC] | 24 | | | | |
| | Input current | [mA] | 4 (at 24 V DC) | | | | |
| | Duty cycle | [ms] | Min. 20 | | | | |
| | Signal voltage | [V DC] | 0 ... 5 (for logical 0) | | | | |
| | | | 15 ... 30 (for logical 1) | | | | |
| Digital outputs (short-circuit proof) | Number | | 5 | | | | |
| | Output voltage | | min. $U_b$ ... $U_b$: –3 V DC (at 0.1 A) | | | | |
| | Output current | [A] | Max. 0.1 | | | | |
| | Max. tripping current | [mA] | 500 | | | | |
| Displacement encoder input MLO-POT-... | Operating voltage | [V DC] | +10 | | – | | |
| | Input voltage | [V DC] | 0 ... +10 | | – | | |
| Displacement encoder input MME-MTS-... | Operating voltage | [V DC] | – | | 24 | – | |
| | Communication | | – | | CAN fieldbus (1 Mbaud) | – | |
| Standard cylinder input DNCI | Operating voltage | [V DC] | – | | | 5 | – |
| | Communication | | – | | | sin/cos | – |
| Linear drive input DGCI | Operating voltage | [V DC] | – | | | | 24 |
| | Communication | | – | | | | CAN fieldbus (1 Mbaud) |
| Valve output | Operating voltage | [V DC] | 24 | | | | |
| Valve output | Output voltage | [V DC] | 0 ... +10 | | | | |
| Relative air humidity | | [%] | 95 (non-condensing) | | | | |
| Weight | | [g] | Approx. 400 | | | | |

| Operating and environmental conditions | | | | | | |
|---|---|---|---|---|---|---|
| End-position controllers SPC11-... | Type | ...-POT-TLF | ...-POT-LWG | ...-MTS-AIF | ...-INC | ...-MTS-AIF-2 |
| Temperature range | [°C] | 0 ... +50 | | | | |
| Degree of protection to IEC 60529 | | IP65 | | | | |
| Vibration resistance, tested to DIN/IEC 68, Part 2-6 | | Severity level 2 | | | | |
| Shock resistance, tested to DIN/IEC 68, Part 2-27 | | Severity level 2 | | | | |
| CE marking (see declaration of conformity) | | To EU EMC Directive | | | | |

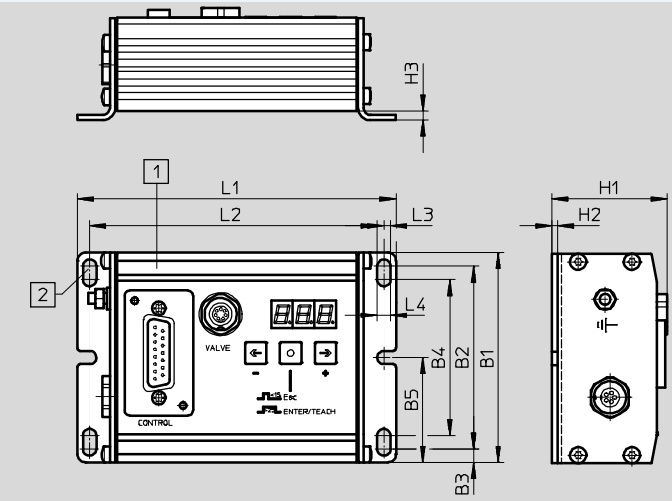
**Dimensions** Download CAD data ➔ **www.festo.com**

SPC11-POT-TLF, SPC11-POT-LWG, SPC11-MTS-AIF




1 Slot for inscription label:
18182 IBS-9x20
18576 IBS-6x10
2 Mounting options for M4 screws
3 Connecting cable (length approx. 335 mm)

SPC11-INC, SPC11-MTS-AIF-2




1 Slot for inscription label:
18182 IBS-9x20
18576 IBS-6x10
2 Mounting options for M4 screws

| Type | B1 | B2 | B3 | B4 | B5 | H1 | H2 | H3 | L1 | L2 | L3 | L4 | L5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SPC11-POT-... | 78 | 68 | 5 | 58 | 39 | 43 | 2 | 4.5 | 118.1 | 109.1 | 4.5 | 5 | 125 |
| SPC11-MTS-AIF | | | | | | | | | | | | | |
| SPC11-MTS-AIF-2 | | | | | | 42.6 | | 4.2 | | | | | – |
| SPC11-INC | | | | | | | | | | | | | – |

**Ordering data**

| Designation | Part No. | Type |
|---|---|---|
| For analogue displacement encoder MLO-POT-...-TLF | **192216** | **SPC11-POT-TLF** |
| For analogue displacement encoder MLO-POT-...-LWG, semi-rotary drive DSMI | **192217** | **SPC11-POT-LWG** |
| For digital displacement encoder MME-MTS-...-AIF | **192218** | **SPC11-MTS-AIF** |
| For standard cylinder DNCI | **537321** | **SPC11-INC** |
| For linear drive DCGI/DDLI | **548129** | **SPC11-MTS-AIF-2** |

## Order example for the pneumatic linear drives DGCI/DDLI

A workpiece weighing 3 kg must be conveyed horizontally on a loading station. The workpiece gripper mounted on the slide unit of the drive weighs 14 kg. The total weight to be weighed is thus 17 kg. The distance to be travelled is 1100 mm. The travel time should be < 1.5 seconds.

**Step 1:**
**Determine the cylinder stroke**
For a travel distance of 1100 mm, the nearest cylinder working stroke greater than this of 1250 mm should be selected from the table ➔ 13. This column has a grey background.

**Step 2:**
**Specify the drive**
For the total mass of 17 kg to be moved horizontally, there is a choice of piston diameter of 25, 32 and 40 mm (see in each case the maximum total mass to be moved). For the example, the selected drive is a DGCI-32-1250-KF-... with part number 544427.

**Step 3:**
**Specify a proportional 5/3-way valve**
The appropriate proportional 5/3-way valve can be found at the intersection of the grey column in step 1 and the row for the linear drive DGCI-32-... selected, in the table area “Proportional 5/3-way valve”. In the case of our example, this is the proportional 5/3-way valve MPYE-5-¼-010B with the part number 151694.

**Step 4:**
**Complete the order information**
To order a complete system you must add the order data for the end-position controller, valve and controller cables and manual (if required). The complete ordering data for the example described can be found ➔ 13. A manual should normally be ordered. If you already have one, leave the appropriate box blank, indicating an express waiver of a manual.

**Step 5:**
**Determine the travel time**
To determine the travel time, use the “Soft Stop” software tool.
In the order example, the travel time is 1.16 seconds.

- Note

For vertical travel, there are two different travel times for $t_{up}$ and $t_{down}$.

- Note

Engineering software
Soft Stop and ProDrive
➔ www.festo.com

- Note

When selecting drive mounting components, please note that these are often not backlash-free and therefore cannot be used in conjunction with the Soft Stop system. The drives must be mounted directly.

- Note

Check that the loads placed on the drive by the workpiece gripper during the movement process do not exceed permissible limits.
To perform a simulation quickly and easily, use the Smart Soft Stop software tool and ProDrive.

