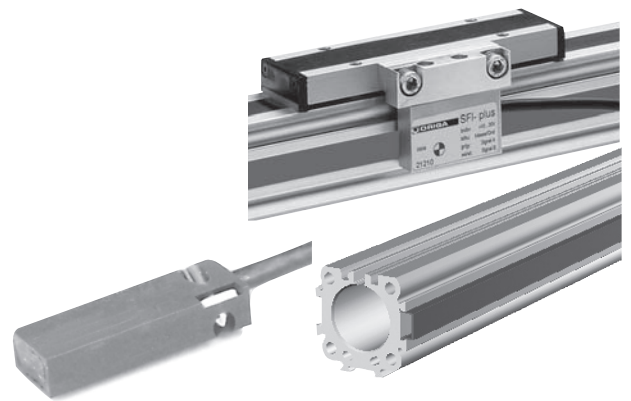


Accessories for Electric Linear Drives Series OSP-E

Magnetic Switches SFI-plus Displacement Measuring System



Contents

Description	Data Sheet	Page
Magnetic Switches Types RS, ES	1.44.030E-2, -3, -4	153-155
SFI-plus Displacement Measuring System	1.44.035E-2, -3, -4	157-159
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Magnetic Switches



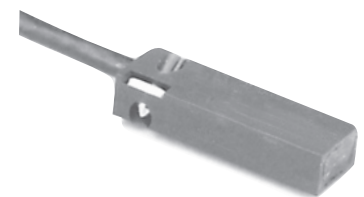
Type RS-
Type ES-

For electrical sensing of the carrier position, e.g. at the end positions, magnetic switches may be fitted. The magnetic switches can as well be used as cut-out switches for a lot of intermediate positions.

Position sensing is contactless and is based on magnets fitted as standard to the carrier. A yellow LED indicates operating status.

Piston speed and switching distance affect signal duration and should be considered in conjunction with the minimum reaction time of ancillary control equipment. In accordance to this, the contact travel must be included in the calculation.

$$\text{Min. reaction time} = \frac{\text{Switching distance}}{\text{Piston speed}}$$



Characteristics				
Characteristics		Symbol	Unit	Description
Electrical Characteristics		Type RS		Type ES
Operating voltage	U_B	V	10-240 AC/DC (NO) 10-150 AC/DC (NC) 10-70 AC/DC (NO/NC)**	10-30 DC
Connection			Two wire	Three wire
Switching function			Normally open (NO) Normally closed (NC)	NPN (NO) PNP (NC)
Max. permanent switching current	I_{Dmax}	mA	200	200
Max. switching capacity		VA (W)	10 VA	—
Residual voltage at I_{Lmax}		V	< 3	< 3
Max. current consumption		mA	—	< 20
Status indicator			LED, yellow	
Typical switching time		ms	On: < 2	On: < 2
Switch-off delay		ms	—	approx. 25
Pole reversal			LED without function	—
Pole reversal protection			—	built in
Short circuit protection			—	built in
Switchable capacity		μF	0.1 at 100 Ω , 24 VDC	
Switching distance		mm	approx. 15	approx. 15
Hysteresis for OSP		mm	approx. 8	approx. 3
Mechanical Characteristics				
Housing			MacroLon, grey	
Insulation class			F to VDE 0580	
Connection*) Type RS-K			Cable, 5 m long	3-pole Connector M8, Cable length ca. 100mm**
Type RS-S			3-pole Connector M8, Cable length ca. 100mm**	
Cable cross section (highly flexible)		mm^2	2 x 0.14	3 x 0.14
Cable (highly flexible *)			PVC	PUR, black
Wire colours			brown AC/DC+ blue or white signal output	Pin 1 = +, brown Pin 3 = 0V, blue Pin 4 = Signal black or white
Minimum permissible bending radius		mm	≥ 20	
of cable	fixed	mm	≥ 70	
	moving	mm	≥ 70	
Switching point accuracy		mm	± 0.2	
Temperature range *) ¹⁾	ϑ_{min} ϑ_{max}	$^{\circ}\text{C}$ $^{\circ}\text{C}$	-25 other temperature ranges +80 on request	
Service life, switching cycles			3 x 10 ⁶ up to 6 x 10 ⁶	theoretically unlimited
Electrical protection		IP	67 according to DIN EN 60529	
Shock resistance			m/s ² (contact switches)	100 500
Weight (mass)		kg	0.12	

*) other versions on request

***)RS with connector (RS-S)

¹⁾ for the magnetic switch temperature range, please take into account the surface temperature and the self-heating properties of the linear drive.

