

LINEAR BEARING SHAFTS

These precision steel shafts are manufactured from high grade steel which is induction hardened and centreless ground to ISO tolerance h6. The deviation is less than 0.1mm per metre.

These consistently high quality shafts can be used with ball bushings and other precision engineering projects.

The exact material specifications are:

	Material	(DIN)	Hardness
Solid Shafts	Cf53-56	(1.1213)	60-65 HRC
Hollow Shafts	100 Cr 6	(1.3505)	60-64 HRC
	C 60	(1.0601)	60-65 HRC
Stainless Steel Shafts	X40 Cr13	(1.4034)	51-55 HRC
	X90CrMoV18	(1.4112)	53-58 HRC



Hard chromed shafts on request.

Solid Shafts						
Diameter	Weight	Tolerance	Roundness	Conicity	Depth of Hardness	Max length
mm ()	kg/m	h 6 µm	µm	µm	mm	m
3	0,06	0-6				0,4
4	0,10	0-8			0,4	
5	0,15	0-8				
6	0,22	0-8			0,8-1,1	
6,35 (1/4)	0,25	-13-25	4	6		
8	0,40	0-9				
9,525 (3/8)	0,59	-13-25				
10	0,62	0-9				3-4
12	0,89	0-11				
12,7 (1/2)	0,91	-13-25				
14	1,21	0-11			1,2-1,5	
15	1,39	0-11	5	8		
15,875 (5/8)	1,54	-13-25				
16	1,58	0-11				
18	2,00	0-11				
19,05 (3/4)	2,40	-13-25				
20	2,47	0-13			1,8-2,2	
22	2,98	0-13				
25	3,85	0-13	6	10		
25,4 (1)	3,95	-13-25				
28	4,84	0-13				
30	5,55	0-13				
31,75 (1 1/4)	6,20	-13-25				
32	6,31	0-16				
35	7,55	0-16				
36	7,98	0-16				
38,1 (1 1/2)	8,50	-15-28	8	11	2,2-3,2	6-7
40	9,87	0-16				
45	12,45	0-16				
50	15,40	0-16				
50,8 (2)	16,50	-15-33				
60	22,20	0-19				
63,5 (2 1/2)	24,50	-18-38	9	13	2,5-3,5	
70	30,20	0-19				
76,2 (3)	35,50	-20-43				
80	39,50	0-19				
100	61,65	0-22			3,5-4,5	
101,6 (4)	63,65	-30-61	11	15		
Hollow Shafts						
d	d _i					
12	4	0,80		10		
16	7	1,28			1,2-1,5	
20	12-14	1,26	5			
25	14,5-15,5	2,37			1,8-2,2	
30	16,5-19,0	3,55				4-6
40	26-28	5,38			2,2-3,2	
50	28-35	10,21	6	12		
60	36	15,07				
80	50-57	20,17	8	13	2,5-3,5	

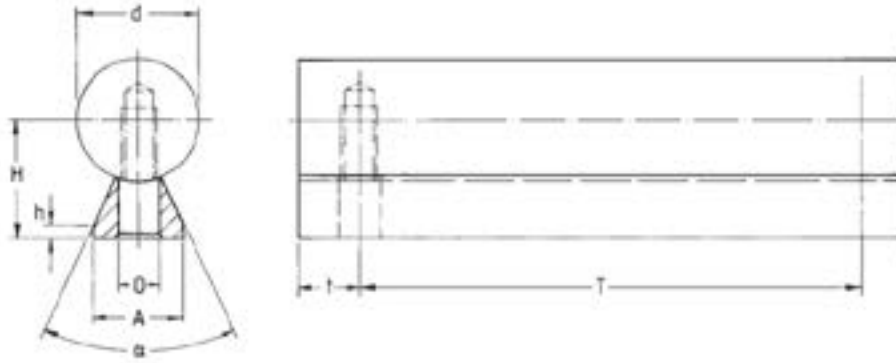
PROFILED STEEL SHAFTS

These profiled supported steel shafts are the most compact available.

