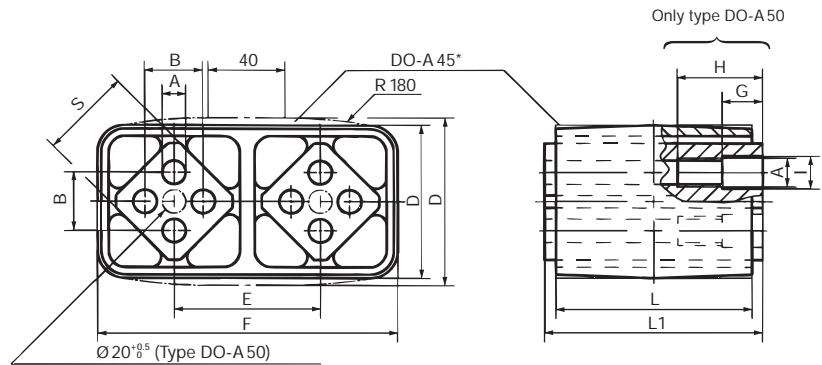


# RUBBER SUSPENSION UNIT TYPE DO-A

(as Spring Accumulator)



Art. No.	Type	$c_d$	L	$L1_{-0.3}^0$	A	B	D	E	F	G	H	I	S	Weight in kg
01 041 013	DO-A 45 x 80	220	80	90	$12_{-0}^{+0.5}$	$35_{-0}^{+0.5}$	85	73	$149.4_{-0.4}^{+1.6}$				45	1.85
01 041 014	DO-A 45 x 100	260	100	110	$12_{-0}^{+0.5}$	$35_{-0}^{+0.5}$	85	73	$149.4_{-0.4}^{+1.6}$				45	2.26
01 041 016	DO-A 50 x 120	400	120	130	M12	$40_{-0}^{+0.5}$	89	78	167	30	60	12.25	50	5.50
01 041 019	DO-A 50 x 160	500	160	170	M12	$40_{-0}^{+0.5}$	88	78	166	30	60	12.25	50	7.40
01 041 017	DO-A 50 x 200	600	200	210	M12	$40_{-0}^{+0.5}$	89	78	167	40	70	12.25	50	8.50

\* DO-A 45 with convex housing shape

## Material Structure

Housing of size 45 is made out of light alloy profile, housing of size 50 in nodular cast; inner squares in light alloy profile with 4 bores for the fixation of connection brackets shaker: frame.

A spring accumulator consists of two ROSTA rubber suspension units type DO-A and a customer supplied connection link **V**. The dynamic spring value of this configuration corresponds to only 50% of a single DO-A element, due to the effected **double serie-connection**, which is reducing the dynamic stiffness to half.

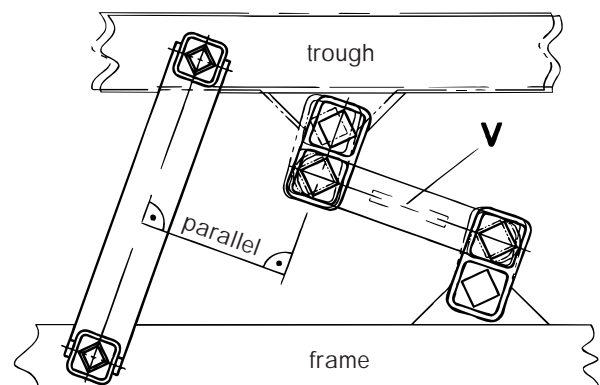
Element Type	$c_d$	Perm. osc. angle	R	sw	$n_{err}$
2 x DO-A45 x 80	110	$\pm 5^\circ$ $\pm 4^\circ$ $\pm 3^\circ$	12.5 10.0 7.5	25.0 20.0 15.0	520 780 1280
2 x DO-A45 x 100	130	$\pm 5^\circ$ $\pm 4^\circ$ $\pm 3^\circ$	12.5 10.0 7.5	25.0 20.0 15.0	480 720 1200
2 x DO-A50 x 120	200	$\pm 5^\circ$ $\pm 4^\circ$ $\pm 3^\circ$	13.6 10.9 8.2	27.2 21.8 16.4	420 600 960
2 x DO-A50 x 160	250	$\pm 5^\circ$ $\pm 4^\circ$ $\pm 3^\circ$	13.6 10.9 8.2	27.2 21.8 16.4	400 570 910
2 x DO-A50 x 200	300	$\pm 5^\circ$ $\pm 4^\circ$ $\pm 3^\circ$	13.6 10.9 8.2	27.2 21.8 16.4	380 540 860

