Balancer kits YHBP

NEW

Characteristics

At a glance

The balancer kit moves loads of up to 999 kg effortlessly at the touch of a finger. The controller automatically detects the weight of the load and sets the balancing force itself. It also takes into account weight changes in the suspended state. This is helpful in keeping production processes really flexible.
The components of the balancer kit are suitable for installation in all common kinematic systems such as lifting columns or parallel kinematic systems.

Two packages can be selected:

Basic package

- Single-channel speed monitoring
- Safety: Performance Level b achievable
- Safely limited speed (SLS)
- Safe stopping and closing (SSC)

Package with safety relay unit

- Dual-channel speed monitoring
- Safety: Performance Level d achievable
- Safely limited speed (SLS)
- Safe stopping and closing (SSC)

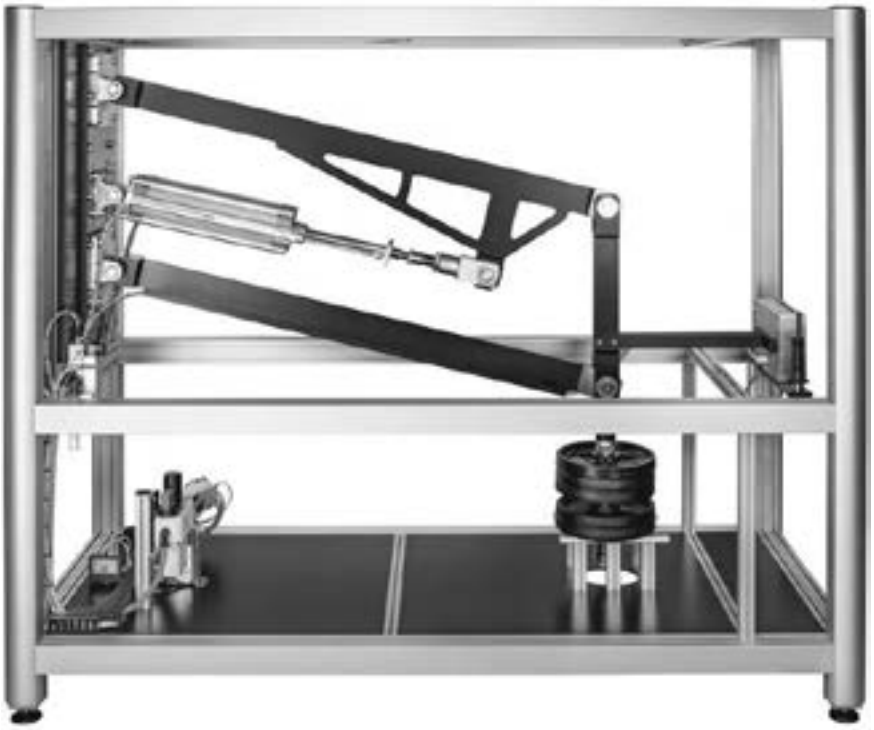
The following operating modes can be selected:

- Load-controlled mode: moving the load mass using the control element or optionally directly at the workpiece
- Position-hold mode: moving the load mass only using the control element. The load is held in this position, even if it changes

Areas of application:

- Loading and unloading
- Stacking and destacking
- Rotating, swivelling, tilting and emptying containers
- Assembly in production lines
- Loading goods

Application example



Key features

Ordering via the configurator

It is very easy to configure and order a wide range of balancer kits using the configurator.
The "Configuration", "Preassembly" and "Accessories" tabs are used to select the combinations and display them with the correct configuration.
CAD files and ePLAN macros included.

Ordering data – Product options

Configurable product This product and all its product options can be ordered using the configurator.	The configurator can be found under Products on the DVD or at ➔ **www.festo.com/catalogue/...**	Part no. **8087218**	Type **YHBP**

Scope of delivery of balancer kit

Designation	Type	Basic package	Package with safety relay unit
Standards-based cylinder	DSBG-...	■	■
Displacement encoder	DNCI-32-... (with one measuring head)	■	–
	DNCI-32-... (with two measuring heads)	–	■
Valve unit	VPCB-6-L-8-G38-10-F-D3-T22	■	–
	VPCB-6-L-8-G38-10-F-D3-T22-M	–	■
Control element	VAOH-P15-H13	■	■
Plug socket with cable	KME-1-24DC-5-LED	■	■
Connecting cable	NEBC-M12G5-ES-5-LE5-CO	■	■
Balancer controller	CECC-D-BA	■	■
Plug	NECC-L2G24-C1	■	■
Plug	NECC-S1G9-C2-M	■	■
Proximity switch	SMT-8M-A-PS-24V-E-2.5-OE	■	■
Sensor interface	CASB-MT-D3-R7	–	■
Connecting cable	KM12-8GD8GS-2-PU	–	■
Connecting cable	NEBU-M12G5-K-5-LE4	–	■
Plug socket with cable	NEBU-M12W8-K-5-N-LE8	–	■
Safety relay unit	PNOZS30C24-240VACDC	–	■

System components

Included in the scope of delivery of the balancer kit

System component	Description

Standards-based cylinder DSBG

- Standards-based cylinder, provides the force for moving the payload
- Stroke range 100 ... 1000 mm
- Piston diameter 80 ... 200 mm
- Theoretical force at 6 bar:
  Advancing: 3016 ... 18850 N
  Retracting: 2721 ... 18096 N
- Optionally with characteristic DSBG-...-L1 (low friction for balancer applications)

Displacement encoder DNCI-32

- For recording position and speed
- For applications with Performance Level b: one measuring head (single-channel)
- For applications with Performance Level d: two measuring heads (dual-channel)