**Ordering data**

| Pneumatic linear drive | | Proportional 5/3-way valve | | End-position controller | |
|---|---|---|---|---|---|
| Part No. | Type | Part No. | Type | Part No. | Type |
| **544427** | **DGCI-32-1250-KF-...** | **151694** | **MPYE-5-¼-010B** | **548129** | **SPC11-MTS-AIF-2** |

| Valve cable | | Controller cable | |
|---|---|---|---|
| Part No. | Type | Part No. | Type |
| **170238** | **KMPYE-AIF-1-GS-GD-2** | **177674** | **KMPV-SUB-D-15-10** |

# End-position controllers SPC11

Technical data

| Step 1 and 2: | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pneumatic linear drives/Type | | DGCI-...[1]-...[2]-KF-...<br>DDLI | | | | | | | | | | | | | |
| Cylinder working stroke | [mm] | 100 | 160 | 225 | 300 | 360 | 450 | 500 | 600 | 750 | 1000 | 1250 | 1500 | 1750 | 2000 |
| Max. overall mass to be moved horizontally/vertically with ∅ | 18 | 15/5 | | | | | | | | | | | | | |
| | 25 | 30/10 | | | | | | | | | | | | | |
| | 32 | 45/15 | | | | | | | | | | | | | |
| | 40 | 70/25 | | | | | | | | | | | | | |
| Part No. for ∅ | 18 | 544425 | | | | | | | | | | | | | |
| | 25 | 544426 | | | | | | | | | | | | | |
| | 32 | 544427 | | | | | | | | | | | | | |
| | 40 | 544428 | | | | | | | | | | | | | |

| Step 3: | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Proportional 5/3-way valves[3]<br>Part No./Type | | 1 = 154200 MPYE-5-M5-010-B<br>2 = 151692 MPYE-5-⅛-LF-010-B | | | | | | 3 = 151693 MPYE-5-⅛-HF-010-B<br>4 = 151694 MPYE-5-¼-010-B | | | | | | | |
| Cylinder working stroke | [mm] | 100 | 160 | 225 | 300 | 360 | 450 | 500 | 600 | 750 | 1000 | 1250 | 1500 | 1750 | 2000 |
| Horizontally/vertically for ∅ | 18 | 1/1 | 1/1 | 1/1 | 1/1 | 2/2 | 2/2 | 2/2 | 2/2 | 2/2 | 2/2 | 2/2 | 2/2 | 2/2 | 3/3 |
| | 25 | 2/2 | 2/2 | 2/2 | 2/2 | 3/2 | 3/2 | 3/2 | 3/2 | 3/2 | 3/3 | 3/3 | 3/3 | 3/3 | 3/3 |
| | 32 | 2/2 | 3/2 | 3/2 | 3/2 | 3/3 | 3/3 | 3/3 | 3/3 | 3/3 | 3/3 | 4/3 | 4/3 | 4/3 | 4/4 |
| | 40 | 3/2 | 3/2 | 3/2 | 3/3 | 3/3 | 3/3 | 3/3 | 4/3 | 4/3 | 4/3 | 4/4 | 4/4 | 4/4 | 4/4 |

| Step 5: | | | | |
|---|---|---|---|---|
| End-position controllers and accessories | | Part No. | Type | Brief description |
| End-position controller | SPC11 | **548129** | **SPC11-MTS-AIF-2** | |
| Cable | Valve | **170238** | **KMPYE-AIF-1-GS-GD-2** | Cable length 2 m |
| | | **170239** | **KMPYE-AIF-1-GS-GD-0,3** | Cable length 0.3 m |
| | SPC11/PLC | **177673** | **KMPV-SUB-D-15-5** | Cable length 5 m |
| | | **177674** | **KMPV-SUB-D-15-10** | Cable length 10 m |

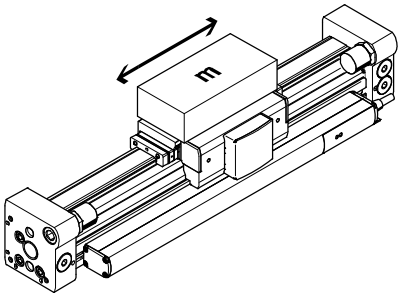
- Note

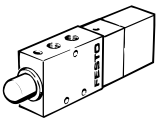
Manuals ➔ 31

1) Specify diameter. Technical data and dimensions ➔ Internet: dgci/ddli
2) Specify cylinder working stroke determined.
3) Technical data and dimensions ➔ Internet: mpye

**Accessories for solution package for horizontal mounting position with DGCI/DDLI**

For cylinder working stroke 100 ... 2000 mm





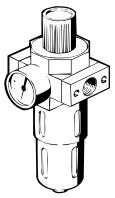
**Ordering data**

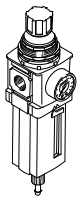
| Cylinder working stroke DGCI/DDLI [mm] | Proportional 5/3-way valve Type | Fittings[1] For MPYE-5-... Part No. | Type | For DGCI/DDLI Part No. | Type | Tubing Part No. | Type | Silencer[2] Part No. | Type |
|---|---|---|---|---|---|---|---|---|---|
| DGCI | | | | | | | | | |
| ∅ 18 | | | | | | | | | |
| 100 ... 160 | **MPYE-5-M5-010-B** | **153306** | **QSM-M5-6** | **153306** | **QSM-M5-6** | **152586** | **PUN-6x1-SI** | **165003** | **UC-M5** |
| 225 ... 300 | **MPYE-5-M5-010-B** | | | | | | | | |
| 360 ... 1750 | **MPYE-5-⅛-LF-010-B** | **153002** | **QS-⅛-6** | **153306** | **QSM-M5-6** | **152586** | **PUN-6x1-SI** | **2307** | **U-⅛** |
| 2000 | **MPYE-5-⅛-HF-010-B** | | | | | | | | |
| | | | | | | | | | |
| DGCI/DDLI | | | | | | | | | |
| ∅ 25 | | | | | | | | | |
| 100 ... 160 | **MPYE-5-⅛-LF-010-B** | **153002** | **QS-⅛-6** | **153002** | **QS-⅛-6** | **152586** | **PUN-6x1-SI** | **2307** | **U-⅛** |
| 225 ... 300 | **MPYE-5-⅛-LF-010-B** | **153004** | **QS-⅛-8** | **153004** | **QS-⅛-8** | **152587** | **PUN-8x1,25-SI** | **2307** | **U-⅛** |
| 360 ... 2000 | **MPYE-5-⅛-HF-010-B** | | | | | | | | |
| | | | | | | | | | |
| ∅ 32 | | | | | | | | | |
| 100 | **MPYE-5-⅛-LF-010-B** | **153002** | **QS-⅛-6** | **153002** | **QS-⅛-6** | **152586** | **PUN-6x1-SI** | **2307** | **U-⅛** |
| 160 ... 1000 | **MPYE-5-⅛-HF-010-B** | **153004** | **QS-⅛-8** | **153004** | **QS-⅛-8** | **152587** | **PUN-8x1,25-SI** | | |
| 1250 ... 2000 | **MPYE-5-¼-010-B** | **153005** | **QS-¼-8** | | | | | **2316** | **U-¼** |
| | | | | | | | | | |
| ∅ 40 | | | | | | | | | |
| 100 ... 160 | **MPYE-5-⅛-HF-010-B** | **153004** | **QS-⅛-8** | **153005** | **QS-¼-8** | **152587** | **PUN-8x1,25-SI** | **2307** | **U-⅛** |
| 225 ... 500 | **MPYE-5-⅛-HF-010-B** | | | | | | | | |
| 600 ... 750 | **MPYE-5-¼-010-B** | **153005** | **QS-¼-8** | **153005** | **QS-¼-8** | **152587** | **PUN-8x1,25-SI** | **2316** | **U-¼** |
| 1000 ... 2000 | **MPYE-5-¼-010-B** | **153007** | **QS-¼-10** | **153007** | **QS-¼-10** | **152588** | **PUN-10x1,5-SI** | **2316** | **U-¼** |
| | | | | | | | | | |
| ∅ 63 | | | | | | | | | |
| 100 ... 300 | **MPYE-5-⅛-HF-010-B** | **153004** | **QS-⅛-8** | **153005** | **QS-⅜-8** | **152587** | **PUN-8x1,25-SI** | **2307** | **U-⅛** |
| 360 ... 450 | **MPYE-5-¼-010-B** | **153007** | **QS-¼-10** | **153008** | **QS-⅜-10** | **152588** | **PUN-10x1,5-SI** | **2316** | **U-¼** |
| 500 ... 2000 | **MPYE-5-⅜-010-B** | **153009** | **QS-⅜-12** | **153009** | **QS-⅜-12** | **152589** | **PUN-12x2-SI** | **2309** | **U-⅜** |

1) Fittings are only supplied in batches of 10.
2) 2 of these are required.

