8 Strength of Housings

FYH bearings can withstand very high loads due to the use of only high quality material and excellent design. However, when high static or impact loads are encountered, the load capacity of the bearing must be determined.

The housing design is such that it can withstand loads from any angle; however the bearing is strongest with a direct downward load through the base of the unit. For loads in other directions, the allowable load must be determined specifically for the direction in question.

Rigidity of the base and flatness of the mounting surface also influence the housing strength. The equipment designer or installer must examine and perform calculations for the complete supporting structure of the bearing.

8.1 Strength of Cast Iron Housings

Although gray cast iron has many superior characteristics, it may fail under impact loads, particularly in a low temperature environment.

Table 8.1 shows the applicable design safety factors for gray cast iron. **Fig. 8.1** to **8.7** show the static rupture strength of the various housing types.

Table 8.1 Safety factor of gray cast iron products (recommended)

Property of load	Safety factor of gray cast iron
Static load	4
With vibration	10
With impact	15

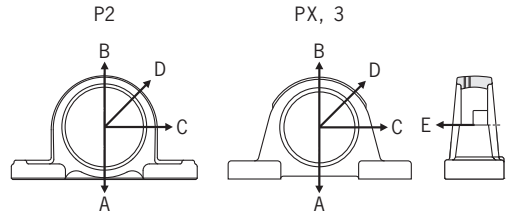
8.2 Strength of Ductile Cast Iron Housings

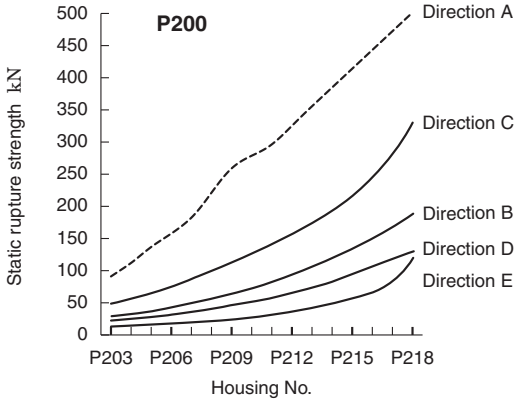
The high-strength ductile cast iron series has the same shape and dimensions as the standard gray cast iron series, but is acceptable in environments where high-strength is required.

Table 8.2 shows safety factors of the load on ductile cast iron housings, and **tables 8.8** to **8.11** show the approximate rupture strength of pillow type, flange type, and take-up type housings.

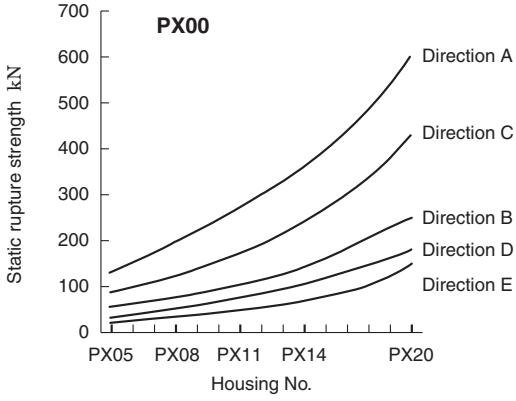
Table 8.2 Safety factor of ductile cast iron (recommended)

Property of load	Safety factor of ductile cast iron
Static load	3
With vibration	5
With impact	10





Remarks The graph value "Direction of A" is a reference value.



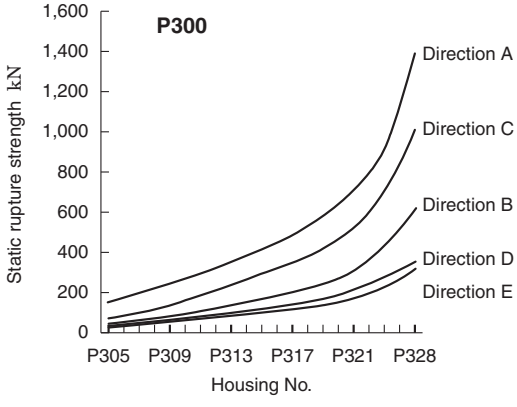


Fig. 8.1 Static rupture strength of pillow type housing (P)

