



A KSB Company

Intelligent Position Feedback Unit

SISTO-SK-i

For Linear Valves
Stroke: Up to 60 mm

Type Series Booklet



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Type Series Booklet SISTO-SK-i

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Contents

Intelligent Position Feedback Unit.....	4
Intelligent Position Feedback Unit for Linear Valves.....	4
SISTO-SK-i.310/.320	4
Product description of SISTO-SK-i	4
Main applications.....	4
Variants	4
Standards and technical codes / directives	4
Operating data	4
Materials	4
Design details	4
Product benefits.....	4
Ordering key.....	5
Related documents	6
Indicator and actuating elements of SISTO-SK-i.310/.320	7
Overview of functions.....	8
Technical data of SISTO-SK-i.310/.320 24 V	9
Technical data of SISTO-SK-i.310/.320 IO-Link	10
Technical data of SISTO-SK-i.310/.320 AS-i.....	12
Additional technical data of SISTO-SK-i.310/.320 with solenoid valve.....	13
Pneumatic connection	13
Dimensions and weights.....	14
Accessories for SISTO-SK-i.310/.320	15
Variants	15
Glossary.....	16

Intelligent Position Feedback Unit

Intelligent Position Feedback Unit for Linear Valves

SISTO-SK-i.310/.320



Product description of SISTO-SK-i

SISTO-SK-i is a compact intelligent position feedback unit for linear valves. Valve position is indicated visually and clearly by means of colour-coded high-visibility LEDs. User-friendly setting of limit positions and fast commissioning by automatic in-situ initialisation or via the process control system.

SISTO-SK-i continuously records valve travel and comprises a microcontroller-based analysing unit. Valve position is signalled visually by the device's high-visibility LEDs and electrically via digital outputs.

Main applications

- Biotechnology
- Chemical industry/Fine chemicals
- Food industry / beverage industry
- Pharmaceutical industry
- Process industry

Variants

Process interfaces

- 24 V
- IO-Link
- AS interface

Housing materials

- Plastic
- Stainless steel

Control

- Position feedback unit
- Position feedback unit with integrated 3/2-way solenoid valve for decentralised process automation
 - SF or OF actuator: 1 solenoid valve
 - AZ actuator: 2 solenoid valves

Standards and technical codes / directives

Standards

Enclosure to EN 60529	IP65
	IP67
Appliance class to EN 61140	Appliance class III

Directives

EMC Directive	2014/30/EU
RoHS Directive	2011/65/EU
Machinery Directive	2006/42/EC

Operating data

Table 1: Operating properties

Characteristic	Value
Stroke [mm]	2 - 60
Min. permissible temperature [°C]	≥ -20
Max. permissible temperature [°C]	≤ +60

Materials

Table 2: Overview of available materials

Description	Material
Lower housing section SK-i.310	Polyamide, black
Lower housing section SK-i.320	Stainless steel A4
Housing cover	Polyamide, transparent
Electrical connection	Stainless steel A4

Design details

- Compact position feedback unit for mounting on linear valves
- Electrical connection via M12 plug
- Continuous valve travel recording via non-contact, wear-free measurement system
- Open/closed position feedback and fault status via digital output
- Status indication and position indication via high-visibility LEDs
- Pneumatic actuator control via integrated solenoid valve (optional)

Product benefits

- Automatic initialisation for fast commissioning
- Remote initialising possible
- Individual configuration of LED colours via IO-Link
- Precise and wear-free measurement system
- Smooth, easy-to-clean surfaces