They are available in Aluminium, **WN00**-... up to a length of 3650 mm. The height tolerance is $\pm 20\mu\text{m}$.

They are also available in C45 Steel, **WP11**-...
The maximum length of the shaft is 6000 mm, with 1800 mm sections of steel support bolted underneath.

Both rails are supplied bolted to precision steel shaft with radial holes at spacing 'T' (see table below).



Aluminium	Steel	d	A	H	h	α (deg)	T	t_{\min}	O	Bolt Size	Weight kg/m
WN00-312	-	12	11	14.5	3	50	75	20	4.5	M4	1.1 / -
WN00-316	WP11-316	16	14	18	3	50	75	20	5.5	M5	1.9 / 2.5
WN00-320	WP11-320	20	17	22	3	50	75	20	6.6	M6	2.9 / 3.8
WN00-325	WP11-325	25	21	26	3	50	75	20	9	M8	4.4 / 5.6
WN00-330	WP11-330	30	23	30	3	50	100	20	11	M10	6.2 / 7.6
WN00-340	WP11-340	40	30	39	4	50	100	20	13.5	M12	11 / 13.4
WN00-350	WP11-350	50	35	46	5	50	100	20	15.5	M14	17 / 20.2

ALUMINIUM SHAFT SUPPORT RAILS

These aluminium shaft support rails are for supporting shafts. They can be supplied individually or with shafts (Cf53 hardened & ground or X90CrMov18 stainless steel). Use with open type linear sets (AE37 & TE33) and open type ball bushings.

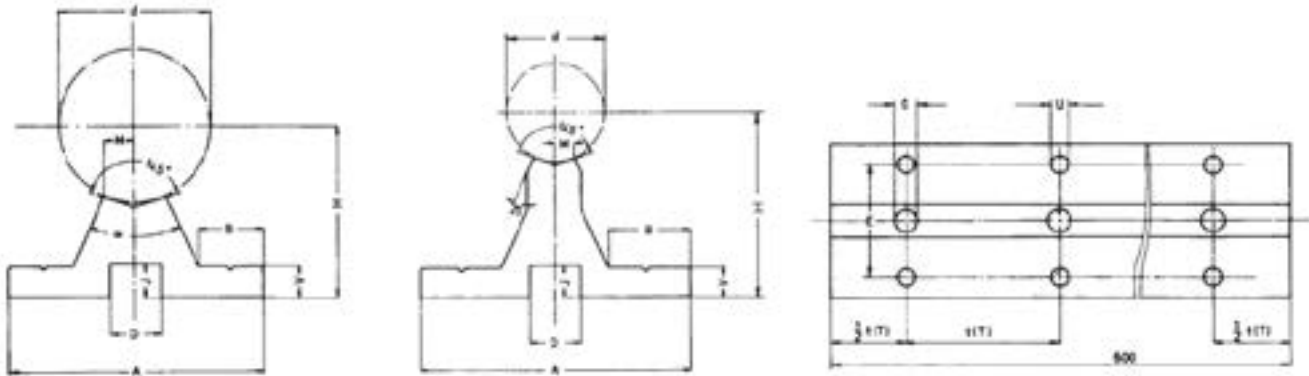
For continuous support of a shaft these 600mm support rails can be mounted end to end. Alternatively they can be cut into "sleepers" and spaced apart.

Two types of rail are available:
The older type WS50-... with a higher height to shaft centre and the new lower type WU50-...

They are available ex stock unmachined or machined with bolt holes and fixing holes at two standard centres:

t (WU50-1..)

T (WU50-2..)