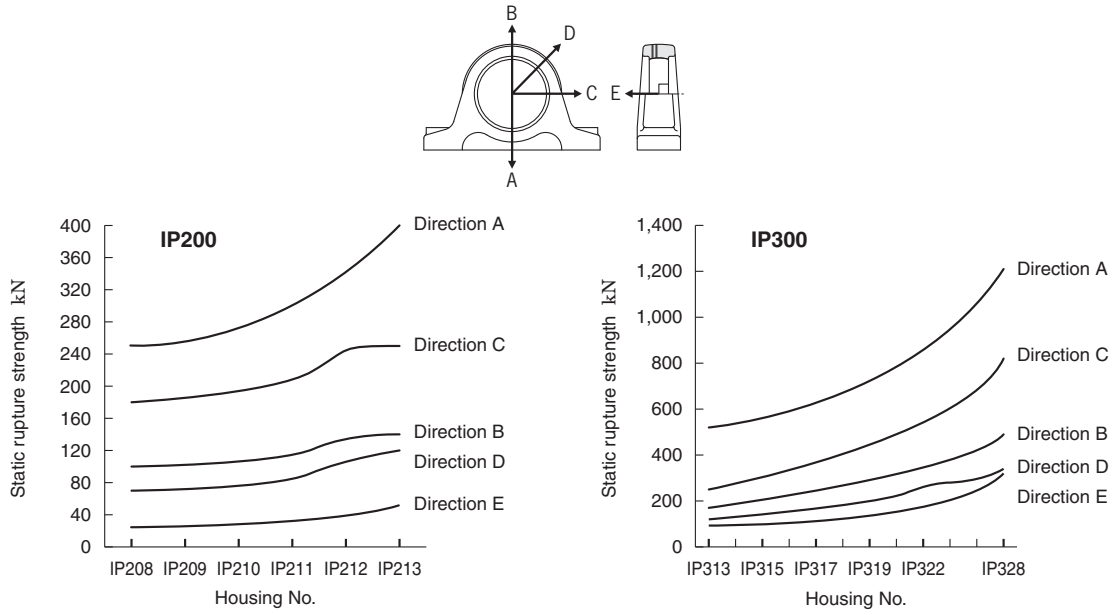


Fig. 8.2 Static rupture strength of thick pillow type housings (IP)

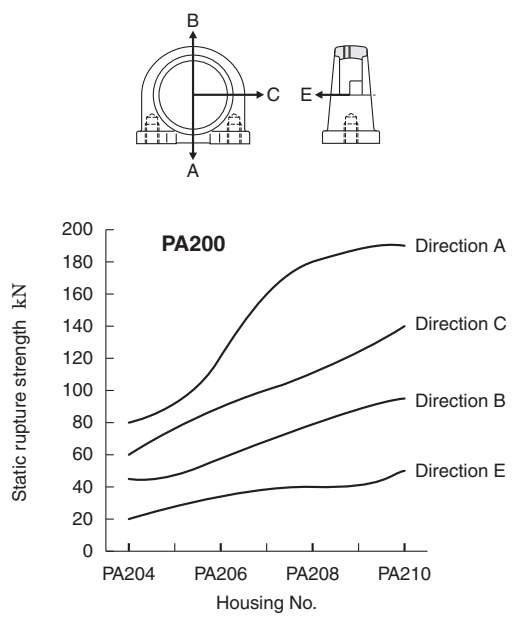


Fig. 8.3 Static rupture strength of tapped base pillow type housings (PA)