Ordering key

Table 3: Ordering key

Ordering example: SK-i. 3 1 0 24 0M 30 00 01							
Product generation	3						
Housing material							
Plastic	1						
Stainless steel	2						
Interface							
24 V		24					
IO-Link		IO					
AS interface		AS					
Control							
0 MV			0M				
1 MV (SF/OF)			1M				
2 MV (AZ)			2M				
Size							
Standard (max. stroke 30 mm)				30			
High (max. stroke 60 mm)				60			
Approval							
EU					00		
Mounting options¹⁾							
SISTO-C LAP.520 MD 30 - MD 65 K63							01
SISTO-C LAP.520 MD 65 K80 - MD 115 K100							02
SISTO-C LAP.520 MD 115 K160							03
SISTO-C LAP.520 MD 168							04
SISTO-C LAP.520 MD 202							05
SISTO-16/-20 LAP.520 MD 40 - MD 65 K63							01
SISTO-16/-20 LAP.520 MD 65 K80 - MD 115 K100							02
SISTO-16/-20 DLAP.230 MD 115 K100							02
SISTO-16/-20 DLAP.230 MD 115 K125/K160							03
SISTO-16/-20 DLAP.230 MD 168							04
SISTO-16/-20 DLAP.230 MD 202							05
SISTO-16S LAP.520 MD 40							01
SISTO-16S DLAP.230 MD 65							12
SISTO-16S DLAP.230 MD 92 - MD 115 K100							02
SISTO-16S DLAP.230 MD 115 K112 - K160							03
SISTO-16S DLAP.230 MD168							04
SISTO-16S DLAP.230 MD 202							05
SISTO-KB DLAP.230 DN 15 - 40							02
SISTO-KB DLAP.230 DN 50 - 80							04
SISTO-KB DLAP.230 DN 100							06
Special design (24 V variant only)						Add as required.	
Alternative signal colours (CLOSED: red, OPEN: green, FAULT: orange)							C1
Alternative signal colours (CLOSED: orange, OPEN: green, FAULT: red)							C2

1 Further mounting variants available on request

Related documents

Table 4: Information/documents

Document	Reference number
SISTO-SK-i.310/.320 operating manual	8676.82
Operating manual	0570.822.
Sterile Processes catalogue	8652.10.

Additional documents / declaration of conformity



Additional documents / declaration of conformity are available via the QR code.

Click the QR code.



Indicator and actuating elements of SISTO-SK-i.310/.320

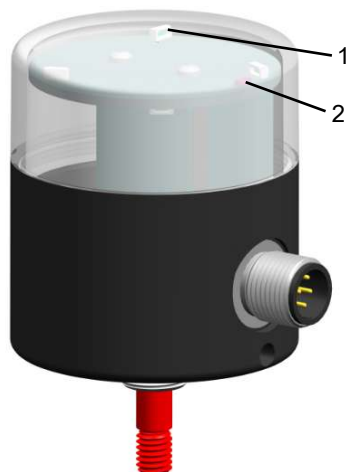


Fig. 1: Indicator and actuating elements of SISTO-SK-i.310/.320

1	High-visibility LED	2	Magnetic sensor for in-situ initialisation
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Table 5: Colour code of high-visibility LED

Colour code of high-visibility LED	Operating status	Colour index
Orange	Valve position, open	4
Green	Valve position, closed	2
Yellow	Warning	5
Red	Fault	1
White	Initialising	7
Blue	Not initialised	3
Violet	Localisation	6
Turquoise	Free function ²⁾	8
Magenta	Free function ²⁾	9
Dark (deactivated)	Free function ²⁾	10

2 Can be set via IO-Link.

Overview of functions

Table 6: Overview of functions

Function	24 V	IO-Link	AS-i V3
Open and Closed position indication via high-visibility LED	x	x	x
Deactivating high-visibility LED (adjusting brightness of LED)	-	x	-
Electrical position feedback Open and Closed	x	x	x
Process input continuous valve position	-	x	-
On-site initialisation	x	x	x
Deactivating on-site initialisation	-	x	x
Remote initialisation	x	x	x
Operating mode feedback	-	x	x
Localisation function	-	x	x
Alternative signal colours	3)	x	x
Activating increased tolerances	-	x	-
Visual indication of errors	x	x	x
Visual indication of warnings	-	x	-
Feedback of error code and error description	-	x	-
Feedback of programmed limit positions	-	x	-
Feedback of initialisation status	-	x	-
Feedback of most recent switching cycles	-	x	-
Feedback of most recent limit positions	-	x	-
Diaphragm cycle counter	-	x	-
Actuator cycle counter	-	x	-
Total cycle counter	-	x	-
Power On counter	-	x	-
Diaphragm operating time counter	-	x	-
Total operating time counter	-	x	-
Switching cycle deviation warning can be enabled	-	x	-
Closed position deviation warning can be enabled	-	x	-
Diaphragm cycle counter warning can be enabled	-	x	-
Actuator cycle counter warning can be enabled	-	x	-
Operating time counter warning can be enabled	-	x	-