PART	PART	d	H	A	M	B	α	V	D	J	O	Bolt	U	E	t(1) hole spacing	T(2) hole spacing
WU50-012		12	22	40	2.9	12	50	5	8	4.5	4.5	M4X20	4.5	29	75	120
WU50-016		16	26	45	3.5	13	50	5	9.5	5.5	5.5	M5X20	5.5	33	100	150
	WS50-016	16	30	48	3.5	14		5	9.5	5.5	5.5	M5X25	5.5	33	100	150
WU50-020		20	32	52	4.4	14	50	6	11	6.5	6.6	M6X25	6.6	37	100	150
	WS50-020	20	38	56	4	15		6	11	6.5	6.6	M6X30	6.6	37	100	150
WU50-025		25	36	57	5.4	15	50	6	14	8.5	9	M8X30	6.6	42	120	200
	WS50-025	25	42	60	5	15		6	14	8.5	9	M8X35	6.6	42	120	200
WU50-030		30	42	69	5.5	19	50	7	17	8.5	11	M10X35	9	51	150	200
	WS50-030	30	53	74	6	19		8	17	10.5	11	M10X40	9	51	150	200
WU50-040		40	50	73	7.5	17	50	8	17	10.5	11	M10X40	9	55	200	300
	WS50-040	40	60	78	8	19		8	19	12.5	11	M10X45	9	55	200	300
WU50-050		50	60	84	9.5	21	46	9	19	12.5	13	M12X45	11	63	200	300
	WS50-050	50	75	90	10	24		10	19	12.5	13	M12X55	11	63	200	300
WU50-060		60	68	94	12.5	23	46	10	22	14.5	15	M14X50	11	72	300	-
	WS50-060	60	80	100	12	25		12	22	14.5	15	M14X55	11	72	300	-
WU50-080		80	86	116	17	27	46	12	25	16.5	17	M16X60	13	92	300	-

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ALUMINIUM SHAFT SUPPORTS - SIDE OPENING

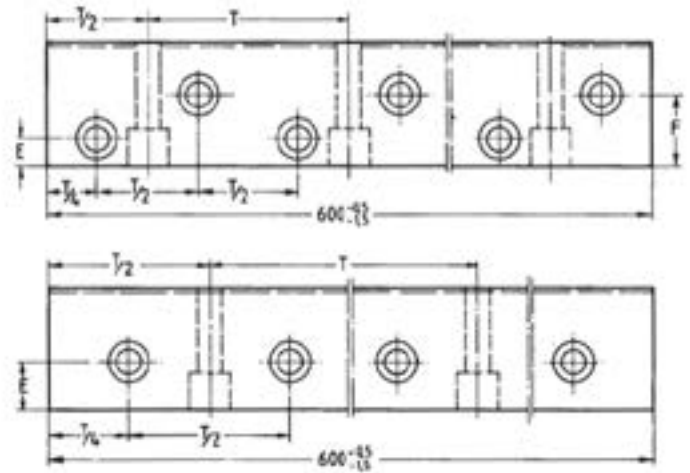
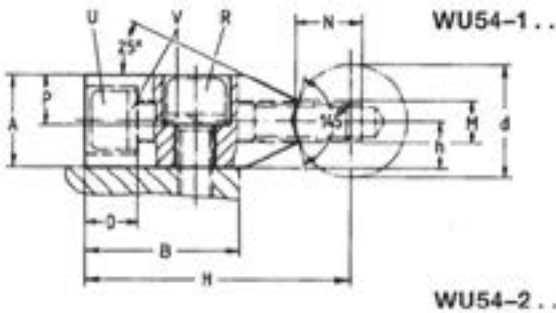
These support rails are very compact and offer high rigidity. They can be mounted either vertically or horizontally.

When mounted horizontally they are especially suitable for the open sided linear sets LE71-... shown on page 33.

There are two types available:

Two rows of fixing holes: WU54-1

One row of fixing holes: WU54-2



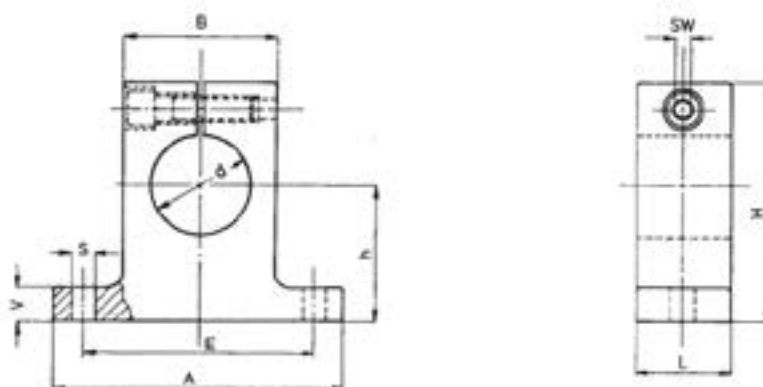
PART		d	h	H	A	M	E	F	T	O	P	B	N	R	U	V
	WU54-220	20	7.5	52	15	8.3	15		100	8.5	8.5	30	11	M6X16	M6X45	6
WU54-120		20	7.5	52	15	8.3	8	22	75	8.5	8.5	30	11	M6X16	M6X45	6
	WU54-225	25	10	62	20	10.8	18		120	14.0	11	36	15	M8X20	M8X50	8
WU54-125		25	10	62	20	10.8	10	26	75	14.0	11	36	15	M8X20	M8X50	8
	WU54-230	30	12.5	72	25	11	21		150	14.5	13.5	42	17	M10X25	M10X60	10
WU54-130		30	12.5	72	25	11	12	30	100	14.5	13.5	42	17	M10X25	M10X60	10
	WU54-240	40	15	88	30	15	25		200	17.5	16	50	21	M12X30	M10X70	12 & 10
WU54-140		40	15	88	30	15	12	38	100	17.0	16	50	21	M12X30	M12X70	12
	WU54-250	50	17.5	105	35	19	30		200	21.5	19	60	25	M14X35	M12X80	14 & 12
WU54-150		50	17.5	105	35	19	15	45	100	21.0	19	60	25	M14X35	M14X80	14

CAST IRON / ALUMINIUM SHAFT END SUPPORTS

These shaft end support blocks are for clamping and fixing down shaft ends. They have a guaranteed height tolerance of $\pm 15\mu\text{m}$ and are an economic way to mount shafts.

The WB55's are made from spheroidal graphite cast iron, offering high rigidity and high dimensional precision.

The WB56's are made from aluminium with the same tolerances as WB55. However they are less stiff due to the lower modulus of elasticity.



CAST IRON	ALUMINIUM	d	h	H	A	B	L	E	S	V
WB55-008	-	8	15	27	32	16	10	25	4.5	5
WB55-012	WB56-012	12	20	35	42	20	12	32	5.5 / 4.3	5.5
WB55-016	WB56-016	16	25	42	50	26	16	40	5.5 / 4.3	6.5
WB55-020	WB56-020	20	30	50	60	32	20	45	5.5 / 4.3	8
WB55-025	WB56-025	25	35	58	74	38	25	60	6.6 / 5.3	9
WB55-030	WB56-030	30	40	68	84	45	28	68	9.0 / 6.4	10
WB55-040	WB56-040	40	50	86	108	56	32	86	11 / 8.4	12
WB55-050	WB56-050	50	60	100	130	80	40	108	11 / 9.0	14
WB55-060	-	60	75	124	160	100	48	132	13.5	15
WB55-080	-	80	100	160	200	130	60	170	17.5	22

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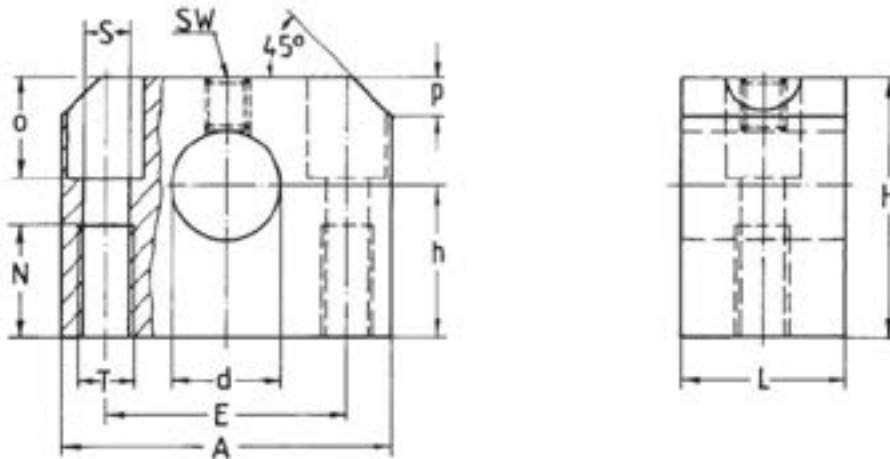
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ALUMINIUM SHAFT END SUPPORTS

The WB57 shaft end support blocks are made in aluminium and complement the TE85- and AE35- linear set ranges.