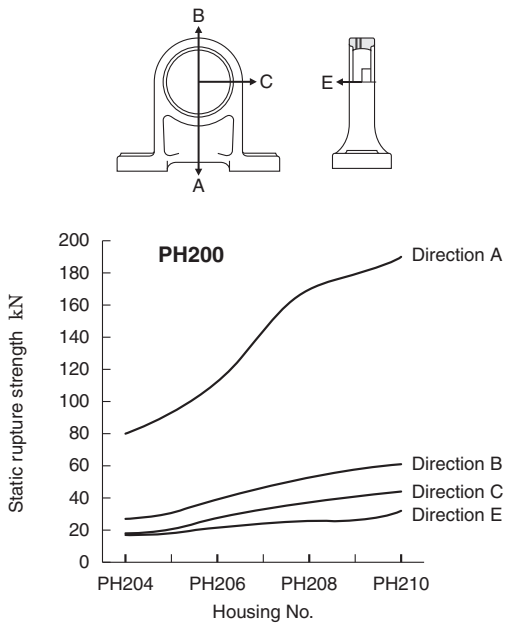
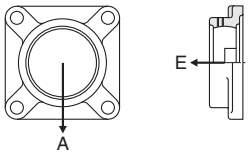
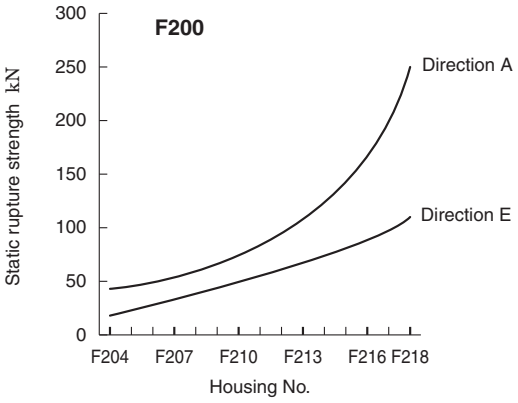
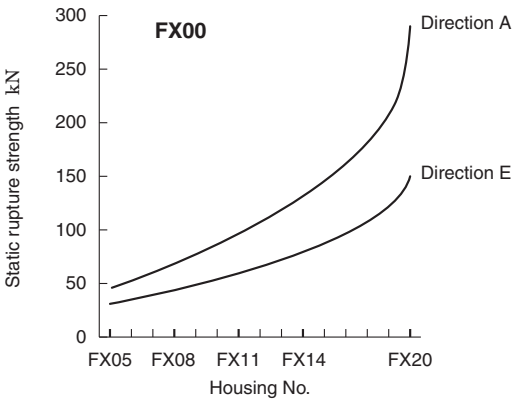


Fig. 8.4 Static rupture strength of High-Base pillow type housings (PH)

8 Strength of Housings







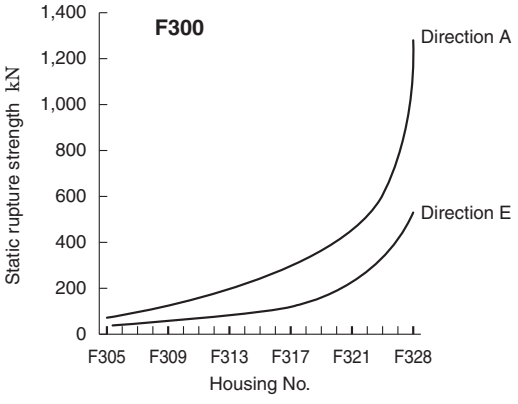
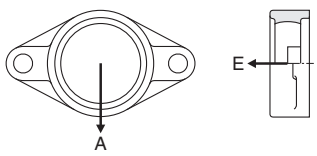
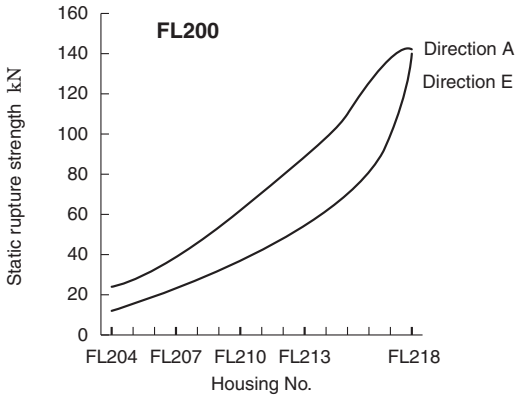
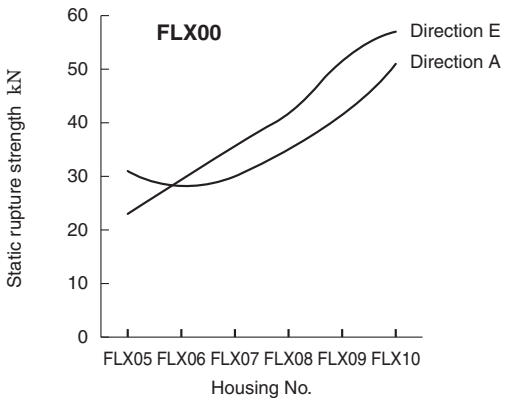


Fig. 8.5 Static rupture strength of square flange type housings (F)