The right to introduce technical modifications is reserved

Magnetic Switches RS and ES

Electrical Service Life Protective Measures

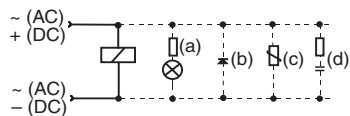
Type RS magnetic switches are sensitive to excessive currents and inductions. With high switching frequencies and inductive loads such as relays, solenoid valves or lifting magnets, service life will be greatly reduced.

With **resistive** and **capacitive** loads with high switch-on current, such as light bulbs, a protective resistor should be fitted. This also applies to long cable lengths and voltages over 100 V.

In the switching of inductive loads such as relays, solenoid valves and lifting magnets, voltage peaks (transients) are generated which must be suppressed by protective diodes, RC loops or varistors.

Connection Examples

- Load with protective circuits
- (a) Protective resistor for light bulb
 - (b) Freewheel diode on inductivity
 - (c) Varistor on inductivity
 - (d) RC element on inductivity



For the type ES, external protective circuits are not normally needed.

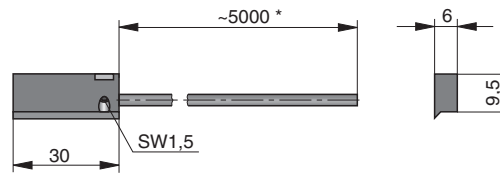
Type RS

In the type RS contact is made by a mechanical reed switch encapsulated in glass.

Type ES

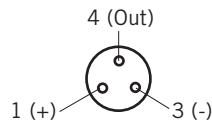
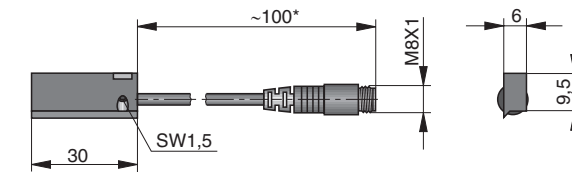
In the type ES contact is made by an electronic switch – without bounce or wear and protected from pole reversal. The output is short circuit proof and insensitive to shocks and vibrations.

Dimensions [mm] – Type RS-K



* Length with possible minus tolerance, see chart below

Dimensions [mm] – Type ES-S / RS-S**



PIN assignment
(view of pins)
according to DIN EN 50044

** Length with possible minus tolerance, see table below

**Operating voltage max. 70 V

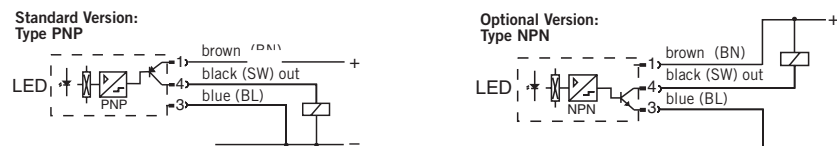
Length of connection cable with length tolerance

Sensor Order No.	Nominal cable length	max. Length tolerance
KL3087	100 mm	-20 mm
KL3047	100 mm	-20 mm
KL3054	100 mm	-20 mm
KL3060	145 mm	± 5 mm
KL3048	5000 mm	-50 mm
KL3045	5000 mm	-50 mm