**Accessories for solution package for horizontal mounting position with DGCI/DDLI**

For cylinder working stroke 100 ... 2000 mm



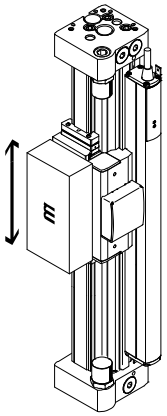


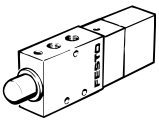

**Ordering data**

| Cylinder working stroke DGCI/DDLI [mm] | Filter regulator, D series with filter cartridge 5 mm | | Filter cartridge 5 mm D series | | Filter regulator, MS series with filter cartridge 5 µm | | Filter cartridge 5 mm MS series | |
|---|---|---|---|---|---|---|---|---|
| | Part No. | Type | Part No. | Type | Part No. | Type | Part No. | Type |
| DGCI | | | | | | | | |
| ∅ 18 | | | | | | | | |
| 100 ... 2000 | **162719** | **LFR-¼-D-5M-MINI** | **159640** | **LFP-D-MINI-5M** | **529152** | **MS4-LFR-¼-D7-CRM-AS** | **534501** | **MS4-LFP-C** |
| | | | | | | | | |
| DGCI/DDLI | | | | | | | | |
| ∅ 25 | | | | | | | | |
| 100 ... 2000 | **162719** | **LFR-¼-D-5M-MINI** | **159640** | **LFP-D-MINI-5M** | **529152** | **MS4-LFR-¼-D7-CRM-AS** | **534501** | **MS4-LFP-C** |
| | | | | | | | | |
| ∅ 32 | | | | | | | | |
| 100 ... 1000 | **162719** | **LFR-¼-D-5M-MINI** | **159640** | **LFP-D-MINI-5M** | **529152** | **MS4-LFR-¼-D7-CRM-AS** | **534501** | **MS4-LFP-C** |
| 1250 ... 2000 | **162721** | **LFR-⅜-D-5M-MIDI** | **159594** | **LFP-D-MIDI-5M** | **529204** | **MS6-LFR-¼-D7-CRM-AS** | **534499** | **MS6-LFP-C** |
| | | | | | | | | |
| ∅ 40 | | | | | | | | |
| 100 ... 500 | **162719** | **LFR-¼-D-5M-MINI** | **159640** | **LFP-D-MINI-5M** | **529152** | **MS4-LFR-¼-D7-CRM-AS** | **534501** | **MS4-LFP-C** |
| 600 ... 2000 | **162721** | **LFR-⅜-D-5M-MIDI** | **159594** | **LFP-D-MIDI-5M** | **529204** | **MS6-LFR-¼-D7-CRM-AS** | **534499** | **MS6-LFP-C** |
| | | | | | | | | |
| ∅ 63 | | | | | | | | |
| 100 ... 360 | **162719** | **LFR-¼-D-5M-MINI** | **159640** | **LFP-D-MINI-5M** | **529152** | **MS4-LFR-¼-D7-CRM-AS** | **534501** | **MS4-LFP-C** |
| 450 ... 600 | **162721** | **LFR-⅜-D-5M-MIDI** | **159594** | **LFP-D-MIDI-5M** | **529204** | **MS6-LFR-¼-D7-CRM-AS** | **534499** | **MS6-LFP-C** |
| 600 ... 2000 | **162724** | **LFR-¾-D-5M-MAXI** | **159641** | **LFP-D-MAXI-5M** | **529224** | **MS6-LFR-⅜-D7-CRM-AS** | | |

**Accessories for solution package for vertical mounting position with DGCI/DDLI**

For cylinder working stroke 100 ... 2000 mm





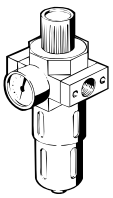
**Ordering data**

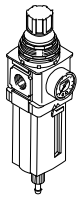
| Cylinder working stroke DGCI/DDLI [mm] | Proportional 5/3-way valve Type | Fittings[1] For MPYE-5-... Part No. | Type | For DGCI/DDLI Part No. | Type | Tubing Part No. | Type | Silencer[2] Part No. | Type |
|---|---|---|---|---|---|---|---|---|---|
| DGCI | | | | | | | | | |
| ∅ 18 | | | | | | | | | |
| 100 ... 300 | **MPYE-5-M5-010-B** | **153306** | **QSM-M5-6** | **153306** | **QSM-M5-6** | **152586** | **PUN-6x1-SI** | **165003** | **UC-M5** |
| 360 ... 1750 | **MPYE-5-1/8-LF-010-B** | **153002** | **QS-1/8-6** | | | | | **2307** | **U-1/8** |
| 2000 | **MPYE-5-1/8-HF-010-B** | | | | | | | | |
| | | | | | | | | | |
| DGCI/DDLI | | | | | | | | | |
| ∅ 25 | | | | | | | | | |
| 100 ... 160 | **MPYE-5-1/8-LF-010-B** | **153002** | **QS-1/8-6** | **153002** | **QS-1/8-6** | **152586** | **PUN-6x1-SI** | **2307** | **U-1/8** |
| 225 ... 750 | **MPYE-5-1/8-LF-010-B** | **153004** | **QS-1/8-8** | **153004** | **QS-1/8-8** | **152587** | **PUN-8x1,25-SI** | | |
| 1000 ... 2000 | **MPYE-5-1/8-HF-010-B** | | | | | | | | |
| | | | | | | | | | |
| ∅ 32 | | | | | | | | | |
| 100 | **MPYE-5-1/8-LF-010-B** | **153002** | **QS-1/8-6** | **153002** | **QS-1/8-6** | **152586** | **PUN-6x1-SI** | **2307** | **U-1/8** |
| 160 ... 300 | **MPYE-5-1/8-LF-010** | **153004** | **QS-1/8-8** | **153004** | **QS-1/8-8** | **152587** | **PUN-8x1,25-SI** | **2307** | **U-1/8** |
| 360 ... 1750 | **MPYE-5-1/8-HF-010** | | | | | | | | |
| 2000 | **MPYE-5-1/4-010-B** | **153005** | **QS-1/4-8** | | | | | **2316** | **U-1/4** |
| | | | | | | | | | |
| ∅ 40 | | | | | | | | | |
| 100 ... 225 | **MPYE-5-1/8-LF-010** | **153004** | **QS-1/8-8** | **153005** | **QS-1/4-8** | **152587** | **PUN-8x1,25-SI** | **2307** | **U-1/8** |
| 300 ... 750 | **MPYE-5-1/8-HF-010** | | | | | | | | |
| 1000 | **MPYE-5-1/8-HF-010** | **190643** | **QS-1/8-10** | **153007** | **QS-1/4-10** | **152588** | **PUN-10x1,5-SI** | | |
| 1250 ... 2000 | **MPYE-5-1/4-010-B** | **153007** | **QS-1/4-10** | | | | | **2316** | **U-1/4** |
| | | | | | | | | | |
| ∅ 63 | | | | | | | | | |
| 100 ... 225 | **MPYE-5-1/8-LF-010** | **153004** | **QS-1/8-8** | **153005** | **QS-3/8-8** | **152587** | **PUN-8x1,25-SI** | **2307** | **U-1/8** |
| 300 | **MPYE-5-1/8-HF-010** | | | | | | | | |
| 360 ... 450 | **MPYE-5-1/4-010-B** | **190643** | **QS-1/8-10** | **153007** | **QS-3/8-10** | **152588** | **PUN-10x1,5-SI** | **2316** | **U-1/4** |
| 500 ... 2000 | **MPYE-5-3/8-010** | **153009** | **QS-3/8-12** | **153009** | **QS-3/8-12** | **152589** | **PUN-12x2-SI** | **2309** | **U-3/8** |

1) Fittings are only supplied in batches of 10.
2) 2 of these are required.