Valve unit VPCB

- Valve block comprising:
  Balancer valve VPCB – 3/3-way proportional-pressure regulator with special pressure control and shut-off valve actuation as well as two shut-off valves designed as 2/2-way valves
- Diagnostic display for fast error detection
- For applications with Performance Level d: with switching position sensing for the shut-off valves

Balancer controller CECC-D-BA

- Balancer controller for actuating and locking the balancer with preinstalled software (browser-based web visualisation for commissioning and diagnostics)

Sensor interface CASB

- Converts the signal from the displacement encoder into a readable signal for the safety relay unit

Control element VAOH

- Ergonomically designed handle for operating the balancer
- The movement of the handle in axial direction produces a positive or negative pressure in the chambers. These differences in pressure are used to control the balancer. Springs in the respective chambers reset the balancer to the centre position

Safety relay unit PNOZS30C24-240VACDC

- Device for speed monitoring. In the event of an error, the compressed air in the cylinder is shut off in two channels and the system is braked. The same happens in the event of a power failure

System components

Can be ordered as accessories

System component

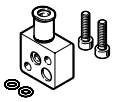
Service unit combination

Comprising:

- Manual on/off valve
- Filter regulator
- Wall mounting plate
- Pressure gauge
- Lockable regulator head
- Plastic bowl with plastic bowl guard
- Manual condensate drain
- Flow direction from left to right

Max. output pressure: 12 bar
Grade of filtration: 5 µm

Connector set VABS



For external pressure measurement. When using this, the sub-base at the valve unit must be replaced (see operating instructions)

Foot mounting for standards-based cylinder DSBG

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Swivel flange for standards-based cylinder DSBG

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Swivel flange for standards-based cylinder DSBG

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Rod clevis for standards-based cylinder DSBG

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Foot mounting for displacement encoder DNCI-32

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Swivel flange for displacement encoder DNCI-32

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Swivel flange for displacement encoder DNCI-32

➔ Page 19

Self-aligning rod coupler for displacement encoder DNCI-32

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Rod eye for displacement encoder DNCI-32

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Inscription labels for sensor interface CASB

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NEW

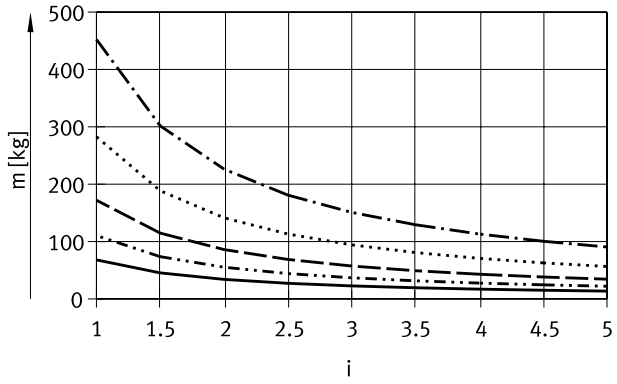
Data sheet

General technical data		
Stroke range	[mm]	100 ... 1000
Piston diameter	[mm]	80 ... 200
Theoretical force at 6 bar		
Advancing	[N]	3016 ... 18850
Retracting	[N]	2721 ... 18096
Load mass[1] at ratio i=1:1	[kg]	70 ... 999
Transmission ratio of kinematics		
For lifting columns		1:1
For parallel kinematic systems		1:1 ... 1:5
Weights		
Overall weight	[g]	4800 ... 48200
Standards-based cylinder weight	[g]	→ www.festo.com/dsbg
Displacement encoder weight	[g]	→ www.festo.com/dnci
Valve unit	[g]	1550
Balancer controller	[g]	200
Control element	[g]	1350
Sensor interface	[g]	300

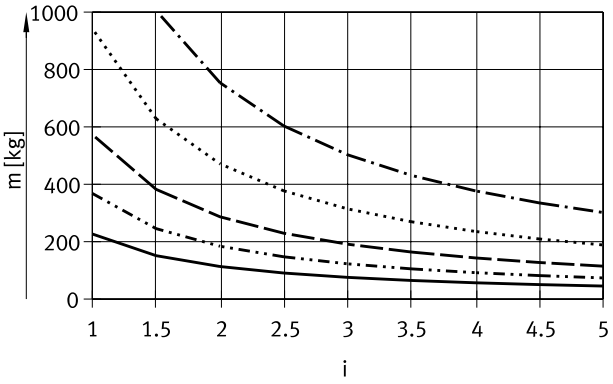
1) Load mass = kinematic system + gripper tool + workpiece

Load m as a function of transmission ratio i and cylinder diameter ⌀

Minimum load at 6 bar



Maximum load at 6 bar



YHBP-80
YHBP-100
YHBP-125
YHBP-160
YHBP-200

Data sheet

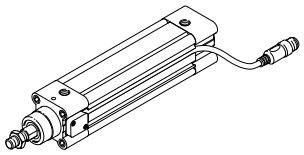
Electrical data		
Operating voltage range	[V DC]	21.6 ... 26.4
Residual ripple	[%]	5
Nominal operating voltage	[V DC]	24
Current consumption with load-free outputs	[A]	2
Duty cycle	[%]	100
Max. electrical power consumption	[W]	48
Reverse polarity protection		For operating voltage

Operating and environmental conditions		
Ambient temperature		
With Performance Level b	[°C]	0 ... +40
With Performance Level d	[°C]	0 ... +50
Storage temperature	[°C]	–20 ... +70
Degree of protection		
For valve unit VPCB		IP65
For balancer controller CECC-D-BA		IP20
Duty cycle	[%]	100
Certification		RCM compliance mark
CE marking (see declaration of conformity)		In accordance with EU EMC Directive[1)]
Note on materials		RoHS-compliant
		Contains paint-wetting impairment substances

1) For information about the area of use, see the EC declaration of conformity at: www.festo.com/sp → Certificates.
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.