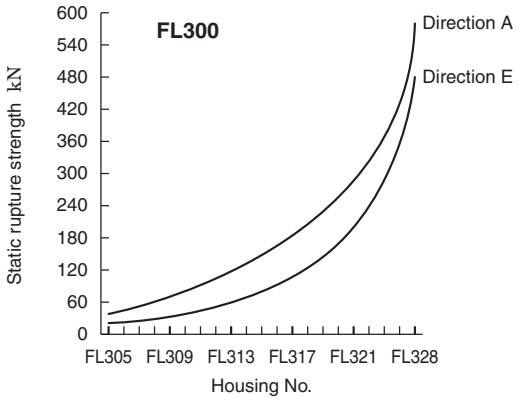
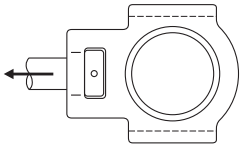


Fig. 8.6 Static rupture strength of oval flange type housings (FL)



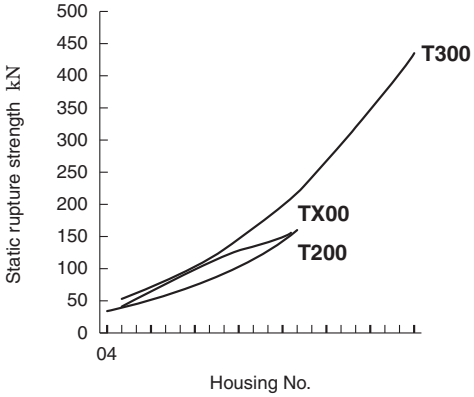
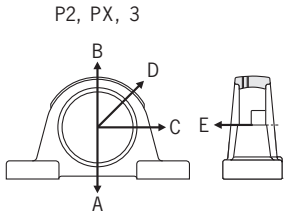
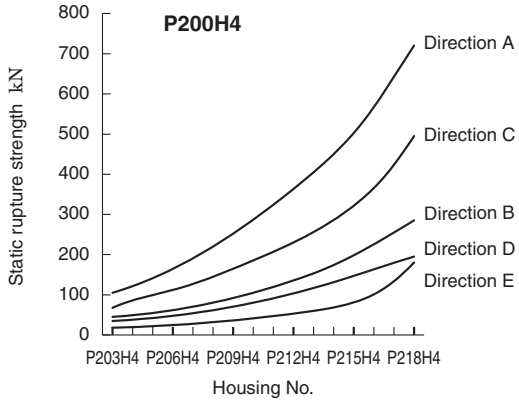
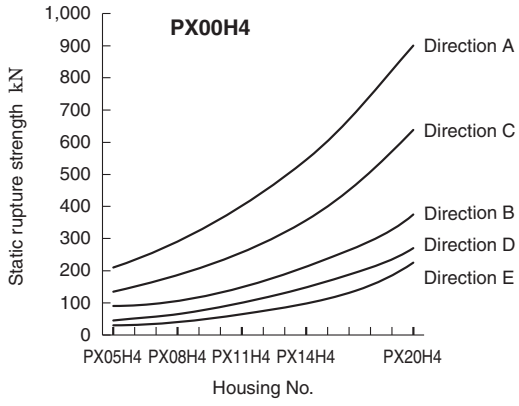


Fig. 8.7 Static rupture strength of take-up type housings (T)