**Accessories for solution package for vertical mounting position with DGCI/DDLI**

For cylinder working stroke 100 ... 2000 mm






**Ordering data**

| Cylinder working stroke DGCI/DDLI [mm] | Filter regulator, D series with filter cartridge 5 mm | | Filter cartridge 5 mm D series | | Filter regulator, MS series with filter cartridge 5 mm | | Filter cartridge 5 mm MS series | |
|---|---|---|---|---|---|---|---|---|
| | Part No. | Type | Part No. | Type | Part No. | Type | Part No. | Type |
| DGCI | | | | | | | | |
| ∅ 18 | | | | | | | | |
| 100 ... 2000 | **162719** | **LFR-¼-D-5M-MINI** | **159640** | **LFP-D-MINI-5M** | **529152** | **MS4-LFR-¼-D7-CRM-AS** | **534501** | **MS4-LFP-C** |
| | | | | | | | | |
| DGCI/DDLI | | | | | | | | |
| ∅ 25 | | | | | | | | |
| 100 ... 2000 | **162719** | **LFR-¼-D-5M-MINI** | **159640** | **LFP-D-MINI-5M** | **529152** | **MS4-LFR-¼-D7-CRM-AS** | **534501** | **MS4-LFP-C** |
| | | | | | | | | |
| ∅ 32 | | | | | | | | |
| 100 ... 1000 | **162719** | **LFR-¼-D-5M-MINI** | **159640** | **LFP-D-MINI-5M** | **529152** | **MS4-LFR-¼-D7-CRM-AS** | **534501** | **MS4-LFP-C** |
| 1250 ... 2000 | **162721** | **LFR-⅜-D-5M-MIDI** | **159594** | **LFP-D-MIDI-5M** | **529204** | **MS6-LFR-¼-D7-CRM-AS** | **534499** | **MS6-LFP-C** |
| | | | | | | | | |
| ∅ 40 | | | | | | | | |
| 100 ... 500 | **162719** | **LFR-¼-D-5M-MINI** | **159640** | **LFP-D-MINI-5M** | **529152** | **MS4-LFR-¼-D7-CRM-AS** | **534501** | **MS4-LFP-C** |
| | | | | | | | | |
| ∅ 63 | | | | | | | | |
| 100 ... 360 | **162719** | **LFR-¼-D-5M-MINI** | **159640** | **LFP-D-MINI-5M** | **529152** | **MS4-LFR-¼-D7-CRM-AS** | **534501** | **MS4-LFP-C** |
| 450 ... 600 | **162721** | **LFR-⅜-D-5M-MIDI** | **159594** | **LFP-D-MIDI-5M** | **529204** | **MS6-LFR-¼-D7-CRM-AS** | **534499** | **MS6-LFP-C** |
| 600 ... 2000 | **162724** | **LFR-¾-D-5M-MAXI** | **159641** | **LFP-D-MAXI-5M** | **529224** | **MS6-LFR-⅜-D7-CRM-AS** | | |

## Order example for the pneumatic drive DNC with linear potentiometer LWG

A workpiece weighing 55 kg must be conveyed horizontally on a loading station. The workpiece gripper mounted on the piston rod of the drive weighs 40 kg. The total weight to be weighed is thus 95 kg. The distance to be travelled is 300 mm. The travel time should be < 1.5 seconds.

**Step 1:**
**Determine the cylinder stroke**

For a travel distance of 300 mm, the nearest standard stroke greater than this of 320 mm or the cylinder working stroke of 291 ...350 mm should be selected from the table ➔ 19. This column has a grey background.

**Step 2:**
**Specify the drive**

For the total mass of 95 kg to be moved horizontally, there is a choice of piston diameter of 50, 63 and 80 mm (see in each case the maximum total mass to be moved). For the example, the selected drive is a DNC-50-320-PPV-A with part number 163378.

**Step 3:**
**Specify the linear potentiometer**

The appropriate linear potentiometer can be determined from the allocation cylinder working stroke ≤ length of linear potentiometer.
The column with the grey background in the Displacement encoder section of the table shows part number 152647 for this example.

- - Note

The linear potentiometer is enclosed separately and must be fitted by the customer.

**Step 4:**
**Specify a proportional 5/3-way valve**
The appropriate proportional 5/3-way valve can be found at the intersection of the grey column in step 1 and the row for the pneumatic drive DNC-50-... selected, in the table area "Proportional 5/3-way valve". In the case of our example, this is the proportional 5/3-way valve MPYE-5-1/8-HF-010B with the part number 151693.

**Step 5:**
**Complete the order information**
To order a complete system you must add the order data for the end-position controller, valve and controller cables and manual (if required). The complete ordering data for the example described can be found ➔ 19. A manual should normally be ordered. If you already have one, leave the appropriate box blank, indicating an express waiver of a manual.

**Step 6:**
**Determine the travel time**
To determine the travel time, use the "Soft Stop" software tool.
In the order example, the travel time is 0.96 seconds.

- - Note

Engineering software
Soft Stop and ProDrive
➔ www.festo.com

- - Note

When selecting drive mounting components, please note that these are often not backlash-free and therefore cannot be used in conjunction with the Soft Stop system. The drives must be mounted directly.

- - Note

Check that the loads placed on the drive by the workpiece gripper during the movement process do not exceed permissible limits.
To perform a simulation quickly and easily, use the Smart Soft Stop software tool.

- - Note

The self-aligning rod coupler FK is not backlash-free. It must not therefore be used in combination with standard cylinder DNC.

**Ordering data**

| Pneumatic drive | | Linear potentiometer | | Proportional 5/3-way valve | | End-position controller | |
|---|---|---|---|---|---|---|---|
| Part No. | Type | Part No. | Type | Part No. | Type | Part No. | Type |
| **163378** | **DNC-50-320-PPV-A** | **152647** | **MLO-POT-360-LWG** | **151693** | **MPYE-5-1/8-HF-010B** | **192217** | **SPC11-POT-LWG** |

| Valve cable | | Controller cable | |
|---|---|---|---|
| Part No. | Type | Part No. | Type |
| **170238** | **KMPYE-AIF-1-GS-GD-2** | **177674** | **KMPV-SUB-D-15-10** |

# End-position controllers SPC11

Technical data

| Step 1 and 2: | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Standard cylinders/Type | | DNC-...[1]-...[2]-PPV-A | | | | | | | | | |
| Max. cylinder working stroke | [mm] | 100 | 150 | 150 | 225 | 225 | 300 | 360 | 450 | 600 | 750 |
| Cylinder working stroke (standard stroke) | [mm] | 80 | 100 | 125 | 160 | 200 | 250 | 320 | 400 | 500 | 650 |
| Max. overall mass to be moved horizontally with ∅ | 32 | 45 kg | | | | | | | | | |
| | 40 | 75 kg | | | | | | | | | |
| | 50 | 120 kg | | | | | | | | | |
| | 63 | 180 kg | | | | | | | | | |
| | 80 | 300 kg | | | | | | | | | |
| Part No. for ∅ | 32 | 163308 | 163309 | 163310 | 163311 | 163312 | 163313 | 163314 | 163315 | 163316 | 163304 |
| | 40 | 163340 | 163341 | 163342 | 163343 | 163344 | 163345 | 163346 | 163347 | 163348 | 163336 |
| | 50 | 163372 | 163373 | 163374 | 163375 | 163376 | 163377 | 163378 | 163379 | 163380 | 163368 |
| | 63 | 163404 | 163405 | 163406 | 163407 | 163408 | 163409 | 163410 | 163411 | 163412 | 163400 |
| | 80 | 163436 | 163437 | 163438 | 163439 | 163440 | 163441 | 163442 | 163443 | 163444 | 163432 |

| Step 3: | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Linear potentiometer[3] | | MLO-POT-...-LWG | | | | | | | | | |
| Max. cylinder working stroke | [mm] | 100 | 150 | 150 | 225 | 225 | 300 | 360 | 450 | 600 | 750 |
| Potentiometer length | [mm] | 100 | 150 | 150 | 225 | 225 | 300 | 360 | 450 | 600 | 750 |
| Part No. | | 192213 | 192214 | 192214 | 152645 | 152645 | 152646 | 152647 | 152648 | 152650 | 152651 |

| Step 4: | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Proportional 5/3-way valves[3] Part No./Type | | 1 = 151692 MPYE-5-⅛-LF-010<br>2 = 151693 MPYE-5-⅛-HF-010 | | | | 3 = 151694 MPYE-5-¼-010-B<br>4 = 151695 MPYE-5-⅜-010 | | | | | |
| Max. cylinder working stroke | [mm] | 100 | 150 | 150 | 225 | 225 | 300 | 360 | 450 | 600 | 750 |
| Horizontally for ∅ | 32 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| | 40 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 |
| | 50 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 |
| | 63 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 4 |
| | 80 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 |

| Step 5: | | | | |
|---|---|---|---|---|
| End-position controllers and accessories | | Part No. | Type | Brief description |
| End-position controller | SPC11 | **192217** | **SPC11-POT-LWG** | |
| Cable | Valve | **170238** | **KMPYE-AIF-1-GS-GD-2** | Cable length 2 m |
| | | **170239** | **KMPYE-AIF-1-GS-GD-0,3** | Cable length 0.3 m |
| | SPC11/PLC | **177673** | **KMPV-SUB-D-15-5** | Cable length 5 m |
| | | **177674** | **KMPV-SUB-D-15-10** | Cable length 10 m |