Data sheet

Technical data – Displacement encoder DNCI-32



DNCI-32-...: with one measuring head
DNCI-32-...-BA: with two measuring heads

Mechanical data		
Measuring principle		Encoder, contactless and relative measurement
Stroke[1]	[mm]	100 ... 1000
Resolution	[mm]	0.01
Repetition accuracy	[mm]	≤ ±0.5
Output signal		Analogue
Linearity error		
Strokes up to 500 mm	[mm]	≤ ±0.08
Strokes up to 1000 mm	[mm]	≤ ±0.09
Max. travel speed	[m/s]	1.5
Maximum permitted magnetic interference field[2]	[kA/m]	10
Cable length[3]	[m]	1.5
Electrical connection		Cable with 8-pin plug, round design, M12
Type of mounting		With accessories
Mounting position		Any
Materials		
Housing		Anodised aluminium
Cover		Die-cast aluminium
Seals		TPE-U
Sensor housing		Polyacetal
Note on materials		RoHS-compliant

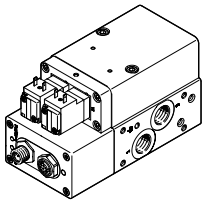
1) Due to its design, the displacement encoder is 10 mm longer than the selected cylinder.
2) At a distance of 100 mm
3) The cable length must not be changed.

Operating and environmental conditions		
Ambient temperature	[°C]	–20 ... +80
Vibration resistance to DIN/IEC 68 Part 2-6		Severity level 2
Shock resistance to DIN/IEC 68 Part 2-82		Severity level 2

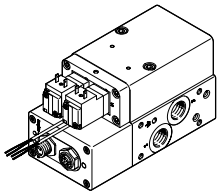
Data sheet

Technical data – Valve unit VPCB

Without switching position display



With switching position display



Mechanical data		
Pneumatic connection		
1, 2, 3		G3/8
H		G1/8
Standard nominal flow rate	[l/min]	725
Nominal width	[mm]	6
Valve function		3-way proportional flow control valve
Design		Piston spool with integrated pressure sensors
Sealing principle		Hard
Actuation type		Electrical
Reset method		Magnetic spring
Type of control		Direct
Flow direction		Non-reversible
Short circuit current rating		Yes
Reverse polarity protection		For operating voltage
Diagnostic function		Display via LED
Typical lowering speed[1)]	[mm/s]	15
Fieldbus interface		
Protocol		CAN bus with Festo protocol
Connection technology		M12x1, A-coded to EN 61076-2-101
Max. CAN bus cable length	[m]	30

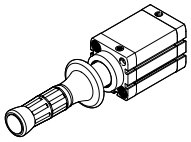
1) When the manual exhaust is operated, with piston diameter 80 mm, transmission ratio 1:1 and load mass of 100 kg.

Electrical data		
Operating voltage range	[V DC]	21.6 ... 26.4
Nominal operating voltage	[V DC]	24
Duty cycle	[%]	100
Proportional directional control valve		
Residual ripple	[%]	5
Current consumption (short term)	[A]	1.2
Current consumption (typical)	[mA]	120
Power consumption	[W]	33.5
Reverse polarity protection		For operating voltage
Shut-off valve		
Current consumption	[mA]	62
Power consumption	[W]	1.5

Operating and environmental conditions		
Operating pressure	[bar]	4 ... 8
Operating medium		Compressed air to ISO 8573-1:2010 [6:4:4]
Note on the operating/pilot medium		Operation with lubricated medium not possible
		Max. particle size 5 µm
Vibration resistance		Transport application test with severity level 2 to FN 942017-4 and EN 60068-2-6
Shock resistance		Shock test with severity level 2 to FN 942017-5 and EN 60068-2-27
Materials		
Housing		Anodised wrought aluminium alloy
Seals		FPM, HNBR, NBR
Note on materials		RoHS-compliant

Data sheet

Technical data – Control element VAOH



Mechanical data		
Piston diameter	[mm]	50
Stroke	[mm]	20
Pneumatic connection		G1/8
Max. transverse load	[N]	100
Position sensing		For proximity switch
Type of mounting		With through-hole
		With female thread
		With accessories
Mounting position		Any

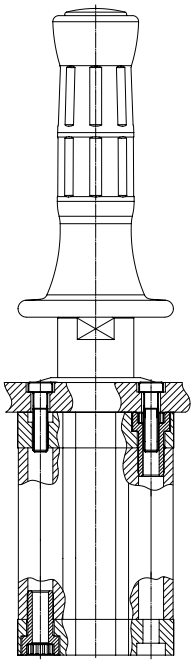
Operating and environmental conditions		
Operating pressure	[bar]	≤ 1
Materials		
Cylinder barrel, end cap		Anodised aluminium
Piston rod		Steel
Note on materials		RoHS-compliant
		Contains paint-wetting impairment substances

