A rotodynamic machine like a blower absorbs power $\propto$ speed^3. It can't be overloaded like a machine tool e.g. Assume 95% drive efficiency, so that required shaft power = 3.5/0.95 = 3.68 kW

Select ABB MBT 112M motor of 4 kW capacity at 1440 rpm.

Belt drive duty factor, say 1.1. So belt design power = 1.1 × 3.68 (rather than 4)
= 4.05 kW.

A drive consisting of 3A belts is selected on basis of "V-belts" program below.

```
**********************                              version 4b
V-BELT DRIVE SELECTOR                               by Doug Wright
**********************

title    : problem 8
design power            (kW) :   4.05
driving speed           (rpm) :  1440
driven speed limits     (rpm) :   635    665
drive life limits       (khr) :   8.2   82.2
flat pulley diameter (mm)     :   260

belt &       pulley  driven   belt    belt  cent   belt  eff'
number     diameters  speed  speed  length  -res   life ness
             mm   mm    rpm    m/s      mm    mm    khr    %

 A   3     125  271    664    9.4    1550   458   22.5   66
 B   3     125  274    657    9.4    1560   461   54.7   41
```

This drive results in a blower speed of 664 rpm, so power absorbed by blower and gearbox is

$P = (664/650)^3 \times 3.5/0.95 = \underline{3.93}$ kW

(note that the 1.1 factor is inapplicable to actual power; the factor is appropriate only for belt life).

Having selected motor and belt drive, the only remaining unknown is the pivoted motor's hinge position.

The motor's shaft height is 112 mm, so we assume $h_y = -150$ mm

We'll also consider all possible inclinations, ϕ, of the shaft centres while maintaining the centre distance at 458 mm for the belt drive.