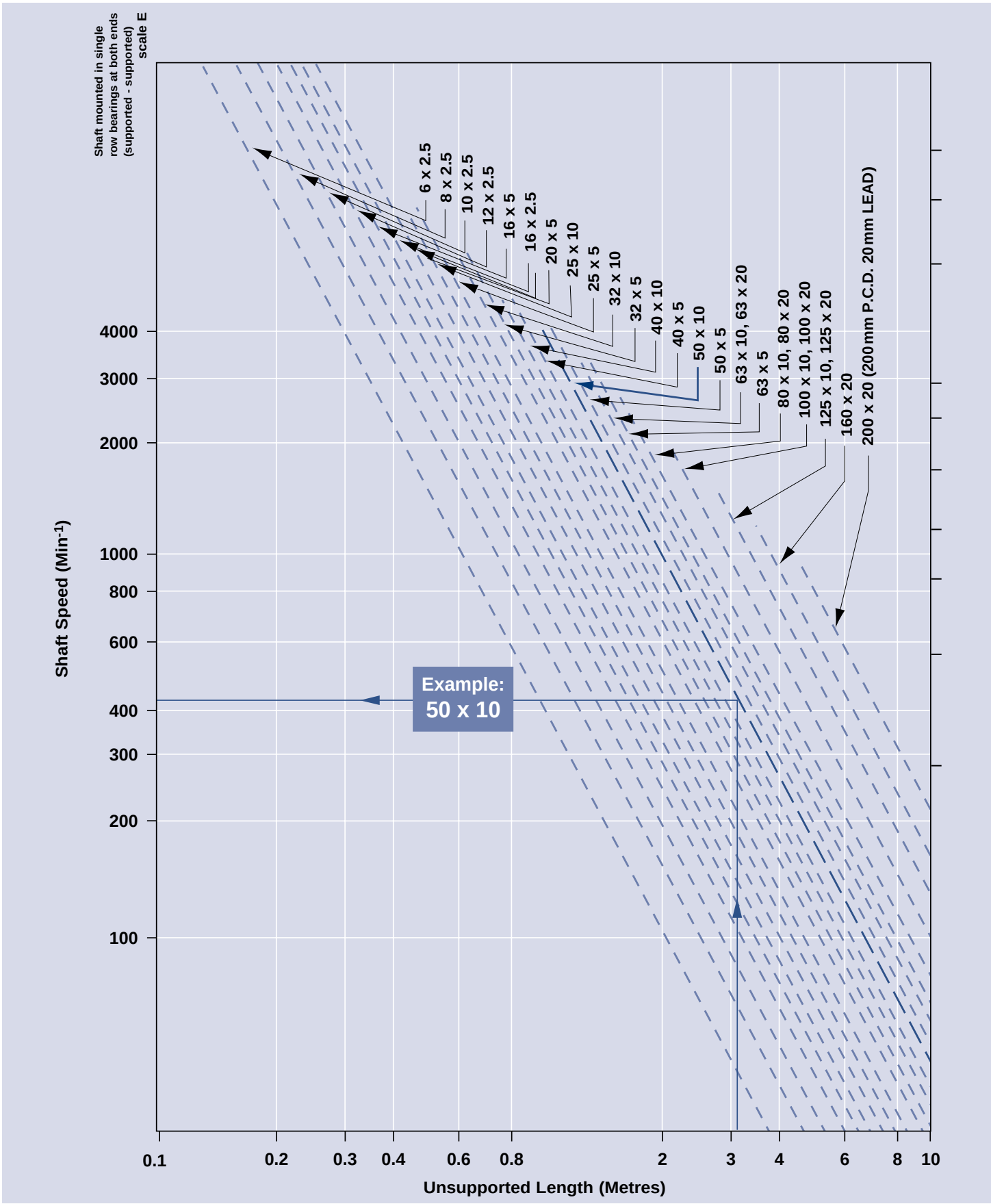
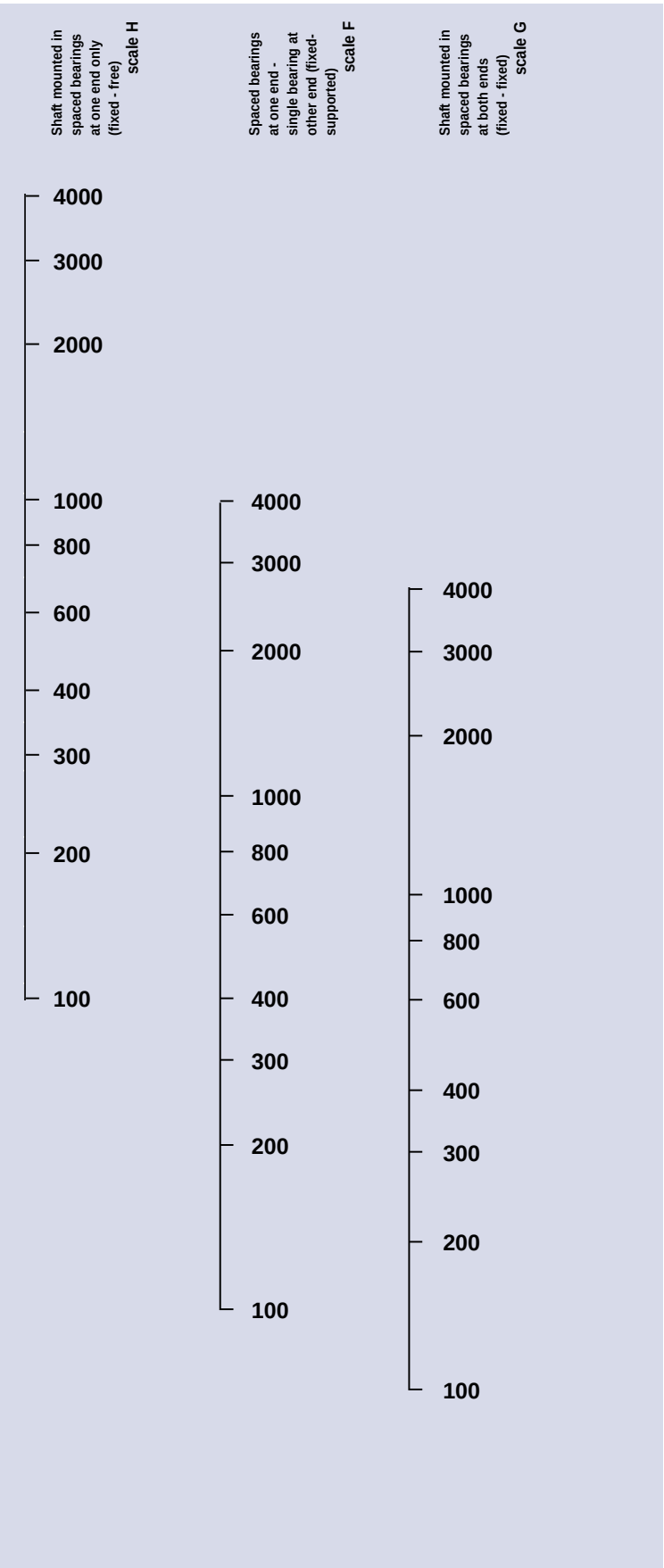