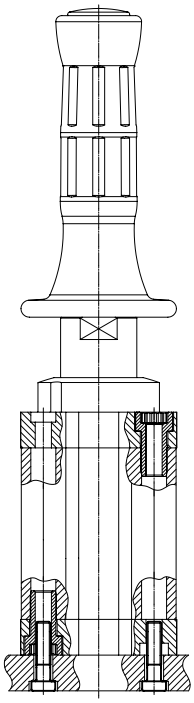
Mounting options

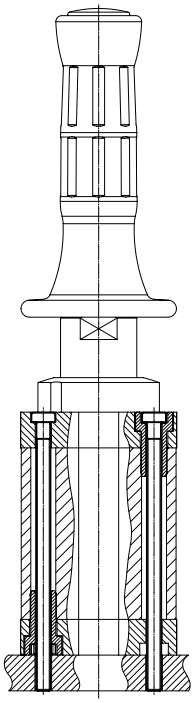
1 Direct mounting on the bearing cap

2 Through-hole mounting

3 Direct mounting on the end cap

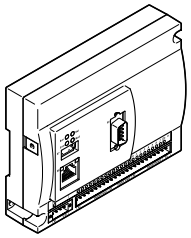






Data sheet

Pin allocation – Balancer controller CECC-D-BA



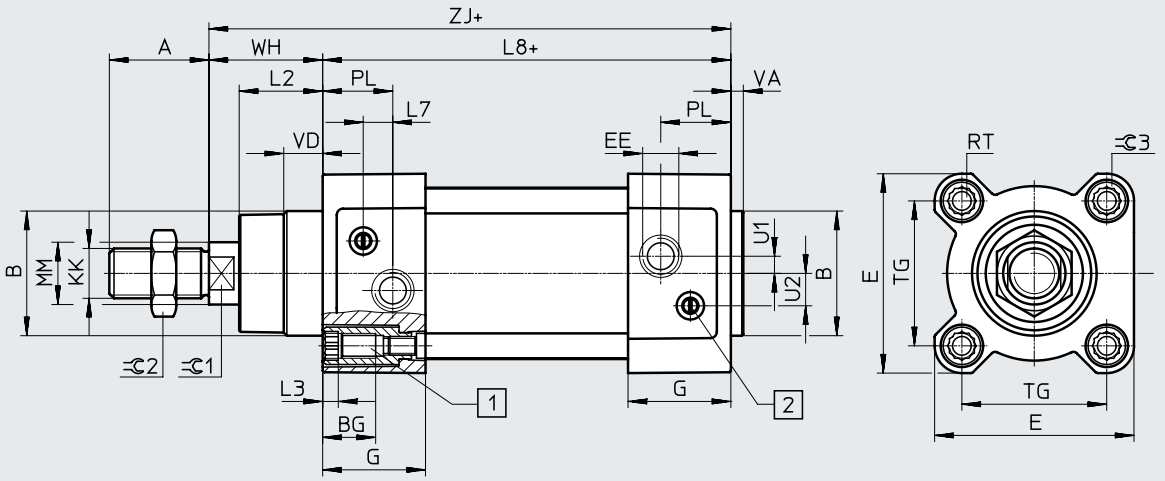
I/O interface for communicating with a higher-order PLC or the control panel

Pin	Connection	Function
X2.0	Inputs	Operation enable
X2.1		Handle active
X2.2		Speed monitor fault input
X2.3		Reference sensor
X2.4		Reset fault
X2.5		Change operating mode
X2.6		Speed monitor signal input
X2.7		Not assigned
X3.0		System enable (emergency off)
X3.1 ... X3.5		User-configured inputs
X4.0	Outputs	Operation enabled
X4.1		Activate speed monitor
X4.2		Shut-off valve 1
X4.3		Shut-off valve 2
X4.4		Fault
X4.5		Load-controlled mode active
X4.6		Balancer mode active
X4.7		System active and ready

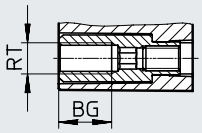
Data sheet

Dimensions Download CAD data ➔ www.festo.com

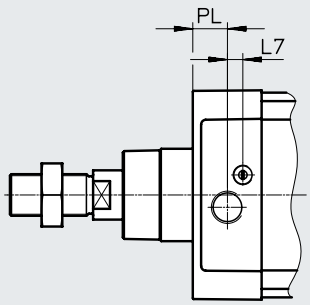
Standards-based cylinder DSBG-80 ... 125



ø 80...125



ø 125



\+ = plus stroke length

[1] Socket head screw with female thread for mounting components

[2] Adjusting screw for adjustable end-position cushioning (PPV)

ø [mm]	A −0.5	B ø d11	BG min.	E +0.5	EE	G −0.2	U2 ±0.1	U1 ±0.1
80	40	45	17	93	G3/8	43	12.5	8
100	40	55	17	110	G1/2	48	13.5	10
125	54	60	20	136	G1/2	44.7	13	8