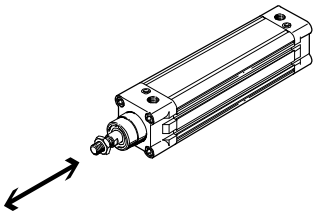
- Note

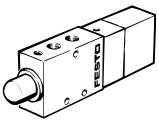
Manuals ➔ 31

1) Specify diameter. Technical data and dimensions ➔ Internet: dnc
2) Specify cylinder working stroke determined.
3) Technical data and dimensions ➔ Internet: mlo
4) Technical data and dimensions ➔ Internet: mpye

**Accessories for solution package for horizontal mounting position with DNC**

For cylinder working stroke 80 ... 750 mm





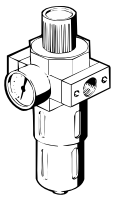
**Ordering data**

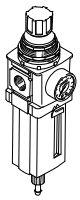
| Cylinder working stroke DNC [mm] | Proportional 5/3-way valve Type | Fittings[1] For MPYE-5-... Part No. | Type | For DNC Part No. | Type | Tubing Part No. | Type | Silencer[2] Part No. | Type |
|---|---|---|---|---|---|---|---|---|---|
| ∅ 32 | | | | | | | | | |
| 80 ... 440 | **MPYE-5-1/8-LF-010** | **153004** | **QS-1/8-8** | **153004** | **QS-1/8-8** | **152587** | **PUN-8x1,25** | **2307** | **U-1/8** |
| 441 ... 735 | **MPYE-5-1/8-HF-010** | | | | | | | | |
| | | | | | | | | | |
| ∅ 40 | | | | | | | | | |
| 80 ... 290 | **MPYE-5-1/8-LF-010** | **153004** | **QS-1/8-8** | **153005** | **QS-1/4-8** | **152587** | **PUN-8x1,25** | **2307** | **U-1/8** |
| 291 ... 440 | **MPYE-5-1/8-HF-010** | | | **153005** | **QS-1/4-8** | | | | |
| 441 ... 735 | **MPYE-5-1/4-010-B** | **153007** | **QS-1/4-10** | **153007** | **QS-1/4-10** | **152588** | **PUN-10x1,5** | **2316** | **U-1/4** |
| | | | | | | | | | |
| ∅ 50 | | | | | | | | | |
| 80 ... 290 | **MPYE-5-1/8-LF-010** | **153004** | **QS-1/8-8** | **153005** | **QS-1/4-8** | **152587** | **PUN-8x1,25** | **2307** | **U-1/8** |
| 291 ... 440 | **MPYE-5-1/8-HF-010** | | | | | | | | |
| 441 ... 735 | **MPYE-5-1/4-010-B** | **153007** | **QS-1/4-10** | **153007** | **QS-1/4-10** | **152588** | **PUN-10x1,5** | **2316** | **U-1/4** |
| | | | | | | | | | |
| ∅ 63 | | | | | | | | | |
| 80 ... 175 | **MPYE-5-1/8-LF-010** | **153004** | **QS-1/8-8** | **153006** | **QS-3/8-8** | **152587** | **PUN-8x1,25** | **2307** | **U-1/8** |
| 176 ... 350 | **MPYE-5-1/8-HF-010** | | | **153006** | **QS-3/8-8** | | | | |
| 351 ... 590 | **MPYE-5-1/4-010-B** | **153007** | **QS-1/4-10** | **153008** | **QS-3/8-10** | **152588** | **PUN-10x1,5** | **2316** | **U-1/4** |
| 591 ... 735 | **MPYE-5-3/8-010** | **153009** | **QS-3/8-12** | **153009** | **QS-3/8-12** | **152589** | **PUN-12x2** | **2309** | **U-3/8** |
| | | | | | | | | | |
| ∅ 80 | | | | | | | | | |
| 80 ... 115 | **MPYE-5-1/8-LF-010** | **153004** | **QS-1/8-8** | **153006** | **QS-3/8-8** | **152587** | **PUN-8x1,25** | **2307** | **U-1/8** |
| 116 ... 175 | **MPYE-5-1/8-HF-010** | | | **153006** | **QS-3/8-8** | | | | |
| 176 ... 440 | **MPYE-5-1/4-010-B** | **153007** | **QS-1/4-10** | **153008** | **QS-3/8-10** | **152588** | **PUN-10x1,5** | **2316** | **U-1/4** |
| 441 ... 735 | **MPYE-5-3/8-010** | **153009** | **QS-3/8-12** | **153009** | **QS-3/8-12** | **152589** | **PUN-12x2** | **2309** | **U-3/8** |

1) Fittings are only supplied in batches of 10.
2) 2 of these are required.

**Accessories for solution package for horizontal mounting position with DNC**

For cylinder working stroke 80 ... 750 mm






**Ordering data**

| Cylinder working stroke DNC [mm] | Filter regulator, D series with filter cartridge 5 mm | | Filter cartridge 5 mm D series | | Filter regulator, MS series with filter cartridge 5 mm | | Filter cartridge 5 mm MS series | |
|---|---|---|---|---|---|---|---|---|
| | Part No. | Type | Part No. | Type | Part No. | Type | Part No. | Type |
| ∅ 32 | | | | | | | | |
| 80 ... 735 | **162719** | **LFR-¼-D-5M-MINI** | **159640** | **LFP-D-MINI-5M** | **529152** | **MS4-LFR-¼-D7-CRM-AS** | **534501** | **MS4-LFP-C** |
| | | | | | | | | |
| ∅ 40 | | | | | | | | |
| 80 ... 440 | **162719** | **LFR-¼-D-5M-MINI** | **159640** | **LFP-D-MINI-5M** | **529152** | **MS4-LFR-¼-D7-CRM-AS** | **534501** | **MS4-LFP-C** |
| 441 ... 735 | **162721** | **LFR-⅜-D-5M-MIDI** | **159594** | **LFP-D-MIDI-5M** | **529204** | **MS6-LFR-¼-D7-CRM-AS** | **534499** | **MS6-LFP-C** |
| | | | | | | | | |
| ∅ 50 | | | | | | | | |
| 80 ... 440 | **162719** | **LFR-¼-D-5M-MINI** | **159640** | **LFP-D-MINI-5M** | **529152** | **MS4-LFR-¼-D7-CRM-AS** | **534501** | **MS4-LFP-C** |
| 441 ... 735 | **162721** | **LFR-⅜-D-5M-MIDI** | **159594** | **LFP-D-MIDI-5M** | **529204** | **MS6-LFR-¼-D7-CRM-AS** | **534499** | **MS6-LFP-C** |
| | | | | | | | | |
| ∅ 63 | | | | | | | | |
| 80 ... 350 | **162719** | **LFR-¼-D-5M-MINI** | **159640** | **LFP-D-MINI-5M** | **529152** | **MS4-LFR-¼-D7-CRM-AS** | **534501** | **MS4-LFP-C** |
| 351 ... 590 | **162721** | **LFR-⅜-D-5M-MIDI** | **159594** | **LFP-D-MIDI-5M** | **529204** | **MS6-LFR-¼-D7-CRM-AS** | **534499** | **MS6-LFP-C** |
| 591 ... 735 | **162724** | **LFR-¾-D-5M-MAXI** | **159641** | **LFP-D-MAXI-5M** | **529224** | **MS6-LFR-⅜-D7-CRM-AS** | **534499** | **MS6-LFP-C** |
| | | | | | | | | |
| ∅ 80 | | | | | | | | |
| 80 ... 175 | **162719** | **LFR-¼-D-5M-MINI** | **159640** | **LFP-D-MINI-5M** | **529152** | **MS4-LFR-¼-D7-CRM-AS** | **534501** | **MS4-LFP-C** |
| 176 ... 440 | **162721** | **LFR-⅜-D-5M-MIDI** | **159594** | **LFP-D-MIDI-5M** | **529204** | **MS6-LFR-¼-D7-CRM-AS** | **534499** | **MS6-LFP-C** |
| 441 ... 735 | **162724** | **LFR-¾-D-5M-MAXI** | **159641** | **LFP-D-MAXI-5M** | **529224** | **MS6-LFR-⅜-D7-CRM-AS** | **534499** | **MS6-LFP-C** |

## Order example for pneumatic standard drive DNCI with integrated displacement encoder

A workpiece weighing 55 kg must be conveyed horizontally on a loading station. The workpiece gripper mounted on the piston rod of the drive weighs 40 kg. The total weight to be weighed is thus 95 kg. The distance to be travelled is 300 mm. The travel time should be < 1.5 seconds.