3 Required colour scheme to be indicated at the time of ordering. (Order code C1/C2 (⇒ Page 5)) No changes can be made after this time.

Technical data of SISTO-SK-i.310/.320 24 V

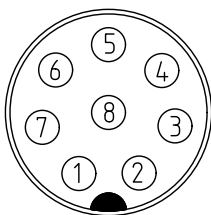
Table 7: Electrical data of SISTO-SK-i.310/.320 24 V

Feature	Value
Electrical connection	8-pin M12 round plug connector
Supply voltage [V]	24 +/- 10 %
Current input [mA]	Approx. 80
Duty ratio	100 %
Digital outputs	24 V, max. 100 mA, short-circuit-proof ▪ Open ▪ Closed ▪ Fault
Digital inputs	24 V, low: 0 - 3 V, high: 18 - 24 V ▪ Remote initialisation

Table 8: Electrical data of SISTO-SK-i.310/.320 24 V with solenoid valve

Feature	Value
Current input [mA]	Approx. 140
Additional digital input	24 V, low: 0 - 3 V, high: 18 - 24 ▪ Solenoid valve

Table 9: Pin assignment of SISTO-SK-i.310/.320 24 V

Connector	Pin	Assignment
	1	+ 24 V
	2	DO Open
	3	0 V
	4	DO Closed
	5	DI Initialising
	6	DI Solenoid valve ⁴⁾
	7	DO Fault
	8	Not used

4 With integrated solenoid valve only

Technical data of SISTO-SK-i.310/.320 IO-Link**Table 10:** Electrical data of SISTO-SK-i.310/.320 IO-Link

Feature	Value
Electrical connection	5-pin M12 round plug connector
Port class	A
Supply voltage [V]	24 (+/-25 %)
Current input [mA]	Approx. 90
Duty ratio	100 %

Table 11: Specification of SISTO-SK-i.310/.320 IO-Link

Specification	
IO-Link revision	V1.1
Transmission rate	38,400 bit/s (COM2)
Minimum cycle time	20 ms
SIO mode	Not available, i.e. feedback of valve position via 24 V DO not possible
Data storage class	2: Semi-automatic DS (initialisation must be carried out after replacing the device)
Exception	24_01 wake-up readiness delay_signed (The device's start time exceeds the permitted time of 300 ms. The SK-i is ready for operation after a device start time of max. 10 s.)

Table 12: Electrical data of SISTO-SK-i.310/.320 IO-Link with solenoid valve

Feature	Value
Current input [mA]	Approx. 140

Table 13: Inputs (process data input)

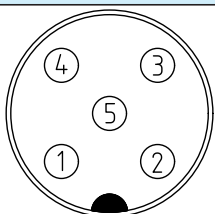
Subindex	Bit offset	Data type	Function	Logic
1	0	Boolean	OPEN position	0 = "Not open" position 1 = "Open" position
2	1	Boolean	CLOSED position	0 = "Not closed" position 1 = "Closed" position
3	2	2-bit UInteger	Operating mode	0 = Normal operation 1 = Initialisation mode 2 = Localisation 3 = Not initialised
4	4	4-bit UInteger	Namur status (NE 107)	0 = Normal 1 = Service required 2 = Outside of specification 3 = Check functioning 4 = Fault
5	8	Boolean	Initialisation error	0 = Not active 1 = E050 E051 E052
6	9	Boolean	Inconsistent limit position error	0 = Not active 1 = E100
7	10	Boolean	Open position error	0 = Not active 1 = E101 E103
8	11	Boolean	Closed position error	0 = Not active 1 = E102 E104
9	12	Boolean	Cycle counter warning	0 = Not active 1 = W010 W011
10	13	Boolean	Switching cycle warning	0 = Not active 1 = W020 W021