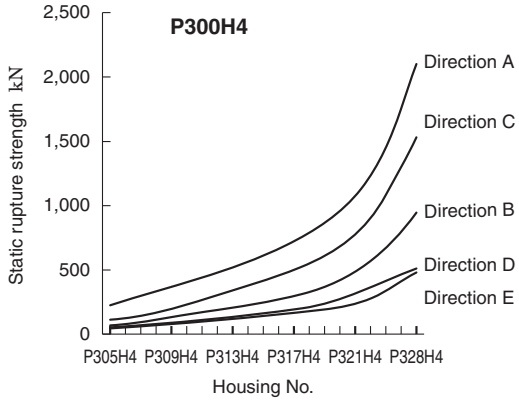
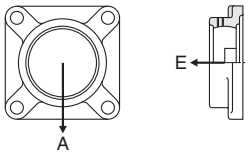
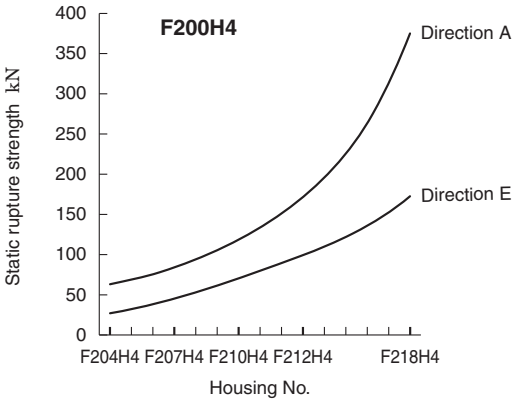
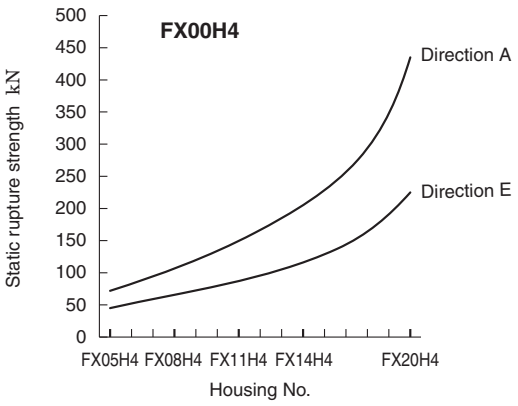


Fig. 8.8 Static rupture strength of ductile cast iron pillow type housings (P_{H4})

8 Strength of Housings







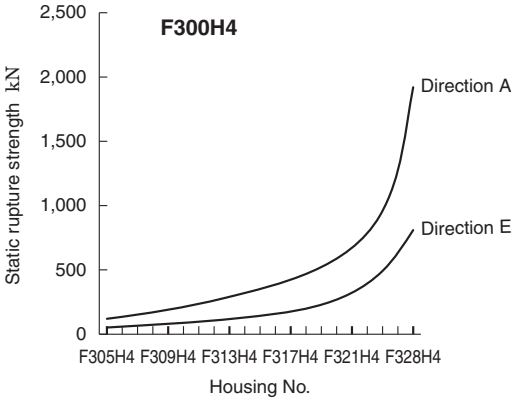
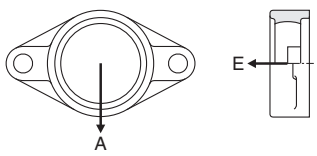
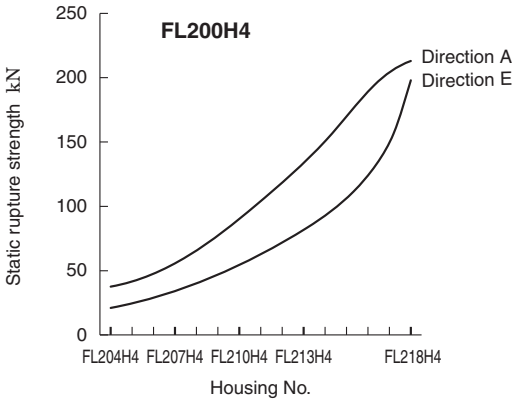
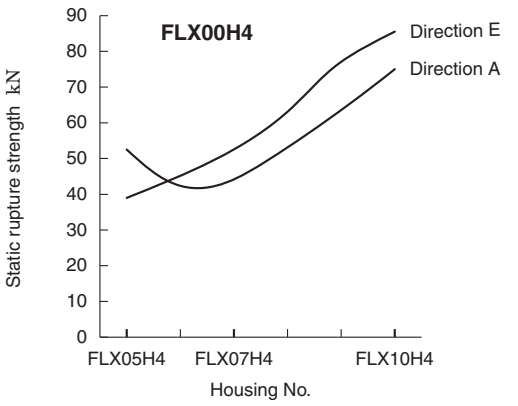


Fig. 8.9 Static rupture strength of ductile cast iron square flange type housings (F_{H4})







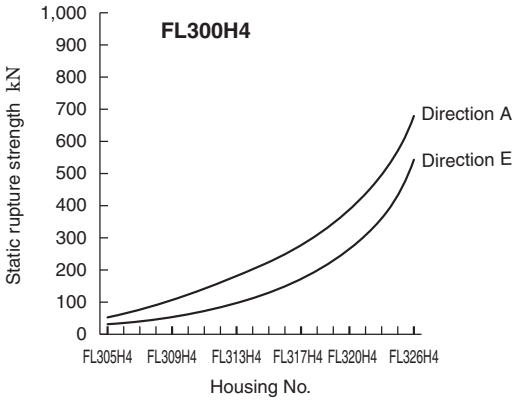


Fig. 8.10 Static rupture strength of ductile cast iron oval flange type housings (FL_{H4})