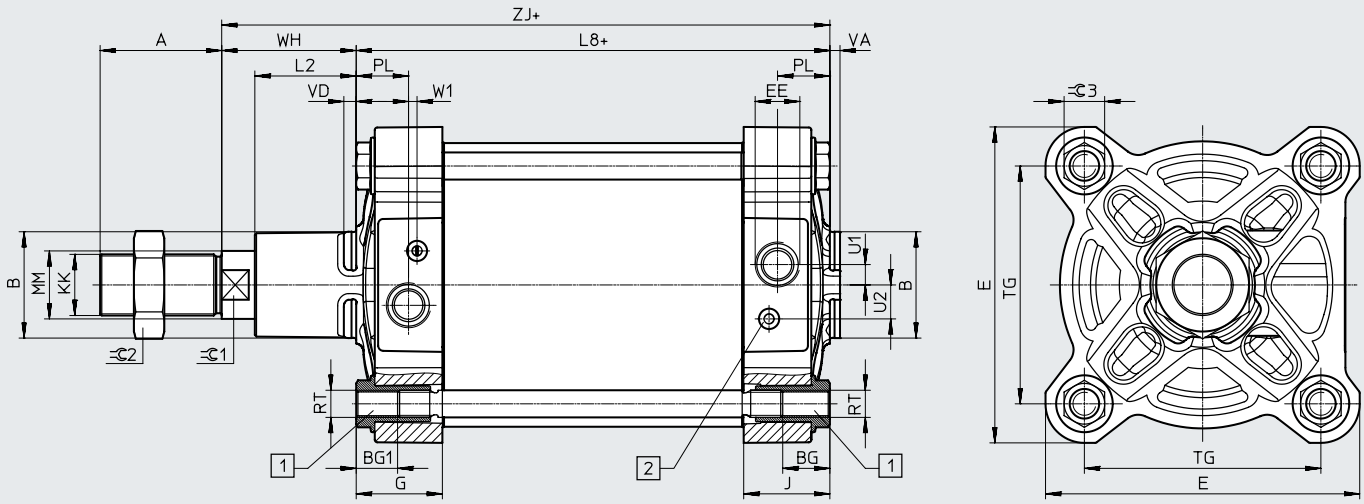
ø [mm]	KK	L2	L3 max.	L7	L8 ±0.4	MM ø	PL ±0.1	RT
80	M20x1.5	$34.2_{-0.2}$	–	11	128	25	30	M10
100	M20x1.5	$38_{-0.2}$	–	7.5	138	25	31.5	M10
125	M27x2	$45_{-0.3}$	–	10	160	32	22.5	M12

ø [mm]	TG ±0.3	VA	VD +0.5	WH +2.2	ZJ +1.8	=C1	=C2	=C3
80	72	$4_{-0.2}$	15.7	45.4	173.6	22	30	6
100	89	$4_{-0.2}$	19.2	49.3	187.5	22	30	6
125	110	$6_{-0.3}$	20.5	64.1	225	27	41	8

Data sheet

Dimensions Download CAD data ➔ www.festo.com

Standards-based cylinder DSBG-160 ... 200



\+ = plus stroke length

[1] Special outer hex nut with female thread for mounting components

[2] Adjusting screw for adjustable end-position cushioning (PPV)

ø	A	B ø	BG	BG1	E	EE	G	J
[mm]	−0.5	d11	min.	±0.5	±0.9			
160	72	65	24	25	186	G3/4	50.7	50.7
200	72	75	24	25	230	G3/4	46.9	46.7

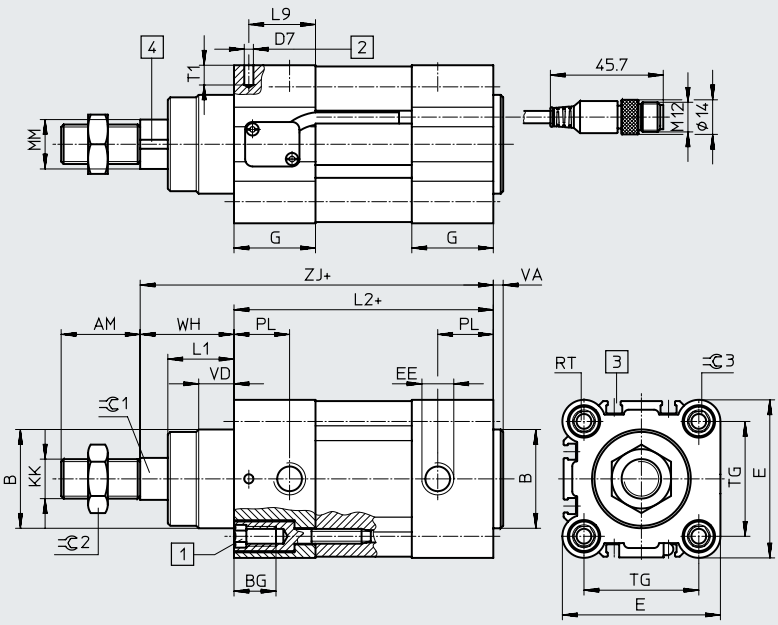
ø	KK DSBG-...		L2	L8	MM	PL	RT	TG	U1
[mm]		-M...						±1.1	
160	M36x2	M36	60	180±1	40	31	M16	140	12
200	M36x2	M36	70	180±1.2	40	30	M16	175	12

ø	U2	VA	VD	W1	WH	ZJ	=C1	=C2	=C3
[mm]		−1				±1			
160	20	6	7	5	80±1.3	260	36	55	24_{h13}
200	20	6	6.5	5	95±1.4	275	36	55	24_{h13}

Data sheet

Dimensions Download CAD data ➔ www.festo.com

Displacement encoder with one measuring head DNCI-32-...



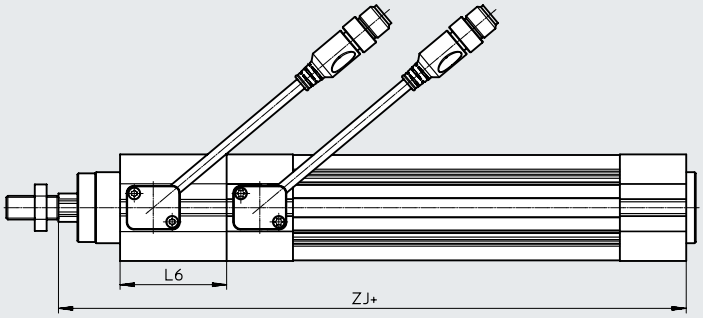
[1] Special outer hex nut with female thread for mounting components
[2] Drilled hole for securing the earthing for self-tapping M4 screw to DIN 7500
[3] Sensor slot for proximity switch SME/SMT-8
[4] Magnetic measuring band

\+ = plus stroke length
++ = plus 2x stroke length

Type	AM	B ø d11	BG	D7 ø	E	EE	G	KK	L1	L2	L9
DNCI-32-...	22	30	16	3.7	45	G1/8	28	M10x1.25	18	94	22.5

Type	MM ø f8	PL	RT	T1	TG	VA	VD	WH	ZJ	=C1	=C2	=C3
DNCI-32-...	12	15.6	M6	8	32.5	4	10	26	120	10	16	6

Displacement encoder with two measuring heads DNCI-32-...