Electrical Connection Type RS

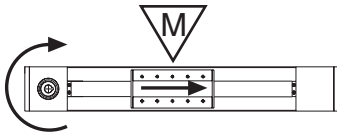


Electrical Connection Type ES

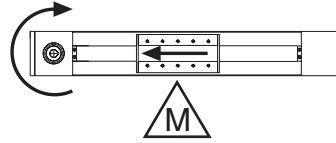


Positioning of Magnetic Sensors/Permanent Magnets — OSP-E..BHD

Standard Version

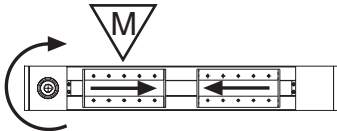


Drive Shaft Option = 0

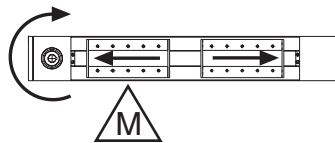


Drive Shaft Option = 1

Bi-Parting Version



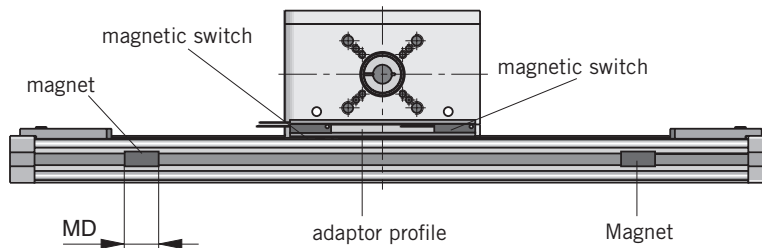
Drive Shaft Option = 2



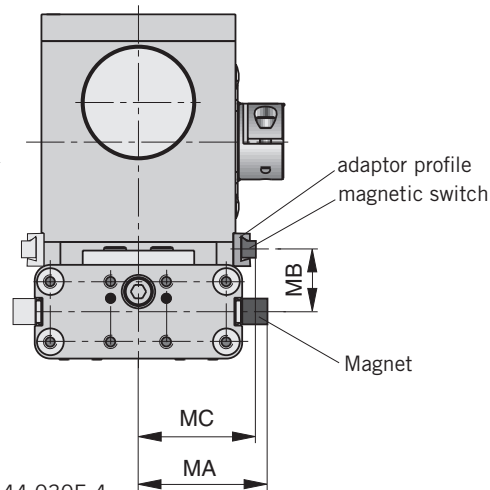
Drive Shaft Option = 3

When arranging the magnetic switches, please mind the position of the magnets integrated in the carrier as a function of the operating direction.
„M“ indicates where magnet is fitted in carrier.

Dimensions for magnetic switch set Series OSP-E..BV



The magnetic switch as well as the magnet can be fitted to either side



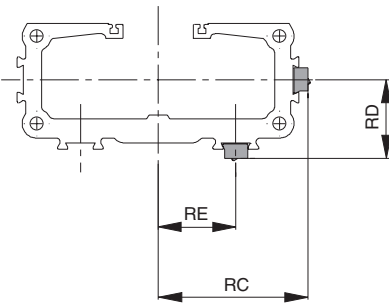
Dimensions see data sheet 1.44.030E-4

Magnetic switch and magnet are externally fitted to the OSP-E..BV.

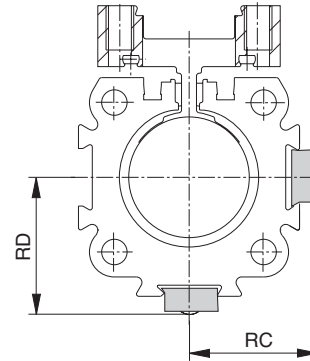
For this purpose please order the magnetic switch set (consisting of 2 magnetic switches, 1 fastening rail and 2 magnets) for contactless position sensing.

Dimensions

OSP-E..BHD



OSP-E..B, ..SB, ..ST, ..SBR, ..STR

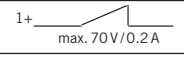
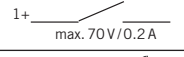
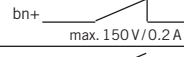
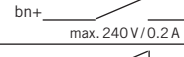
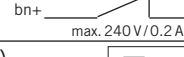



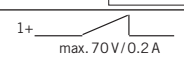


Dimension Table (mm)

Series	Dimension						
	RC	RD	RE	MA	MB	MC	MD
OSP-E20BHD	41.5	26.6	23	-	-	-	-
OSP-E25BHD	51	27	26	-	-	-	-
OSP-E32BHD	63	34	32	-	-	-	-
OSP-E50BHD	87	48	34	-	-	-	-
OSP-E20BV	-	-	-	46	23.7	42.3	35
OSP-E25BV	-	-	-	56	26	51	35
OSP-E25*	25	27	-	-	-	-	-
OSP-E32*	31	34	-	-	-	-	-
OSP-E50*	43	48	-	-	-	-	-