$c_d$  = dynamic spring value in N/mm

R = permissible radius in mm

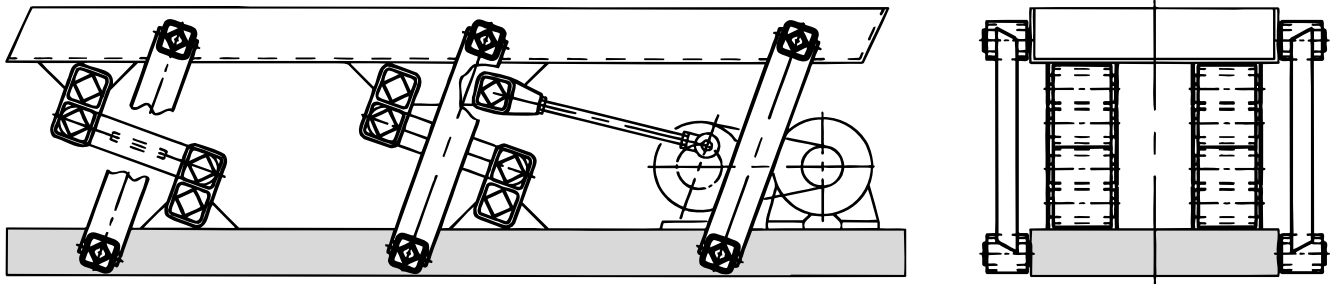
sw = max. amplitude (peak to peak) in mm

$n_{err}$  = max. frequency in  $\text{min}^{-1}$



# RUBBER SUSPENSION UNIT TYPE DO-A

## As Spring Accumulator for One-mass Shaker Conveyor Troughs (Compression/Tension Spring Accumulator)



The oscillating conveyor systems are built such that they run very close to the resonance frequency in order to keep the energy consumption down and to improve the fatigue resistance of the structure (trough and frame). The total spring value  $c_t$  of the trough should be approximately equal to

the stiffness of the oscillating elements. Usually the spring accumulators produce a dynamic rigidity exceeding the one of the rocker arms by far and allowing the oscillating machine to run very close to the resonance frequency in a smooth and harmonic manner.

### Typical Calculation

#### Given:

Oscillating conveyor trough: length: 6.0 m (due to the trough stiffness there are mounted 4 rockers on each side)

Total oscillating mass	$m$	= 375 kg
Revolutions per minute	$n_{err}$	= 460 min <sup>-1</sup>
Crank radius	$R$	= 6 mm
Oscillating machine factor	$K$	= 1.4
Total spring value	$c_t = m \cdot \left(\frac{2\pi}{60} \cdot n_{err}\right)^2 \cdot 0.001$	= 870 N/mm

#### Wanted:

Number of rocker suspensions for operation close to the resonance frequency

$$\text{Load per rocker } G = \frac{m \cdot g}{z} = \frac{375 \cdot 9.81}{8} = 459.8 \text{ N}$$

→ 8 AS-C 38 units are necessary

$$\text{Spring value } c_d = 8 \cdot 19 \text{ N/mm} = 152 \text{ N/mm}$$

$$\begin{aligned} &4 \text{ rocker suspensions each consisting} \\ &\text{of 2 DO-A 50 x 120 elements} \\ &\text{with } c_d = 200 \text{ N/mm each} \end{aligned} = 800 \text{ N/mm}$$

$$\text{Total } c_d \text{ of all ROSTA rubber suspension units} = 952 \text{ N/mm}$$

$$\text{Necessary total spring value } c_t \text{ of trough} = 870 \text{ N/mm}$$

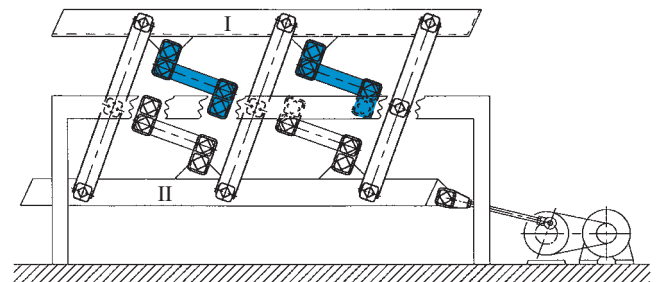
$$\text{Reserve value for overload} = 82 \text{ N/mm} (= 9.4\%)$$

## Suspension Units for Two-mass Oscillating Conveyor Trough

The installation of the two-mass oscillation conveyor system (see page 37) must be done according to the figure on the right.