Shaft mounted in single row bearings at both ends (supported - supported) scale E
6 x 2.5
8 x 2.5
10 x 2.5
12 x 2.5
16 x 5
16 x 2.5
20 x 5
25 x 10
25 x 5
32 x 10
32 x 5
40 x 10
40 x 5
50 x 10
50 x 5
63 x 10, 63 x 20
63 x 5
80 x 10, 80 x 20
100 x 10, 100 x 20
125 x 10, 125 x 20
160 x 20
200 x 20 (200mm P.C.D. 20mm LEAD)
Example:
50 x 10
Shaft Speed (Min-1)
4000
3000
2000
1000
800
600
400
300
200
100
0.1
0.2
0.3
0.4
0.6
0.8
2
3
4
6
8
10
Unsupported Length (Metres)

Fig. 8



CRITICAL SPEEDS

As the speed of a rotating shaft is increased, at certain speeds the shaft will commence to vibrate. If the speed is then allowed to remain constant the vibrations may build-up until damage results.
However, if the speed is further increased the shaft will again run smoothly. Similar conditions are produced when a nut is rotated on a stationary shaft. The speeds at which resonant vibrations occur are known as the critical speeds.
Critical speeds are influenced by the diameter and unsupported length of the shaft and by the type and method of mounting of the supporting bearings (see Figure 7, see page 26/27).
The torque applied to the shaft may also reduce the critical speeds.
It is normal for ballscrews to operate below the first critical speed and a safety margin of 20% below this speed is generally adequate to avoid vibration problems.
Ballscrew speeds are also limited by the resultant velocity of the balls within the nut. This ball speed is for convenience, indicated by a Dwn value
(Ball P.C.D. x rotational speed). (Dwn value = 120,000).

Figure 8 (page 28/29) shows the maximum safe speeds for JENA-TEC ballscrew sizes relative to unsupported length and bearing mounting. The horizontal portions of the lines indicate, on the L.H. scale, the maximum speed of the ballscrew which will not exceed the recommended Dwn value.