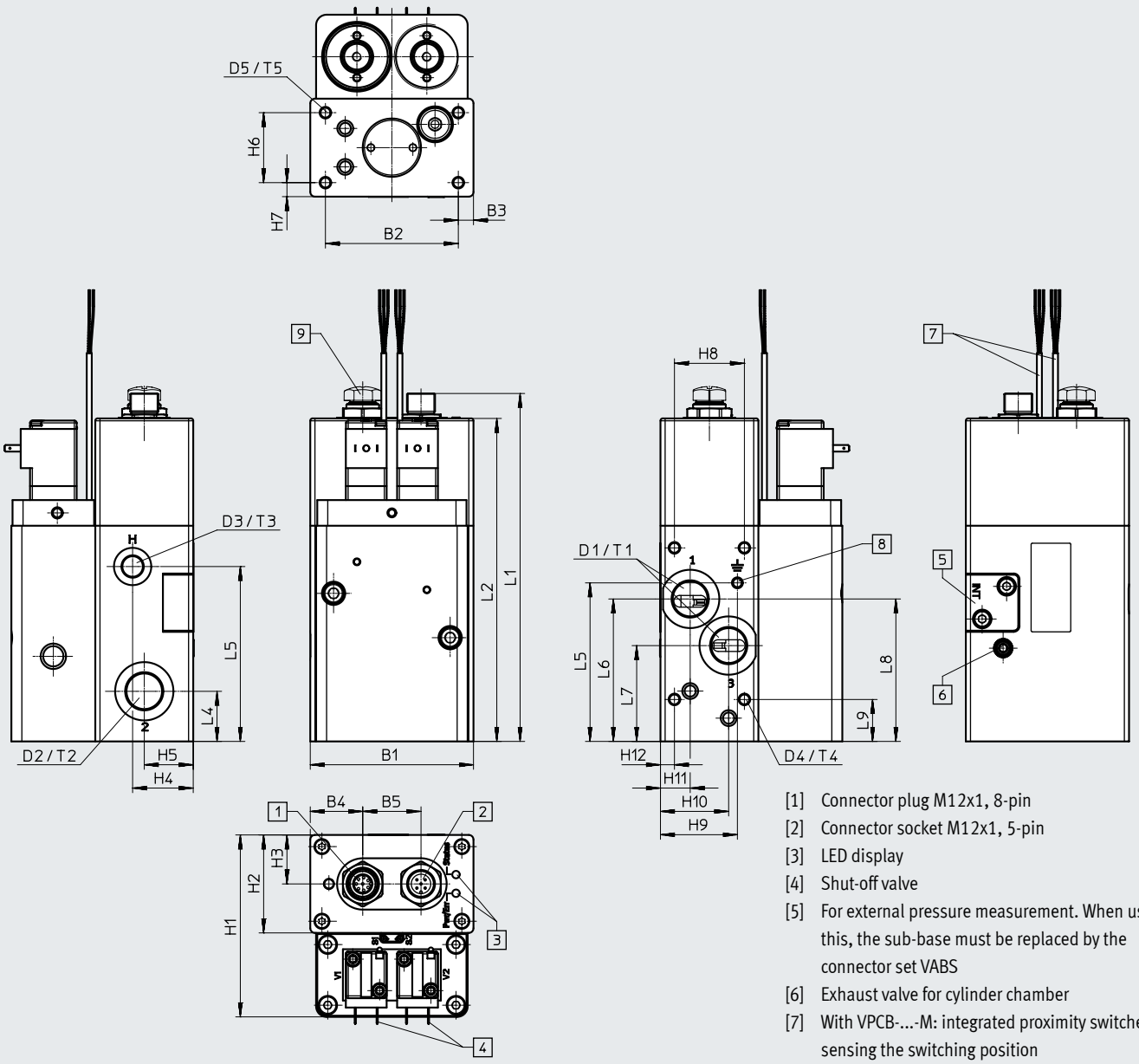


Type	L6	ZJ+
DNCI-32-...	45	165

Data sheet

Dimensions Download CAD data ➔ www.festo.com

Valve unit VPCB



[1] Connector plug M12x1, 8-pin
[2] Connector socket M12x1, 5-pin
[3] LED display
[4] Shut-off valve
[5] For external pressure measurement. When using this, the sub-base must be replaced by the connector set VABS
[6] Exhaust valve for cylinder chamber
[7] With VPCB-...-M: integrated proximity switches for sensing the switching position
[8] Drilled hole for earthing