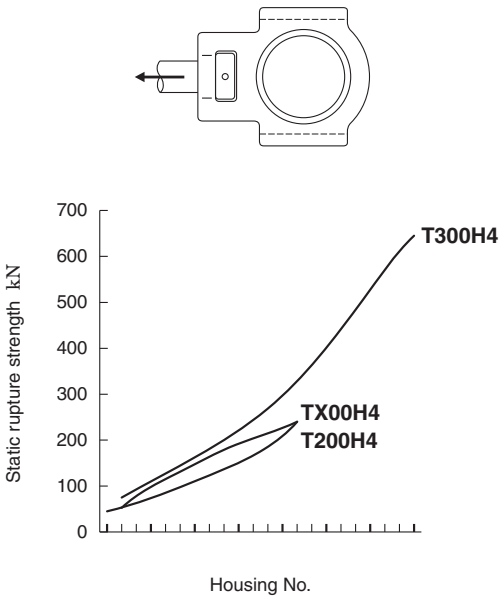


Fig. 8.11 Static rupture strength of ductile cast iron take-up type housings (T_{H4})

8.3 Strength of Stamped Steel Housings

The precisely formed stamped steel housing is very rigid, but it is not as strong as cast iron or cast steel housings. Therefore, it will not support loads to the maximum rating of the bearing itself and must be down-rated per **Table 8.3**.

Table 8.3 Allowable load of steel plate housings (recommended)

Load direction	Allowable load of stamped steel housings
Radial	Approx. 1/6 of basic dynamic radial load rating of bearing (C_r)
Axial	Approx. 1/18 of basic dynamic radial load rating of bearing (C_r)

8.4 Strength of Stainless Steel Housings

FYH supplies stainless steel housings (SP-H1, SPA-H1, SF- H1, SFL-H1, ST-H1, SP, SFL).

Table 8.4 shows the safety factors for stainless steel products. As for the basic values of the static rupture strength of SP-H1, SPA-H1, SF-H1, SFL-H1, ST-H1, SFC-H1 type housings, apply P200 of **Fig. 8.1**, PA200 of **Fig. 8.3**, F200 of **Fig. 8.5**, FL200 of **Fig. 8.6** and T200 of **Fig. 8.7**. As for the basic values of the static rupture strength of SFC-H1 housings, apply F200 of **Fig. 8.5**. For the basic values of the static rupture strength of the SP and SFL type housings, see P000~P006 of **Fig. 8.12** and FL000~FL006 of **Fig. 8.13** and multiply them by 1.5 respectively.

Table 8.4 Safety factor of stainless steel products

Property of load	Safety factor of stainless steel products
Static load	3
With vibration	5
With impact	10

8.5 Strength of Die-cast Housings

The clean series housing is made of die-cast zinc alloy, but the zinc alloy material is not as strong as cast iron or cast steel. **Table 8.5** shows safety factors for die-cast zinc alloy, and **Fig. 8.12** and **8.13** show the basic values of the static rupture strength of the die-cast zinc alloy housing.

Table 8.5 Safety factor of zinc alloy die-cast products

Property of load	Safety factor of die-cast products
Static load	8
With vibration	15
With impact	20

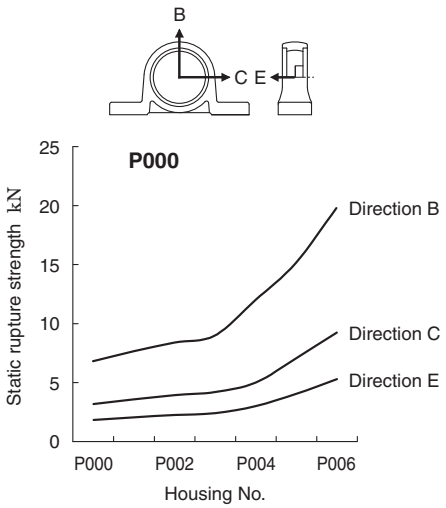


Fig. 8.12 Static rupture strength of clean housings (P)