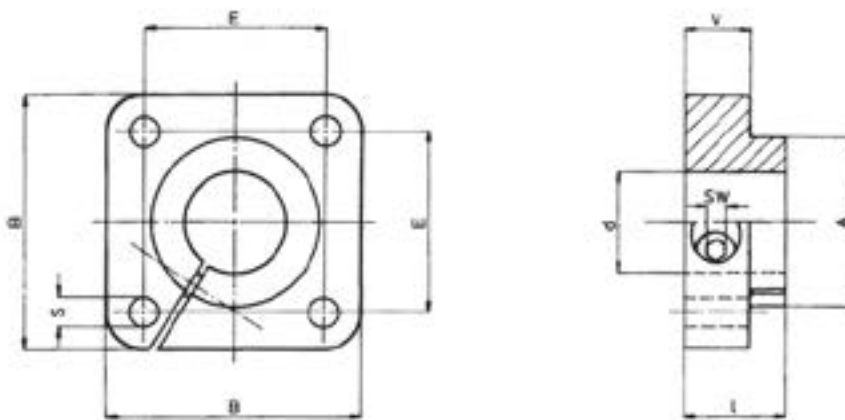
The WB58 shaft end support blocks are made in aluminium and complement the AG27- and AG28- ranges.



PART	d	h	H	A	L	E	S	T	N	o	p	SW
WB57-012	12	20	35	42	20	30	5.3	M6	13	16	5	3
WB58-012	12	19	33	40	18	27	5.3	M6	13	15	5	3
WB57-016	16	25	42	52	24	38	6.6	M8	18	17	6	3
WB58-016	16	22	38	45	20	32	5.3	M6	13	17	6	3
WB57-020	20	30	50	60	30	42	8.4	M10	22	21	7	4
WB58-020	20	25	45	53	24	39	6.6	M8	18	21	7	4
WB57-025	25	35	60	76	38	56	10.5	M12	26	25	9	5
WB58-025	25	31	54	62	28	44	8.4	M10	22	24	9	5
WB57-030	30	40	70	86	40	64	10.5	M12	26	28	10	5
WB58-030	30	34	60	67	30	49	8.4	M10	22	27	10	5
WB57-040	40	50	90	108	48	82	13.5	M16	34	34	12	6
WB58-040	40	42	76	87	40	66	10.5	M12	26	35	12	6
WB57-050	50	60	105	130	58	100	17.5	M20	43	40	13	6
WB58-050	50	50	92	103	50	80	13.5	M16	34	43	13	6

FLANGED SHAFT END SUPPORTS

These flanged shaft end support blocks are made from spheroidal graphite cast iron. They are designed to secure linear bearing shafts between bulkheads or other vertical surfaces. They are shaped to enable easy alignment against the mounting surface.



PART	d	B	I	A	E	S	V	SW
FH56-012	12	42	20	23	30	5.5	12	4
FH56-016	16	50	20	27	35	5.5	12	4
FH56-020	20	54	23	33	38	6.6	14	5
FH56-025	25	60	25	42	42	6.6	16	5
FH56-030	30	76	30	49	54	9	19	6
FH56-040	40	96	40	65	68	11	26	8
FH56-050	50	106	50	75	75	11	36	8