Subindex	Bit offset	Data type	Function	Logic
11	14	Boolean	Diaphragm operating time warning	0 = Not active 1 = W022
12	15	Boolean	Closed position deviation warning	0 = Not active 1 = W030
13	16	32-bit Integer	Valve position [µm]	- 5,000 - +65,000

Table 14: Outputs (process data output)

Subindex	Bit offset	Data type	Function	Logic
1	0	Boolean	Operate valve ⁵⁾	0 = Solenoid valve not operated 1 = Solenoid valve operated
2	1	Boolean	Start initialisation	0 = Normal operation 1 = Initialisation mode
3	2	Boolean	Localisation	0 = Normal operation 1 = Activate localisation
4	3	Boolean	Reserve	Not defined
5	4	4-bit UInteger	LED colour mode	0 = Standard signalisation 1 = Red 2 = Green 3 = Blue 4 = Orange 5 = Yellow 6 = Purple 7 = White 8 = Turquoise 9 = Magenta 10 = Dark

Table 15: Pin assignment of SISTO-SK-i.310/.320 IO-Link

Connector	Pin	Assignment
	1	+24 V
	2	Not used
	3	GND
	4	C/Q IO-Link
	5	Not used

⁵ With integrated solenoid valve only

Technical data of SISTO-SK-i.310/.320 AS-i

Table 16: Electrical data of SISTO-SK-i.310/.320 AS-i

Feature	Value
Electrical connection	5-pin M12 round plug connector
Supply voltage [V]	26,5 - 31,6
Current input [mA]	Approx. 90
Duty ratio	100 %
AS-i specification	V3.0

Table 17: Electrical data of SISTO-SK-i.310/.320 AS-i with solenoid valve

Feature	Value
Current input [mA]	Approx. 140

Table 18: AS interface profile

Characteristic	Value
Profile designation	S-7.A-E
I/O configuration	7
ID code	A
ID1 code	7
ID2 code	E

Table 19: Inputs of SISTO-SK-i.310/.320 AS-i (AS-i master perspective)

Bit	Function	Logic
DI0	OPEN position	0 = "Not open" position 1 = "Open" position
DI1	CLOSED position	0 = "Not closed" position 1 = "Closed" position
DI2	Ready	0 = Normal operation 1 = Initialisation mode
DI3	Fault	0 = Normal operation 1 = Fault Alternating at 1 Hz = valve not initialised

Table 20: Outputs of SISTO-SK-i.310/.320 AS-i (AS-i master perspective)

Bit	Function	Logic
DO0	Operate valve ⁶⁾	0 = Solenoid valve not operated 1 = Solenoid valve operated
DO1	Localisation	0 = Normal operation 1 = Activate localisation
DO2	Start initialisation	0 = Normal operation 1 = Initialisation mode

Table 21: Pin assignment

Connector	Pin	Assignment
	1	AS-i +
	2	Not used
	3	AS-i -
	4	Not used
	5	Not used

⁶ With integrated solenoid valve only

Additional technical data of SISTO-SK-i.310/.320 with solenoid valve

Table 22: Pneumatic data

Feature	Value
Threaded port	Internal thread M5
Flow rate (integrated solenoid valve) [l _N /min.]	19
Flow rate, pilot valve ⁷⁾ [l _N /min.]	650
P max. [bar]	8

The pressure applied must not exceed the maximum control pressure of the process valve.

SISTO-SK-i.310/.320 with solenoid valve is suitable for compressed air as control fluid in accordance with ISO 8573-1.