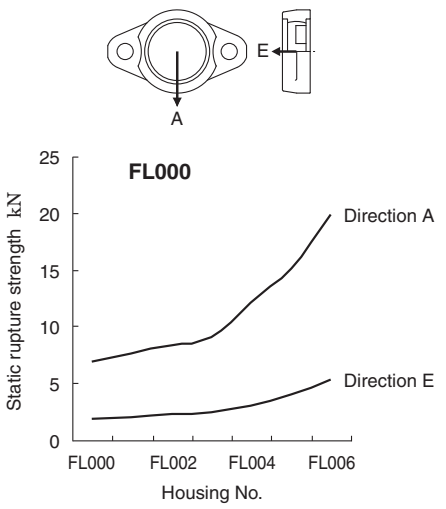


Fig. 8.13 Static rupture strength of clean housings (FL)

8.6 Static Rupture Strength of Plastic Housings

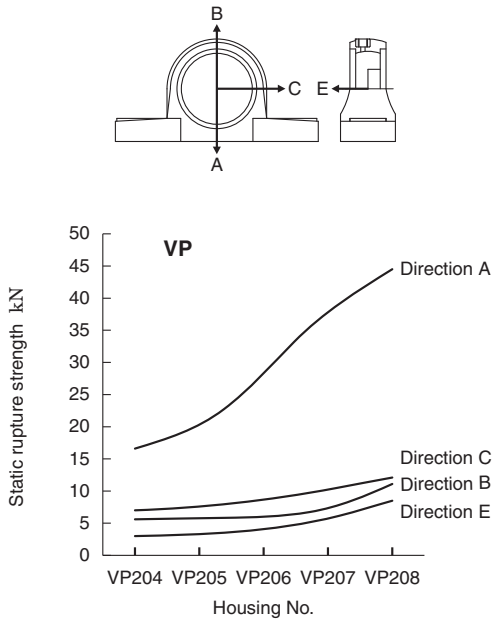


Fig. 8.14 Static rupture strength of plastic housings (VP)

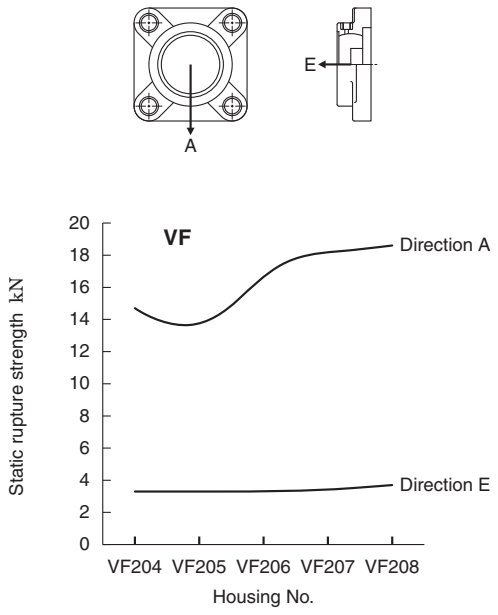


Fig. 8.15 Static rupture strength of plastic housings (VF)

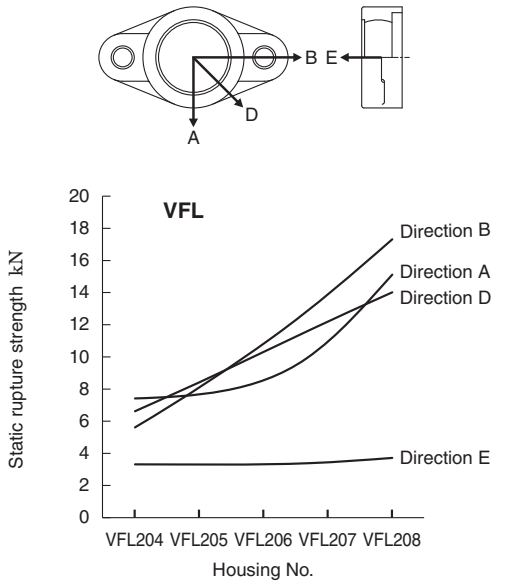


Fig 8.16 Static rupture strength of plastic housings (VFL)

Note:
The figure shows the average static rupture strength of housings.
The correct safety factor should be considered to properly account for combined load in various directions at room temperature (23 ºC ±5 ºC).