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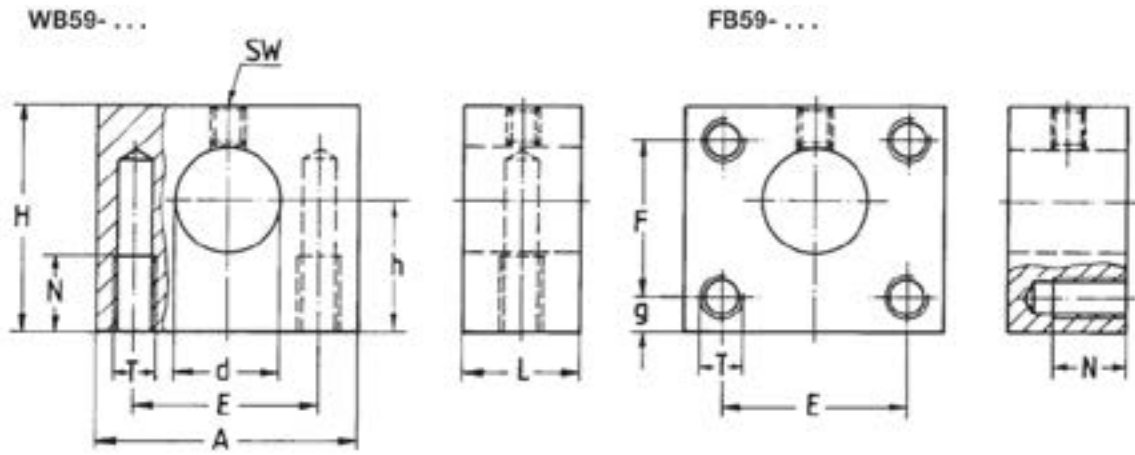
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STAINLESS STEEL SHAFT END SUPPORTS

These shaft supports are made from highly corrosion & acid resistant chrome-nickel steel. The WB59 supports are mounted from below, whilst the FB59 blocks are bolted from the side.

These supports are particularly suitable for the chemical, pharmaceutical & food industries.

Should you want to attach the supports from above, the bolt holes in WB59 can be drilled all the way through.



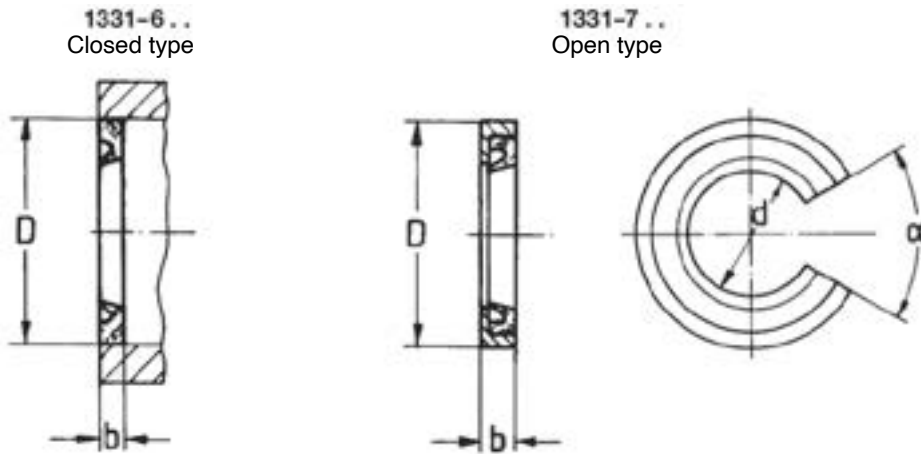
Part Number	d	h	H	A	L	E	F	g	N	T	SW
WB59-512	12	19	33	40	18	27			12	M6	3
FB59-512	12	19	33	40	18	27	22	6	12	M6	3
WB59-516	16	22	38	45	20	32			13	M6	3
FB59-516	16	22	38	45	20	32	26	6	13	M6	3
WB59-520	20	26	46	53	24	39			15	M8	4
FB59-520	20	26	46	53	24	39	30	8	15	M8	4
WB59-525	25	31	54	62	28	44			18	M10	4
FB59-525	25	31	54	62	28	44	38	8	18	M10	4
WB59-530	30	36	62	67	30	49			22	M10	4
FB59-530	30	36	62	67	30	49	42	10	22	M10	4
WB59-540	40	46	80	87	40	66			22	M12	5
FB59-540	40	46	80	87	40	66	60	10	22	M12	5

SEALS

These seal rings are designed to ensure they locate perfectly in the housing bore without any other retaining facility (interference fit).