Table 23: Quality grade of air as control fluid

	Operation above 0 °C	Operation down to -20 °C
Quality grade	5.4.3	5.3.3
Filter	40 µm	40 µm
Oil concentration	≤ 1 mg/m ³	≤ 1 mg/m ³
Dew point	≤ +3 °C	≤ -20 °C

For determining the required air quality consider the specifications of all components used in the system.

Pneumatic connection

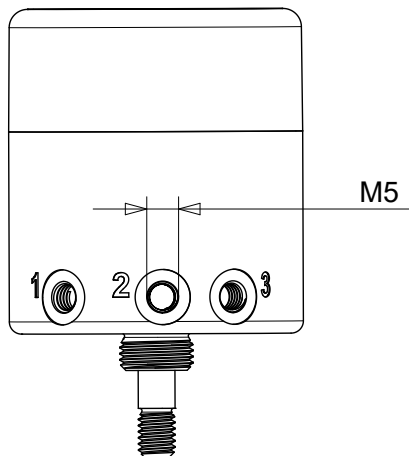


Fig. 2: Pneumatic connection of SK-i.310/.320

Table 24: Assignment of pneumatic connections

Connection	Assignment	Connection
1	Air supply	
2	Actuator	
3	Air outlet	

SISTO-SK-i.310/.320 with integrated solenoid valve is supplied with angled connectors (M5/6 mm tube) fitted at ports 1 and 2 and a silencer fitted at port 3.

7 SISTO-SK-i.310/.320 with integrated solenoid valve and long stroke (60 mm) comes with a pneumatic pilot valve (booster) and pneumatic connector for an 8-mm tube.

Dimensions and weights

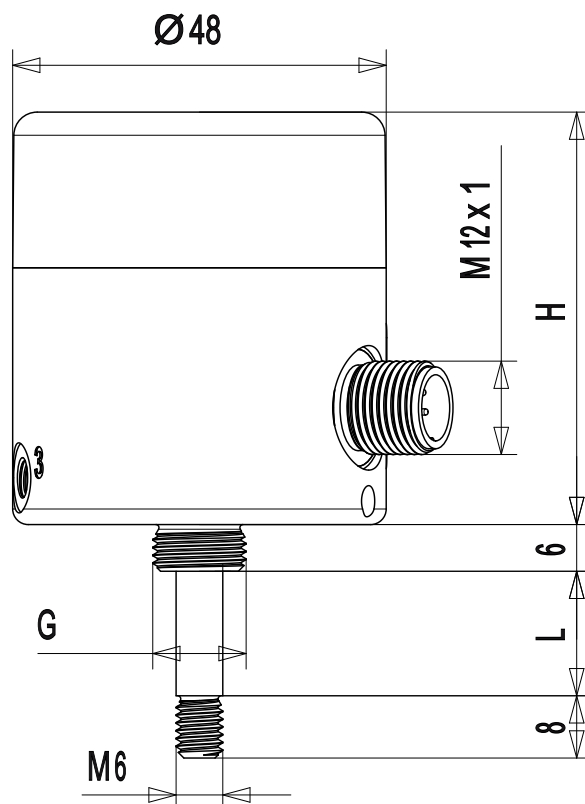


Fig. 3: SISTO-SK-i.310/.320

Mechanical data

Table 25: Dimensions table of SISTO-SK-i.310/.320

Order code for mounting on valve (⇒ Page 5)	01	02	03	04	05
MD	30 - 65 K63	65 K80 - 115 K100	115 K125 - K160	168	202
Adapter thread G	M12 × 1	M18 × 1			
L [mm]	19	32	38	60	69
Rod length [mm]	31	44	50	72	81
Size [mm]	30			60	
Height H [mm]	53			83	
Diameter [mm]	48				
Weight [kg] SK-i.310	0,07			0,08	
Weight [kg] SK-i.320	0,19			0,31	