Type	B1	B2	B3	B4	B5	D1	D2	D3	D4	D5	H1	H2
VPCB-...	70	57	7.5	22.5	25	G3/8	G3/8	G1/8	M5	M5	78	42

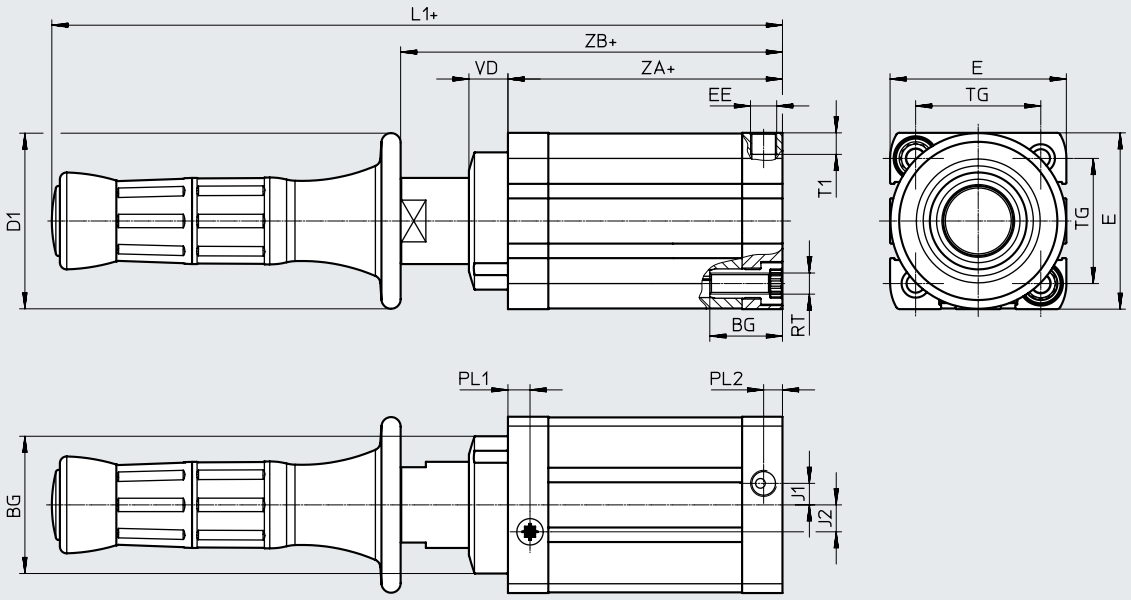
Type	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12	L1	L2
VPCB-...	21	26	21	30	6	30	33	29.3	12.8	6	149.2	138.5

Type	L3	L4	L5	L6	L7	L8	L9	T1	T2	T3	T4	T5
VPCB-...	75	21.5	68	61.1	41.1	65	18	10	10	8	10	10

Data sheet

Dimensions Download CAD data ➔ www.festo.com

Control element VAOH



Type	B ø	BG	D1 ø	E	EE	J1	J2	L1
VAOH-...	51	27	65	65.5	G1/8	8	10	271.5

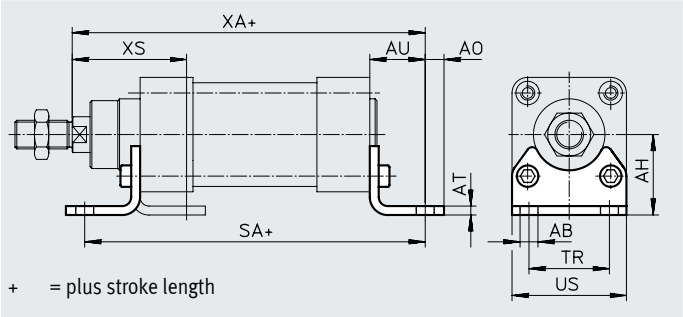
Type	PL1	PL2	RT	T1	TG	VD	ZA	ZB[1)]
VAOH-...	8.2	7	M8	8	46.5	14.5	102	142

1) +/– 10 mm stroke

Accessories

Foot mounting HNC

Material:
HNC: galvanised steel
Free of copper and PTFE

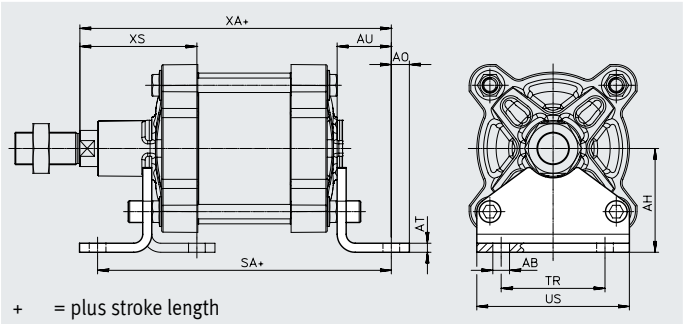


Dimensions and ordering data

For Ø [mm]	AB Ø	AH	AO	AT	AU	SA	TR	US	XA	XS	Weight [g]	Part no.	Type
32	7	32	6.5	4	24	142	32	45	144	45	144	**174369**	**HNC-32**
80	12	63	15	6	41	210	63	93	215	81	829	**174373**	**HNC-80**
100	14.5	71	17.5	6	41	220	75	110	230	86	1009	**174374**	**HNC-100**
125	16.5	90	22	8	45	250	90	131	270	102	1902	**174375**	**HNC-125**

Foot mounting HNG

Material:
Galvanised steel
Free of copper and PTFE



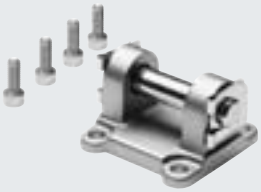
Dimensions and ordering data

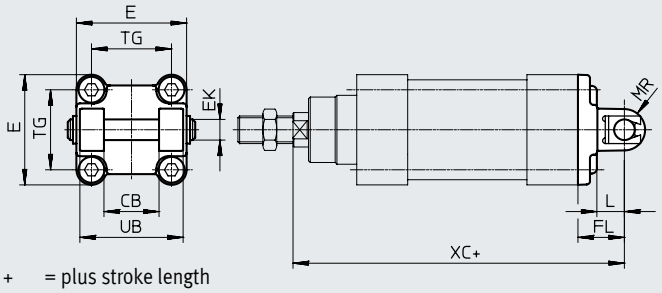
For Ø [mm]	AB Ø	AH	AO	AT	AU	SA	TR	US	XA	XS	Weight [g]	Part no.	Type
160	18.5	115	20	10	60	300	115	169	320	130	3931	**34476**	**HNG-160**
200	24	135	30	12	70	320	135	214	345	153	6896	**34477**	**HNG-200**