**Step 1:**
**Determine the cylinder stroke**

For a travel distance of 300 mm, the nearest standard stroke greater than this of 320 mm or the cylinder working stroke of 320 mm should be selected from the table ➔ 23. This column has a grey background.

**Step 2:**
**Specify the drive**

For the total mass of 95 kg to be moved horizontally, there is a choice of piston diameter of 50 or 63 mm (see in each case the maximum total mass to be moved).
For the example, the selected drive is a DNCI-50-320-P-A with part number 535413.

**Step 3:**
**Specify a proportional 5/3-way valve**
The appropriate proportional 5/3-way valve can be found at the intersection of the grey column in step 1 and the row for the pneumatic drive DNCI-50-... selected, in the table area "Proportional 5/3-way valve". In the case of our example, this is the proportional 5/3-way valve MPYE-5-1/8-HF-010B with the part number 151693.

**Step 4:**
**Complete the order information**
To order a complete system you must add the order data for the end-position controller, valve and controller cables and manual (if required). The complete ordering data for the example described can be found ➔ 23.
A manual should normally be ordered. If you already have one, leave the appropriate box blank, indicating an express waiver of a manual.

**Step 5:**
**Determine the travel time**
To determine the travel time, use the "Soft Stop" software tool.
In the order example, the travel time is 0.92 seconds.

- Note

Engineering software
Soft Stop and ProDrive
➔ www.festo.com

- Note

When selecting drive mounting components, please note that these are often not backlash-free and therefore cannot be used in conjunction with the Soft Stop system. The drives must be mounted directly.

- Note

Check that the loads placed on the drive by the workpiece gripper during the movement process do not exceed permissible limits.
To carry out simulation quickly and easily, use the Smart Soft Stop software tool.

- Note

The self-aligning rod coupler FK is not backlash-free. It must not therefore be used in combination with standard cylinder DNCI.

**Ordering data**

| Pneumatic drive | | Proportional 5/3-way valve | | End-position controller | |
|---|---|---|---|---|---|
| Part No. | Type | Part No. | Type | Part No. | Type |
| **535413** | **DNCI-50-320-P-A** | **151693** | **MPYE-5-1/8-HF-010B** | **537321** | **SPC11-INC** |

| Valve cable | | Controller cable | |
|---|---|---|---|
| Part No. | Type | Part No. | Type |
| **170238** | **KMPYE-AIF-1-GS-GD-2** | **177674** | **KMPV-SUB-D-15-10** |

# End-position controllers SPC11

Technical data

| **Step 1 and 2:** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Standard cylinders/Type | | DNCI-...[1]-...[2]-P-A | | | | | | |
| Cylinder working stroke (standard stroke) | [mm] | 100 | 160 | 200 | 250 | 320 | 400 | 500 |
| Max. overall mass to be moved horizontally with ∅ | 32 | 45 kg | | | | | | |
| | 40 | 75 kg | | | | | | |
| | 50 | 120 kg | | | | | | |
| | 63 | 180 kg | | | | | | |
| Part No. for ∅ | 32 | 535411 | | | | | | |
| | 40 | 535412 | | | | | | |
| | 50 | 535413 | | | | | | |
| | 63 | 535414 | | | | | | |

| **Step 3:** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Proportional 5/3-way valves[3] Part No./Type | | 1 = 151692 MPYE-5-⅛-LF-010<br>2 = 151693 MPYE-5-⅛-HF-010 | | | 3 = 151694 MPYE-5-¼-010-B | | | |
| Cylinder working stroke (standard stroke) | [mm] | 100 | 160 | 200 | 250 | 320 | 400 | 500 |
| Horizontally for ∅ | 32 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| | 40 | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| | 50 | 1 | 1 | 1 | 1 | 2 | 2 | 3 |
| | 63 | 1 | 1 | 2 | 2 | 2 | 3 | 3 |

| **Step 4:** | | | | |
|---|---|---|---|---|
| End-position controllers and accessories | | Part No. | Type | Brief description |
| End-position controller | SPC11 | **537321** | **SPC11-INC** | |
| Cable | Valve | **170238** | **KMPYE-AIF-1-GS-GD-2** | Cable length 2 m |
| | | **170239** | **KMPYE-AIF-1-GS-GD-0,3** | Cable length 0.3 m |
| | SPC11/PLC | **177673** | **KMPV-SUB-D-15-5** | Cable length 5 m |
| | | **177674** | **KMPV-SUB-D-15-10** | Cable length 10 m |

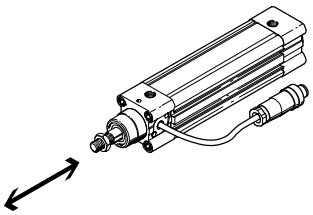
- Note

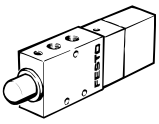
Manuals ➔ 31

1) Specify diameter. Technical data and dimensions ➔ Internet: dnci
2) Specify cylinder working stroke determined.
3) Technical data and dimensions ➔ mpye

**Accessories for solution package for horizontal mounting position with DNCI**

For cylinder working stroke 100 ... 500 mm





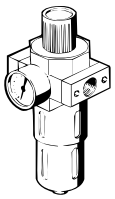
**Ordering data**

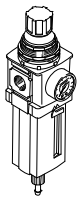
| Cylinder working stroke DNCI [mm] | Proportional 5/3-way valve Type | Fittings[1] For MPYE-5-... Part No. | Type | For DNCI Part No. | Type | Tubing Part No. | Type | Silencer[2] Part No. | Type |
|---|---|---|---|---|---|---|---|---|---|
| ∅ 32 | | | | | | | | | |
| 100 ... 400 | **MPYE-5-⅛-LF-010** | **153004** | **QS-⅛-8** | **153004** | **QS-⅛-8** | **152587** | **PUN-8x1,25** | **2307** | **U-⅛** |
| 500 | **MPYE-5-⅛-HF-010** | | | | | | | | |
| | | | | | | | | | |
| ∅ 40 | | | | | | | | | |
| 100 ... 250 | **MPYE-5-⅛-LF-010** | **153004** | **QS-⅛-8** | **153005** | **QS-¼-8** | **152587** | **PUN-8x1,25** | **2307** | **U-⅛** |
| 320 ... 500 | **MPYE-5-⅛-HF-010** | | | **153005** | **QS-¼-8** | | | | |
| | | | | | | | | | |
| ∅ 50 | | | | | | | | | |
| 100 ... 250 | **MPYE-5-⅛-LF-010** | **153004** | **QS-⅛-8** | **153005** | **QS-¼-8** | **152587** | **PUN-8x1,25** | **2307** | **U-⅛** |
| 320 ... 400 | **MPYE-5-⅛-HF-010** | | | | | | | | |
| 500 | **MPYE-5-¼-010-B** | **153007** | **QS-¼-10** | **153007** | **QS-¼-10** | **152588** | **PUN-10x1,5** | **2316** | **U-¼** |
| | | | | | | | | | |
| ∅ 63 | | | | | | | | | |
| 100 ... 160 | **MPYE-5-⅛-LF-010** | **153004** | **QS-⅛-8** | **153006** | **QS-⅜-8** | **152587** | **PUN-8x1,25** | **2307** | **U-⅛** |
| 200 ... 320 | **MPYE-5-⅛-HF-010** | | | **153006** | **QS-⅜-8** | | | | |
| 400 ... 500 | **MPYE-5-¼-010-B** | **153007** | **QS-¼-10** | **153008** | **QS-⅜-10** | **152588** | **PUN-10x1,5** | **2316** | **U-¼** |

1) Fittings are only supplied in batches of 10.
2) 2 of these are required.