Accessories for SISTO-SK-i.310/.320

Set comprising programming magnet, Allen key and lanyard

Order number: 42504056



Fig. 4: Accessories for SISTO-SK-i.310/.320

Variants

Variants and application

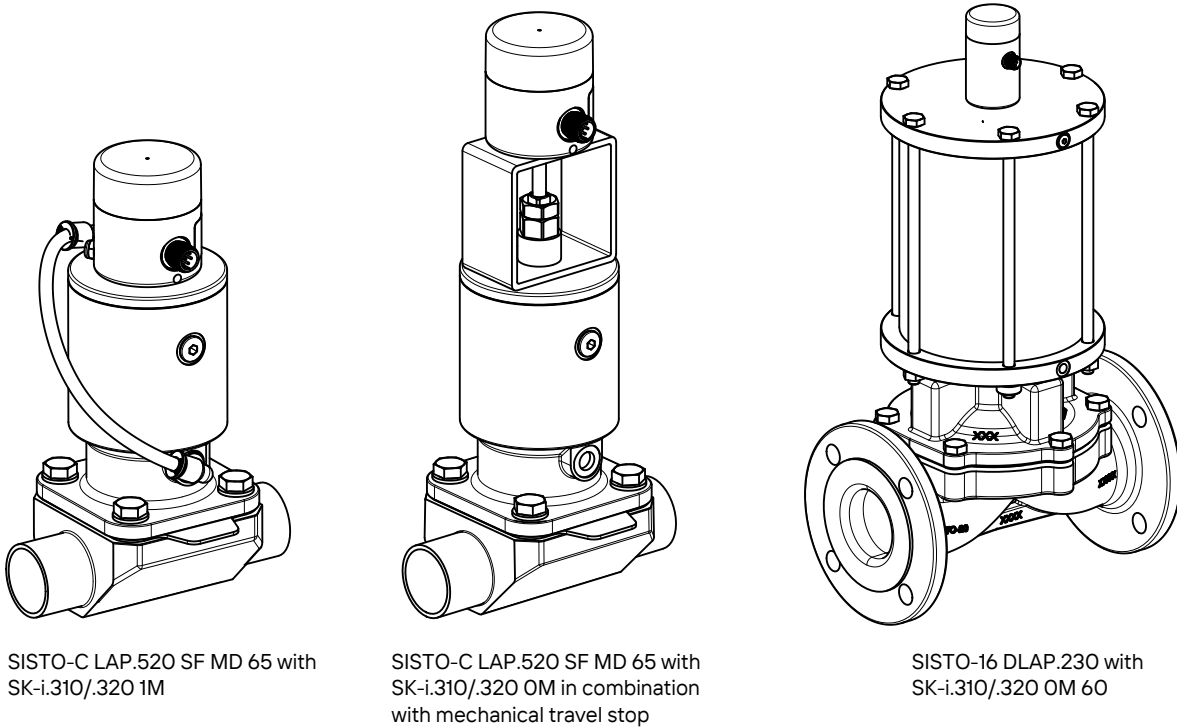


Fig. 5: Variants and application of SISTO-SK-i.310/.320

Glossary

24 V

Communications system with discrete digital inputs and digital outputs

AS-i

AS interface (abbreviation for Actuator Sensor interface) – standard interface for field bus communication for connecting actuators and sensors in accordance with IEC 62026-2.

AZ actuator

OPEN/CLOSE = double-acting piston actuator (air-to-open / air-to-close)

DI

Digital input, binary input

DO

Digital output, binary output

IO-Link

Communications system for connecting intelligent sensors and actuators to an automation system in accordance with the IEC 61131-9 standard.

K

Piston diameter

LAP

Pneumatic piston actuator, available in versions SF, OF and AZ

MD

Diaphragm diameter, numeric designation of the diaphragm size

MV

Solenoid valve

OF actuator

Opening spring = pneumatic piston actuator, fail-open (spring-to-open / air-to-close)

SF actuator

Closing spring = pneumatic piston actuator, fail-close (air-to-open / spring-to-close)



SISTO Armaturen S.A.

18, rue Martin Maas • L-6468 Echternach
www.sisto-aseptic.com

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