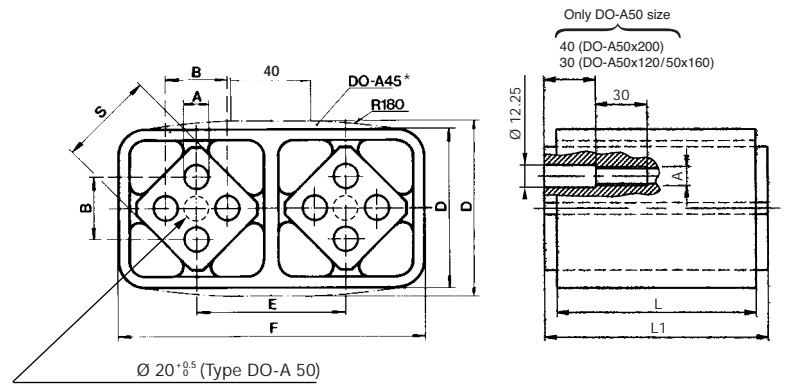
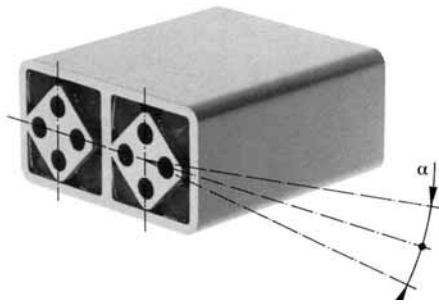
The accumulators are mounted either on trough I and on the machine frame (see blue elements) or on the frame and on counterweight II.

When calculating the total spring value  $c_t$  of the two-mass oscillating machine it is necessary to **fully include** the counterweight.



# RUBBER SUSPENSION UNIT TYPE DO-A

(as Elastic Drive Head)



Art. No.	Type	$c_d$	L	L1-0.3	A	B	D	E	F	S	Weight in kg
01 041 008	DO-A 27 x 60	160	60	65	8 <sup>+0.5</sup> <sub>0</sub>	20 <sup>±0.4</sup>	47 <sup>±0.15</sup>	44	91 <sup>+0.2</sup> <sub>0</sub>	27	0.47
01 041 011	DO-A 38 x 80	210	80	90	10 <sup>+0.5</sup> <sub>0</sub>	25 <sup>±0.4</sup>	63 <sup>±0.2</sup>	60	123 <sup>+0.3</sup> <sub>0</sub>	38	1.15
01 041 013	DO-A 45 x 80	220	80	90	12 <sup>+0.5</sup> <sub>0</sub>	35 <sup>±0.5</sup>	85	73	149.4 <sup>+1.6</sup> <sub>-0.4</sub>	45	1.85
01 041 014	DO-A 45 x 100	260	100	110	12 <sup>+0.5</sup> <sub>0</sub>	35 <sup>±0.5</sup>	85	73	149.4 <sup>+1.6</sup> <sub>-0.4</sub>	45	2.26
01 041 016	DO-A 50 x 120	400	120	130	M12	40 <sup>±0.5</sup>	89	78	167	50	5.50
01 041 019	DO-A 50 x 160	500	160	170	M12	40 <sup>±0.5</sup>	88	78	166	50	7.40
01 041 017	DO-A 50 x 200	600	200	210	M12	40 <sup>±0.5</sup>	89	78	167	50	8.50

$c_d$  = dynamic spring value N/mm at  $\pm 5^\circ$ , in frequency range 300–600 min<sup>-1</sup>

Elements with higher load capacity are available on request.

\* DO-A 45 with convex housing shape

## Material Structure

The housings up to size DO-A 45 are made out of light alloy profiles, housing of size 50 in nodular cast; inner squares in light alloy profile with 4 bores for the fixation of connection brackets shaker: eccentric rod.

## Typical Calculation

ROSTA rubber suspension units DO-A employed as elastic drive heads are to be selected so that their spring value corresponds roughly to the total spring value. The oscillation angle  $\alpha$  of the units must not exceed  $\pm 5^\circ$ . Elastic drive heads shall only be used in combination with **resonance** shaker conveyors by **continuous** material feeding.

### Given:

Total weight of oscillating mass  $m$  = 210 kg  
 Speed  $n_{err}$  = 320 min<sup>-1</sup>  
 Eccentric radius  $R$  = 14 mm

### Wanted:

Total spring  $c_t$  in N/mm

$$c_t = m \cdot \left( \frac{2\pi}{60} \cdot n_{err} \right)^2 \cdot 0.001 = 210 \cdot \left( \frac{2\pi}{60} \cdot 320 \right)^2 \cdot 0.001 = 235.8 \text{ N/mm}$$

**Selected:** 1 piece of DO-A 45 x 100

## Guidelines for Fitting

The elastic slider crank drive may be applied optionally onto the trough I or the counterweight II, at the beginning of the trough or elsewhere. Force introduction must be  $90^\circ$  to the angle  $\beta$  of the rocker suspensions. The unit axis must be  $90^\circ$  to the longitudinal axis of the conveyor trough and run centrally with this. Fixing is by shaft screws of 8.8 quality (analogous to fixing the universal joint support). **Elastic drive heads should only be applied in natural frequency shaker systems!**