A number of factors have to be considered when selecting supplementary seals, for instance, the arrangement, design or available space. Furthermore, seals increase friction. This V-section seal consists of two wipers and performs two purposes. The inner wiper retains the lubricant in the bushing and the outer wiper protects the ball bushing against the ingress of particles.

Bellows type covers should be used if it is envisaged that quantities of dirt particles will be evident in the operating environment.



PART		d	D	b	α
CLOSED	OPEN				
1331-612		12	22	3	
	1331-712	12	22	3	66
1331-616		16	26	3	
	1331-716	16	26	3	68
1331-620		20	32	4	
	1331-720	20	32	4	55
1331-625		25	40	4	
	1331-725	25	40	4	57
1331-630		30	47	5	
	1331-730	30	47	5	57
1331-640		40	62	5	
	1331-740	40	62	5	56
1331-650		50	75	6	
	1331-750	50	75	6	54

COMPLETE SLIDING SYSTEM (CLOSED)

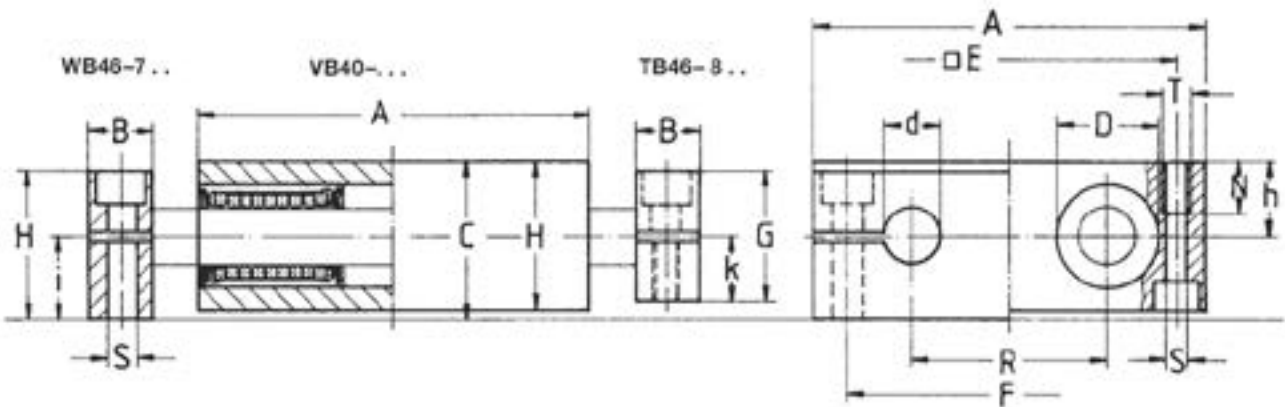
The major benefit of this quad housing is that it is much easier to set up than using multiple single housings or a torque resistant ball bushing. Each quad housing contains four ball bushings. The shafts are machined to order and can be supplied to any length (limited only by permissible deflection)

Two aluminium shaft end support blocks hold the shafts parallel and clamped (when bolted down) in position. The assembly can be arranged so that the table is fixed with the shaft ends free, or the shaft ends can be fixed so that the table is free. The ball bushings in the housing unit are sealed as standard.



For operating temperatures > 80° C (where the seals will be damaged) specify the all steel unsealed ball bushing type NB00- using part number VB40-0..

If you require corrosion resistant ball bushings these can be fitted – please specify VB40-5.. (where ..= shaft diameter).