* = ..B, ..SB, ..ST, ..SBR, ..STR

Order Instructions

Description	Function	Series	Cable Length [mm]	Type	Order No.
Magnetic switches, Reed contact, with M8-Connector PIN 3 neutral (ES-S compatible connector)	NC 	all*	100	RS-S	KL3087
	NO 	all*	100	RS-S	KL3047
Magnetic switches, Reed contact, with cable	NC 	all*	5000	RS-K	KL3048
	NO 	all*	5000	RS-K	KL3045
	NC 	OSP-E..STR	5000	RS-K	KL3096
Magnetic switches, electronical with M8-connector	NPN (NO) 	all*	100	ES-S	KL 3060
	PNP (NC) 	all*	100	ES-S	KL 3054
	PNP (NC) 	OSP-E..STR	100	ES-S	KL 3098
Magnetic switch set **	NC 	OSP-E..BV	2 x 100	RS-S	15886
Connecting cable					
suitable for cable chain			5000		KL3186
suitable for cable chain			10000		KL3217
suitable for cable chain			15000		KL3216
standard			5000		4041
standard			10000		KL9074

* = except for OSP-E..STR

** = consisting of 2 magnetic switches KL 3087, 1 fastening rail, 2 magnets

Characteristics		
Characteristics	Unit	Description
Type		21210
Output function		
Resolution	mm	0.1
Pole length scale	mm	5
Max. speed	m/s	10
Repeating accuracy		± 1 increment
Distance sensor/scale mm		≤ 4
Tangential deviation	≤ 5°	
Possible lateral deviation	mm	≤ ± 1.5
Switching output		PNP
Electrical Characteristics		
Operating voltage U _b	V DC	18 – 30
Voltage drop	V	≤ 2
Continuous current per output	mA	≤ 20
Power consumption at U _b = 24V, switched on, no-load	mA	≤ 50
Short-circuit protection		yes
Reverse voltage protection		yes
Protection against inductive switch-off peak		yes
Power-up pulse suppression		yes
EMC		
Electrostatic discharge	kV	6, B, according to EN 61000-4-2
Electromagnetic field	V/m	10, A, according to EN61000-4-3
Fast transients signals, burst (signal connections)	kV	1, B, according to EN 61000-4-4
Fast transients signals, burst (DC-connections)	kV	2, B, according to EN 61000-4-4
EMC immunity, surge (signal-connections)	kV	1, B, according to EN 61000-4-5
EMC immunity, surge (DC-connections)	kV	0,5, B, according to EN 61000-4-5
HF cable fed	V	10, A, according to EN 61000-4-6
Magnetic field at 50 Hz	A/m	30, A, according to EN 61000-4-8
Radio frequency interference		according to EN 61000-6-4
Radiated disturbances		according to EN 55011, group 1, A
Mechanical parameters		
Housing		Aluminium
Cable length	m	5.0 – fixed, open end
Cable cross-section	mm ²	4 x 0.14
Type of cable		PUR, black
Bending radius	mm	≥ 36
Weight (mass)	kg	approx. 0.165
Ambient conditions/shock resistance		
Encapsulation class	IP	67 according to EN60529
Ambient temperature range	°C	-25 to +80
Broad band noise according to EN 60068-2-64	g	5.5 Hz to 2 kHz, 0.5 h per axis
Vibration according to EN 60068-2-6	g	12, 10 Hz to 2 kHz, 2 mm, 5 h per axis
Shock acc. EN 60068-2-27	g	100, 6 ms, 50 shocks per axis
Continuous shock according to EN 60068-2-29	g	5, 2 ms, 8000 shocks per axis

Displacement Measuring System

for automated movement

ORIGA-Sensoflex

(Incremental Displacement Measuring System)

Series SFI-plus

- **Series OSP-E..SB**
Linear Drive with ball screw
- **Series OSP-E..ST**
Linear Drive with trapezoidal screw

Special properties:

- contactless, magnetic displacement measuring system
- freely selectable displacement length up to 32 m
- resolution 0,1 mm
- displacement speed up to 10 m/s
- suited for linear and gyratory movements
- for almost all control and display units with suitable counter input

The magnetic displacement measuring system SFI-plus consists of 2 main components:

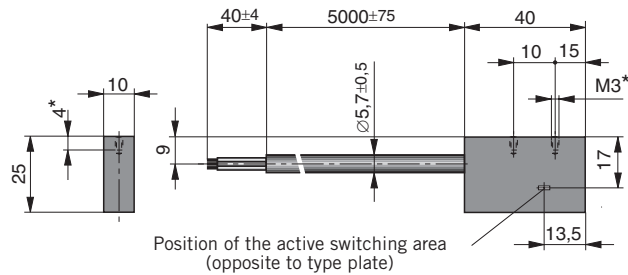
- **Measuring scale**
self-adhesive, magnetic measuring scale
- **Sensing head**
converts the magnetic poles into electric signals which are then processed by counter inputs downstream (e.g. PLC, PC, digital counters)



Sensing head

The sensing head supplies two pulsating, 90° out of phase counter signals (phase A/B) with a resolution of 0,4 mm (option 4 mm). External pulse edge control can improve the resolution to 0.1mm (option 1 mm). The counting direction automatically results from the phase shift of the counter signal.

Dimensions [mm] – Reading Head

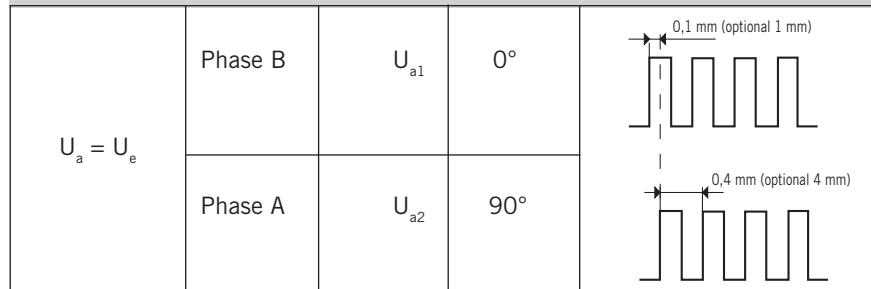


* Max. thread depth 4mm

Electric connection

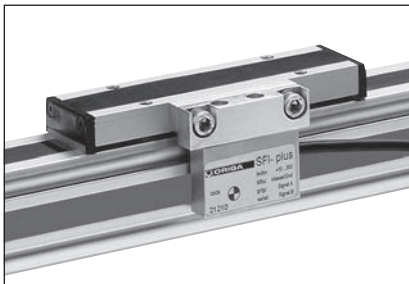
colour	Designation
bn = brown	+ DC
bl = blue	- DC
bk = black	phase A
wt = white	phase B

Signal curve – sensing head OUT



SFI-plus in connection with electric linear drives of series OSP-E..ST

The SFI-plus can be mounted directly to the electric linear drive of series OSP-E..ST by means of a special mounting kit. The position of the sensing head is generally staggered by 90° to the carrier.

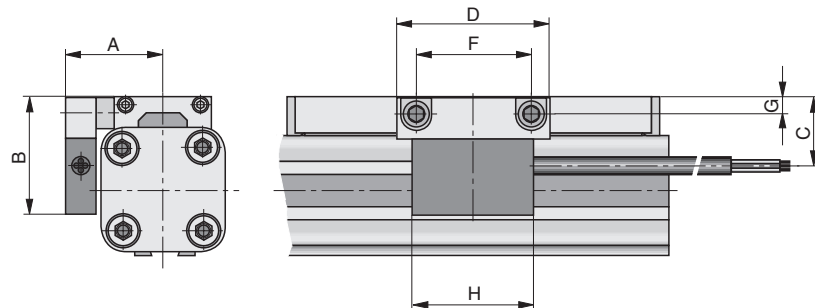


For later installation a corresponding carrier kit with threaded holes can be ordered.

SFI-plus in connection with electric linear drives of series OSP-E..SB

The displacement measuring system in connection with series OSP-E..SB can only be retrofitted, if the system is reconditioned by the manufacturer.

Dimensions – in combination with OSP-E linear drives



Dimension Table [mm]

Series	A	B	C	D	F	G	H
OSP-E25SB, ST	32	39	23	50	38	5.5	40
OSP-E32SB, ST	37.5	46	30	50	38	6.5	40
OSP-E50SB, ST	49.5	55	39	50	38	6.5	40

Order Instructions	
Description	Order No.
Sensing head with measuring scale – resolution 0.1 mm (please indicate scale length)	21240
Sensing head - resolution 0.1 mm (spare part)	21210
Measuring scale per meter for (to be replaced)	21235
Mounting kit for OSP-P25	21213
Mounting kit for für OSP-P32	21214
Mounting kit for für OSP-P50	21216

* The overall length of the measuring scale results from the dead length of the linear drive and the stroke length.
For dead lengths for linear drives of series OSP-E see table.