Accessories

Swivel flange SNCB

Material:
Die-cast aluminium
Free of copper and PTFE
RoHS-compliant





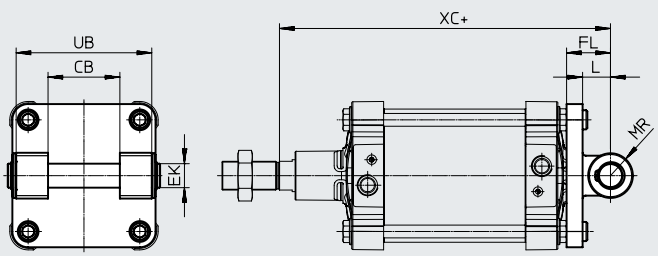
\+ = plus stroke length

Dimensions and ordering data

For ø	CB	E	EK ø	FL	L	MR	TG	UB	XC	Weight	Part no.	Type
[mm]	H14	H9/e8	e8	±0.2		–0.5		h14		[g]		
80	50	$93_{-0.8}$	16	36	22	16	72	90	210	636	**174394**	**SNCB-80**
100	60	$110^{+0.3}_{-0.8}$	20	41	27	20	89	110	230	1035	**174395**	**SNCB-100**
125	70	$131_{-0.8}$	25	50	30	25	110	130	275	1860	**174396**	**SNCB-125**

Swivel flange SNGB

Material:
ø160: die-cast aluminium
ø200: galvanised steel
Free of copper and PTFE
RoHS-compliant



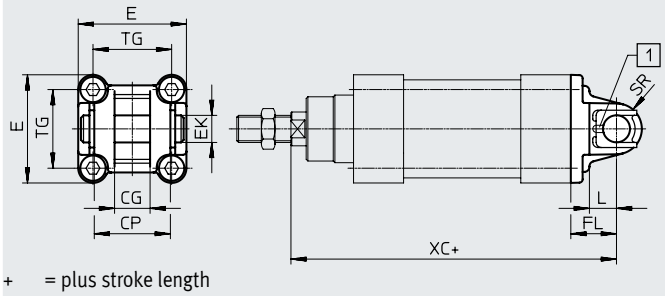
\+ = plus stroke length

Dimensions and ordering data

For ø	CB ø	EK ø	FL	L	MR	UB	XC	Weight	Part no.	Type
[mm]	H14	E10	±0.2			h14		[g]		
160	90	30	55	37	30	170	315	3445	**34547**	**SNGB-160**
200	90	30	60	40	25	170	335	10020	**562455**	**SNGB-200-B**

Swivel flange SNC

Material:
Die-cast aluminium
Free of copper and PTFE
RoHS-compliant



\+ = plus stroke length

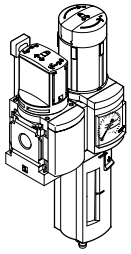
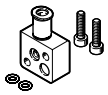
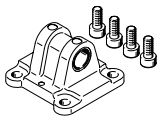
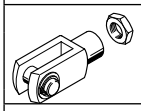
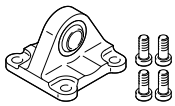
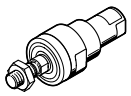
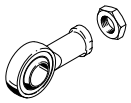
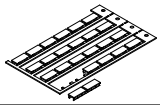
[1] The pivot pin is secured against rotation with a spring pin.

Dimensions and ordering data

For ø	CG	CP	E	EK ø	FL	L	SR	TG	XC	Weight	Part no.	Type
[mm]	H14	h14		H9	±0.2					[g]		
32	14	34	$45^{+0.2}_{-0.5}$	10	22	13	10	32.5	142	93	**174383**	**SNC-32**

Accessories

Ordering data

	Description	Part no.	Type
Service unit combination			
	Comprising: • Manual on/off valve • Filter regulator • Wall mounting plate • Pressure gauge • Lockable regulator head • Plastic bowl with plastic bowl guard • Manual condensate drain • Flow direction from left to right Max. output pressure: 12 bar Grade of filtration: 5 µm	**542280**	**MSB6-1/2:C3J3-WP**
Connector set VABS			
	For external pressure measurement. When using this, the sub-base at the valve unit must be replaced (see operating instructions)	**8070953**	**VABS-P15-S-B6**
Swivel flange for standards-based cylinder DSBG			
	For piston diameter 80	**174408**	**SNCL-80**
	For piston diameter 100	**174409**	**SNCL-100**
	For piston diameter 125	**174410**	**SNCL-125**
	For piston diameter 160	**151534**	**SNGL-160**
	For piston diameter 200	**151535**	**SNGL-200**
Rod clevis for standards-based cylinder DSBG			
	For piston diameter 80, 100	**6147**	**SG-M20x1.5**
	For piston diameter 125	**14987**	**SG-M27x2-B**
	For piston diameter 160, 200	**9581**	**SG-M36x2**
Swivel flange for displacement encoder DNCI-32			
	For piston diameter 32	**174397**	**SNCS-32**
Self-aligning rod coupler for displacement encoder DNCI-32			
	For piston diameter 32	**2305778**	**CRFK-M10x1.25**
Rod eye for displacement encoder DNCI-32			
	For piston diameter 32	**9261**	**SGS-M10x1.25**
Inscription labels for sensor interface CASB			
	–	**18576**	**IBS-6x10**