**Accessories for solution package for horizontal mounting position with DNCI**

For cylinder working stroke 100 ... 500 mm






**Ordering data**

| Cylinder working stroke DNCI [mm] | Filter regulator, D series with filter cartridge 5 mm | | Filter cartridge 5 mm D series | | Filter regulator, MS series with filter cartridge 5 mm | | Filter cartridge 5 mm MS series | |
|---|---|---|---|---|---|---|---|---|
| | Part No. | Type | Part No. | Type | Part No. | Type | Part No. | Type |
| ∅ 32 | | | | | | | | |
| 100 ... 500 | **162719** | **LFR-¼-D-5M-MINI** | **159640** | **LFP-D-MINI-5M** | **529152** | **MS4-LFR-¼-D7-CRM-AS** | **534501** | **MS4-LFP-C** |
| | | | | | | | | |
| ∅ 40 | | | | | | | | |
| 100 ... 400 | **162719** | **LFR-¼-D-5M-MINI** | **159640** | **LFP-D-MINI-5M** | **529152** | **MS4-LFR-¼-D7-CRM-AS** | **534501** | **MS4-LFP-C** |
| 500 | **162721** | **LFR-⅜-D-5M-MIDI** | **159594** | **LFP-D-MIDI-5M** | **529204** | **MS6-LFR-¼-D7-CRM-AS** | **534499** | **MS6-LFP-C** |
| | | | | | | | | |
| ∅ 50 | | | | | | | | |
| 100 ... 400 | **162719** | **LFR-¼-D-5M-MINI** | **159640** | **LFP-D-MINI-5M** | **529152** | **MS4-LFR-¼-D7-CRM-AS** | **534501** | **MS4-LFP-C** |
| 500 | **162721** | **LFR-⅜-D-5M-MIDI** | **159594** | **LFP-D-MIDI-5M** | **529204** | **MS6-LFR-¼-D7-CRM-AS** | **534499** | **MS6-LFP-C** |
| | | | | | | | | |
| ∅ 63 | | | | | | | | |
| 100 ... 320 | **162719** | **LFR-¼-D-5M-MINI** | **159640** | **LFP-D-MINI-5M** | **529152** | **MS4-LFR-¼-D7-CRM-AS** | **534501** | **MS4-LFP-C** |
| 400 ... 500 | **162721** | **LFR-⅜-D-5M-MIDI** | **159594** | **LFP-D-MIDI-5M** | **529204** | **MS6-LFR-¼-D7-CRM-AS** | **534499** | **MS6-LFP-C** |

## Order example for semi-rotary drive DSMI

A workpiece with a mass moment of inertia of 400 $kgm^2x10^{-4}$ needs to be conveyed on an unloading station. The workpiece gripper mounted on the shaft of the semi-rotary drive has a mass moment of inertia of 230 $kgm^2x10^{-4}$. The total mass moment of inertia to be moved is thus 630 $kgm^2x10^{-4}$. The swivel angle is 250°. The travel time should be < 1 second.

**Step 1:**
**Specify the swivel angle**

The maximum swivel angle of the semi-rotary drive DSMI-25-270, DSMI-40-270 and DSMI-63-270 is in each case 270°, and can be used in its entirety. The integrated displacement encoder is appropriately designed.

**Step 2:**
**Specify the drive**

For the total mass moment of inertia of 630 $kgm^2x10^{-4}$ to be moved horizontally, it is necessary to use the DSMI-40-270
➔ 27.

**Step 3:**
**Specify a proportional 5/3-way valve**

As can be seen from the table ➔ 27, in general the semi-rotary drive DSMI-40-270 requires the proportional 5/3-way valve MPYE-5-1⁄8-LF-010B

**Step 4:**
**Complete the order information**

To order a complete system you must add the order data for the end-position controller, valve and controller cables and manual (if required). The complete ordering data for the example described can be found ➔ 27. A manual should normally be ordered. If you already have one, leave the appropriate box blank, indicating that you do not want a manual.

**Step 5:**
**Determine the travel time**

To determine the travel time, use the "Soft Stop" software tool.
In the order example, the travel time is 0.89 seconds.

- Note

Engineering software
Soft Stop and ProDrive
➔ www.festo.com

- Note

When selecting drive mounting components, please note that these are often not backlash-free and therefore cannot be used in conjunction with the Soft Stop system. The drives must be mounted directly.

- Note

Check that the loads placed on the drive by the workpiece gripper during the movement process do not exceed permissible limits.
To perform a simulation quickly and easily, use the Smart Soft Stop software tool.

## Ordering data

| Semi-rotary drive | | Proportional 5/3-way valve | | End-position controller | |
|---|---|---|---|---|---|
| Part No. | Type | Part No. | Type | Part No. | Type |
| **561691** | **DSMI-40-270-A-B** | **151692** | **MPYE-5-1⁄8-LF-010B** | **192217** | **SPC11-POT-LWG** |

| Valve cable | | Controller cable | |
|---|---|---|---|
| Part No. | Type | Part No. | Type |
| **170238** | **KMPYE-AIF-1-GS-GD-2** | **177674** | **KMPV-SUB-D-15-10** |

# End-position controllers SPC11

Technical data

| **Step 1 and 2:** | | | |
|---|---|---|---|
| Semi-rotary drive with integrated potentiometer | DSMI-25-270-A-B | DSMI-40-270-A-B | DSMI-63-270-A-B |
| Swivel angle | 270° | | |
| Max. permissible mass moment of inertia, horizontal | 300 $kgm^2x10^{-4}$ | 1200 $kgm^2x10^{-4}$ | 6000 $kgm^2x10^{-4}$ |
| Part No. | 561690 | 561691 | 1202485 |

| **Step 3:** | | | | | | |
|---|---|---|---|---|---|---|
| Proportional 5/3-way valves[1)] | Part No. | Type | Part No. | Type | Part No. | Type |
| | **154200** | **MPYE-5-M5-010B** | **151692** | **MPYE-5-⅛-LF-010B** | **151692** | **MPYE-5-⅛-LF-010B** |

| **Step 4:** | | | | |
|---|---|---|---|---|
| End-position controllers and accessories | | Part No. | Type | Brief description |
| End-position controller | SPC11 | **192217** | **SPC11-POT-LWG** | |
| Cable | Valve | **170238** | **KMPYE-AIF-1-GS-GD-2** | Cable length 2 m |
| | | **170239** | **KMPYE-AIF-1-GS-GD-0,3** | Cable length 0.3 m |
| | SPC11/PLC | **177673** | **KMPV-SUB-D-15-5** | Cable length 5 m |
| | | **177674** | **KMPV-SUB-D-15-10** | Cable length 10 m |

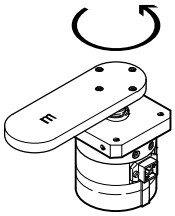
- - Note

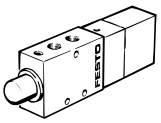
Manuals ➔ 31

1) Technical data and dimensions ➔ Internet: dsmi

**Accessories for solution package for horizontal mounting position with DSMI**

For swivel angle 0° ... 270°





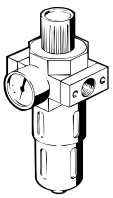
**Ordering data**

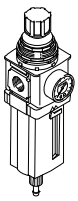
| Swivel angle DSMI | Proportional 5/3-way valve Type | Fittings[1] For MPYE-5-... Part No. | Type | For DSMI Part No. | Type | Tubing Part No. | Type | Silencer[2] Part No. | Type |
|---|---|---|---|---|---|---|---|---|---|
| Size 25 | | | | | | | | | |
| 0° ... 270° | **MPYE-5-M5-010-B** | **153306** | **QSM-M5-6** | **153306** | **QSM-M5-6** | **152586** | **PUN-6x1** | **1205858** | **AMTE-M-LH-M5** |
| | | | | | | | | | |
| Size 40 | | | | | | | | | |
| 0° ... 270° | **MPYE-5-⅛-LF-010-B** | **153004** | **QS-⅛-8** | **153004** | **QS-⅛-8** | **152587** | **PUN-8x1,25** | **2307** | **U-⅛** |
| | | | | | | | | | |
| Size 63 | | | | | | | | | |
| 0° ... 270° | **MPYE-5-⅛-LF-010-B** | **153004** | **QS-⅛-8** | **153005** | **QS-¼-8** | **152587** | **PUN-8x1,25** | **2307** | **U-⅛** |

1) Fittings are only supplied in batches of 10.
2) 2 of these are required.