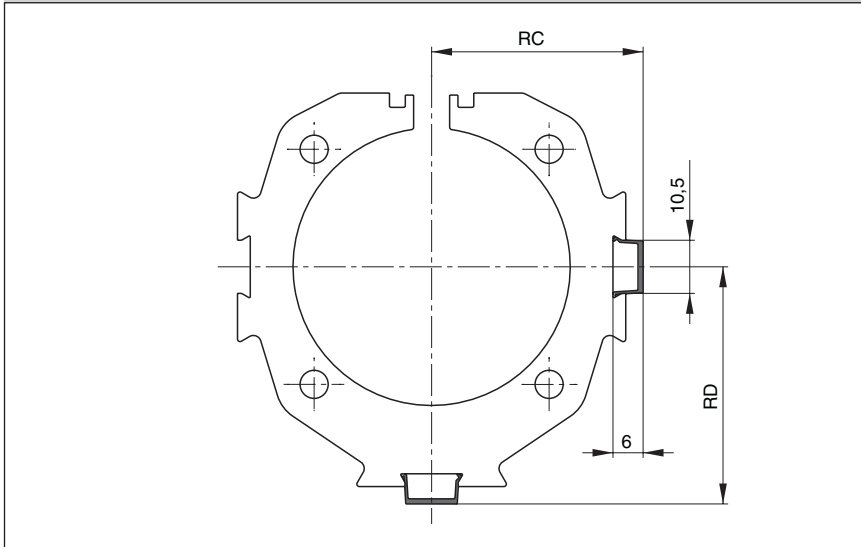
Series	Dead lengths [mm]
OSP-E25SB, ST	154
OSP-E32SB, ST	196
OSP-E50SB, ST	280

Example:

Linear Drive OSP-E, Ø25 mm,
stroke 1000 mm

Dead length + stroke = overall length of the measuring scale
154 mm + 1000 mm = 1154 mm

Series OSP-E..B, ..SB, ..ST, ..SBR, ..STR – Dimensions [mm]



Cable Cover

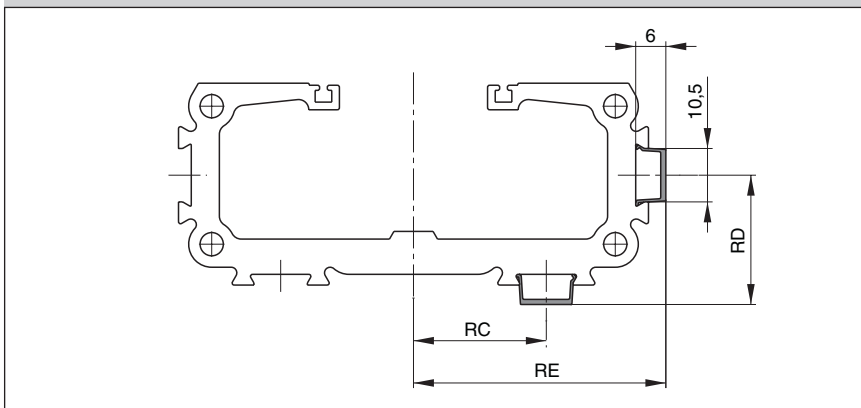
Size 20, 25, 32, 50



For clean guidance of magnetic switch cables along the cylinder body.
Contains a maximum of 3 cables with diameter 3 mm.

Material: Plastic
Colour: Red
Temperature Range: -10 bis +80°C

Series OSP-E..BHD – Dimensions [mm]



Dimension Table [mm] and Order Instructions

for Series	RC	RD	RE	Order No.
OSP-E25 *	23.5	25.5	–	13039 Minimum length: 1m Max. profile length: 2m Multiple profiles can be used.
OSP-E32 *	29.5	32	–	
OSP-E50 *	41.5	46.5	–	
OSP-E20BHD	23	25	40	
OSP-E25BHD	26	25.5	49.5	
OSP-E32BHD	32	32	61.5	
OSP-E50BHD	44	46.5	85.5	

* B, SB, ST, SBR, STR

The right to introduce technical modifications is reserved