SHAFT SUPPORTS		HOUSING	d	A	H	h	C	D	E	R	i	B	S	T	N	k	F	G	Load C (N)	Load C ₀ (N)	
Fixed End	Free End																				
		VB40-208	8	65	23	15.5	24	16	55	32			4.3	M5	11					860	1640
WB46-708	TB46-808		8	65	23					32	12.5	12	5.5	M5		11	52	22			
		VB40-212	12	85	32	16	34	22	73	42			5.3	M6	13					1630	3120
WB46-712	TB46-812		12	85	32					42	18	14	6.6	M6		14	70	28			
		VB40-216	16	100	36	18	38	26	88	54			5.3	M6	13					1890	3560
WB46-716	TB46-816		16	100	36					54	20	18	9	M8		16	82	32			
		VB40-220	20	130	46	23	48	32	115	72			6.4	M8	18					2750	5600
WB46-720	TB46-820		20	130	46					72	25	20	11	M10		21	108	42			
		VB40-225	25	160	56	28	58	40	140	88			8.4	M10	22					3140	6400
WB46-725	TB46-825		25	160	56					88	30	25	13.5	M12		26	132	52			
		VB40-230	30	180	64	32	67	47	158	96			10.5	M12	26					5120	10800
WB46-730	TB46-830		30	180	64					96	35	25	13.5	M12		29	150	58			
		VB40-240	40	230	80	40	84	62	202	122			13.5	M16	34					7040	16000
WB46-740	TB46-840		40	230	80					122	44	30	17.5	M16		36	190	72			
		VB40-250	50	280	96	48	100	75	250	152			13.5	M16	34					12160	31600
WB46-750	TB46-850		50	280	96					152	52	30	17.5	M16		44	240	88			

COMPLETE SLIDING SYSTEM (OPEN)

The open type quad housing is more cost effective and avoids the hassle of precisely adjusting four single housings or two tandem units.

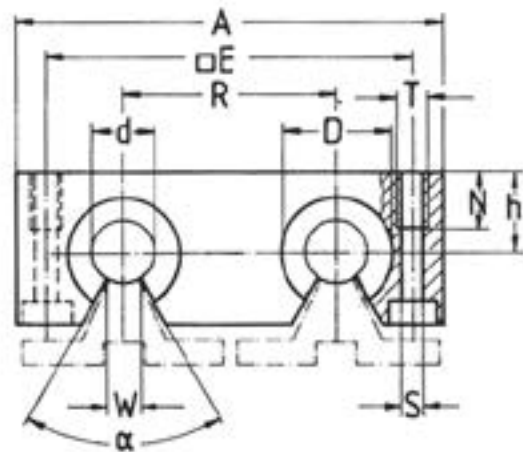
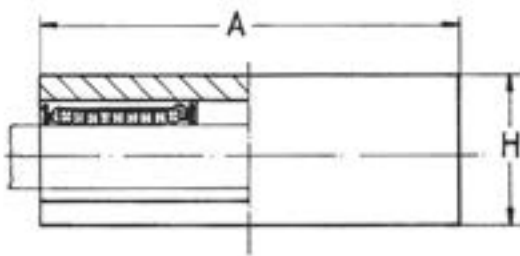
The user can choose between all the shaft support rails shown in this catalogue i.e. WU50, WS50, WU54, WN00 & WP11.

The steel shafts can be machined to the customer's requirements and if necessary can be joined to exceed the maximum length.

The housing contains four fully sealed open type ball bushings.

For temperatures $> 80^{\circ}\text{C}$ specify the all steel unsealed open type ball bushings NB30- with part number VB45-0..

To order the unit with stainless steel linear bearings specify VB45-5.. (where ..= shaft diameter).



PART	d	A	H	h	D	E	R	S	T	N	W	α	Load C (N)	Load C_0 (N)
VB45-212	12	85	30	18	22	73	42	5.3	M6	13	7.5	78	1660	3240
VB45-216	16	100	35	22	26	88	54	5.3	M6	13	10	78	2020	4000
VB45-220	20	130	42	25	32	115	72	6.4	M8	18	10	60	3010	6280
VB45-225	25	160	51	30	40	140	88	8.4	M10	22	12.5	60	3200	6880
VB45-230	30	180	60	35	47	158	96	10.5	M12	26	12.5	50	5250	11400
VB45-240	40	230	77	45	62	202	122	13.5	M16	34	16.8	50	7200	17160
VB45-250	50	280	93	55	75	250	152	13.5	M16	34	21	50	12450	33900