**Accessories for solution package for horizontal mounting position with DSMI**

For swivel angle 0° ... 270°





**Ordering data**

| Swivel angle DSMI | Filter regulator, D series with filter cartridge 5 µm | | Filter cartridge 5 µm D series | | Filter regulator, MS series with filter cartridge 5 µm | | Filter cartridge 5 µm MS series | |
|---|---|---|---|---|---|---|---|---|
| | Part No. | Type | Part No. | Type | Part No. | Type | Part No. | Type |
| Size 25 | | | | | | | | |
| 0° ... 270° | **162719** | **LFR-¼-D-5M-MINI** | **159640** | **LFP-D-MINI-5M** | **529152** | **MS4-LFR-¼-D7-CRM-AS** | **534501** | **MS4-LFP-C** |
| | | | | | | | | |
| Size 40 | | | | | | | | |
| 0° ... 270° | **162719** | **LFR-¼-D-5M-MINI** | **159640** | **LFP-D-MINI-5M** | **529152** | **MS4-LFR-¼-D7-CRM-AS** | **534501** | **MS4-LFP-C** |
| | | | | | | | | |
| Size 63 | | | | | | | | |
| 0° ... 270° | **162719** | **LFR-¼-D-5M-MINI** | **159640** | **LFP-D-MINI-5M** | **529152** | **MS4-LFR-¼-D7-CRM-AS** | **534501** | **MS4-LFP-C** |

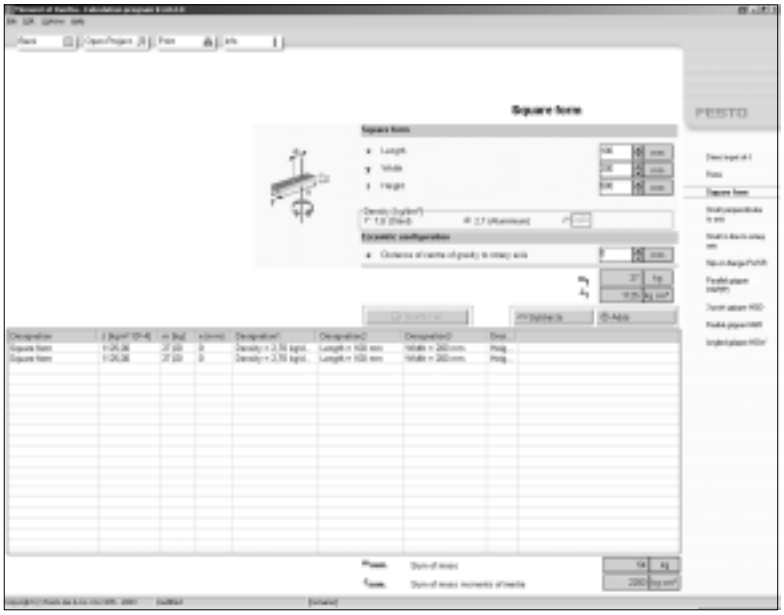
## Mass moment of inertia calculation with the aid of Festo software

Software tool: mass moment of inertia


Whether washers, blocks, push-on flanges or grippers, this tool does the job of calculating all mass moments of inertia for you.
Just save, send, or print – and you're finished.

- Note

Configuration software for calculating the mass moment of inertia
➔ www.festo.com



# End-position controllers SPC11

Technical data

FESTO

**Ordering data – Manuals**

| | | Part No. | Type |
|---|---|---|---|
| System description – End-position controllers | | | |
| SPC11 | German | **196723** | **P.BE-SPC11-SYS-DE** |
| | English | **196724** | **P.BE-SPC11-SYS-EN** |
| | French | **196727** | **P.BE-SPC11-SYS-FR** |
| | Italian | **196726** | **P.BE-SPC11-SYS-IT** |
| | Spanish | **196725** | **P.BE-SPC11-SYS-ES** |
| | | | |
| Drive-specific supplement | | | |
| For DGCI/DDLI | | | |
| SPC11 | German | **549166** | **P.BE-SPC11-DGCI-DE** |
| | English | **549167** | **P.BE-SPC11-DGCI-EN** |
| | French | **549169** | **P.BE-SPC11-DGCI-FR** |
| | Italian | **549170** | **P.BE-SPC11-DGCI-IT** |
| | Spanish | **549168** | **P.BE-SPC11-DGCI-ES** |
| | | | |
| For DNC | | | |
| SPC11 | German | **196735** | **P.BE-SPC11-DNC-DE** |
| | English | **196736** | **P.BE-SPC11-DNC-EN** |
| | French | **196739** | **P.BE-SPC11-DNC-FR** |
| | Italian | **196738** | **P.BE-SPC11-DNC-IT** |
| | Spanish | **196737** | **P.BE-SPC11-DNC-ES** |

| | | Part No. | Type |
|---|---|---|---|
| For DSMI | | | |
| SPC11 | German | **196741** | **P.BE-SPC11-DSMI-DE** |
| | English | **196742** | **P.BE-SPC11-DSMI-EN** |
| | French | **196745** | **P.BE-SPC11-DSMI-FR** |
| | Italian | **196744** | **P.BE-SPC11-DSMI-IT** |
| | Spanish | **196743** | **P.BE-SPC11-DSMI-ES** |
| | | | |
| For DNCI | | | |
| SPC11 | German | **539888** | **P.BE-SPC11-DNCI-DE** |
| | English | **539889** | **P.BE-SPC11-DNCI-EN** |
| | French | **539891** | **P.BE-SPC11-DNCI-FR** |
| | Italian | **539892** | **P.BE-SPC11-DNCI-IT** |
| | Spanish | **539890** | **P.BE-SPC11-DNCI-ES** |

# End-position controllers SPC11

Technical data

## Converting existing systems

**What should be taken into consideration when converting existing systems that use pneumatic drive DGC or DNC?**

Optimum system behaviour is guaranteed by Festo's uniquely specified solution packages, in which all components are harmonised. When converting existing systems, observe the following points:

**Where could system behaviour possibly change when an existing system is converted?**

In normal cases, the entire cylinder stroke is used, including the internal cushioning length (PPV); no stroke reserve is available.

**What should be noted when installing the pneumatics?**

- Pay particular attention here to symmetrical arrangement, i.e. ensure that the tube length is equal for compressed air supply to the drive on both sides.
- No flow control valves between the valve and drive.
- Open end-position cushioning (PPV) 100%.

Accessories and tubing diameters can be found in the description for the respective solution package.

**What should be noted when installing the electrics?**

As far as the electrical actuation is concerned, the Smart Soft Stop system behaves like a standard pneumatic system which uses a double solenoid valve with two coils and two proximity sensors.

For further information see the manual
System description:
SPC11-... ➔ 31.

**Does the control program need to be adapted?**

Existing systems which have provision for two digital inputs/outputs can be converted without adaptation of the control program.

**What proportional 5/3-way valve should be selected for the conversion project?**

There is no change compared to the solution package ➔ 19.

**What end-position controller is suitable for each drive or displacement encoder?**

| End-position controller | Drive | Displacement encoder |
|---|---|---|
| SPC11-POT-TLF | DGC-KF | MLO-POT-...-TLF |
| SPC11-POT-LWG | DNC | MLO-POT-...-LWG |
| | DSMI | Integrated |
| SPC11-MTS-AIF | DGC-KP | MME-MTS-...-AIF |
| SPC11-INC | DNCI | Integrated |
| SPC11-MTS-AIF-2 | DGCI/DDLI | Adapted |