

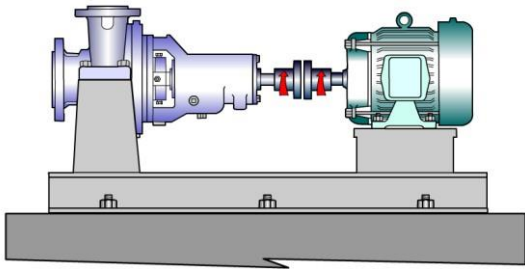


MÉTODO DIAL INVERTIDO

JAIME ANDRES CASTAÑEDA



MÉTODO DIAL INVERTIDO

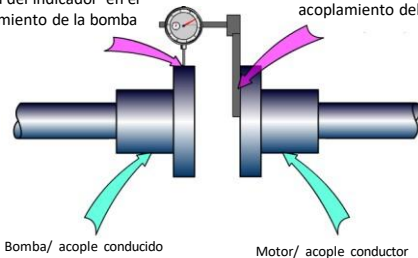


el método dial invertido se considera que es una de las maneras más precisas y prácticas de alineamiento de equipos rotativos como la bomba y el motor que se muestra

MÉTODO DIAL INVERTIDO

Lectura del indicador en el
acoplamiento de la bomba

Reloj de comprador fijado en el
acoplamiento del motor

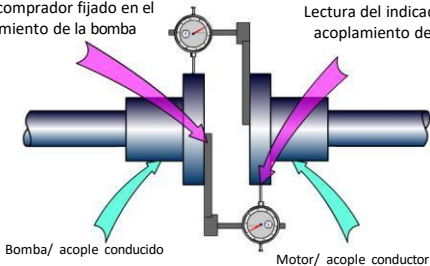


MÉTODO DIAL INVERTIDO

El alineamiento Dial invertido implica el uso de un reloj comparador más fijado a la bomba (equipo accionado) con el husillo desplazable en el acoplamiento del motor

Reloj de comprador fijado en el
acoplamiento de la bomba

Lectura del indicador en el
acoplamiento del motor

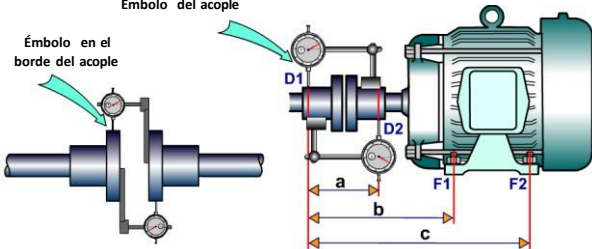


MÉTODO DIAL INVERTIDO

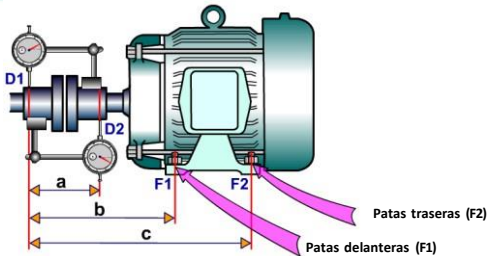
EL émbolo del reloj comparador puede ser ubicado en cualquiera de las posiciones mostradas

Émbolo del acople

Émbolo en el
borde del acople



MÉTODO DIAL INVERTIDO

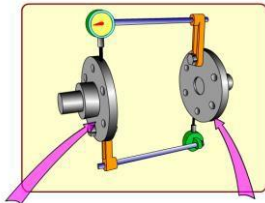
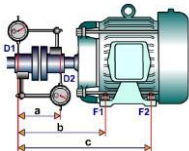


Las siguientes dimensiones deben ser medidas con una cinta de y ser anotadas

- a = Distancia entre el eje del émbolo de ambos diales (D1 a D2)
- b= Distancia entre el reloj comparador con el émbolo sobre el acople de la bomba D1 y las patas delanteras F1 del motor
- c = Distancia entre el reloj comparador con el émbolo sobre el acople de la bomba D1 y las patas posteriores F2 del motor

MÉTODO DIAL INVERTIDO

La ilustración nos muestra las 3 dimensiones necesarias y la configuración del indicador

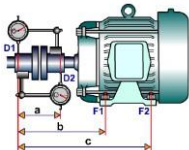


Acople de la bomba

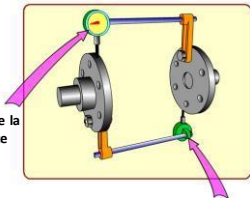
Acople del motor

MÉTODO DIAL INVERTIDO

En esta etapa vamos a indicar dos puntos importantes en la configuración del reloj comparador



Mantener el dial de la bomba en la parte superior

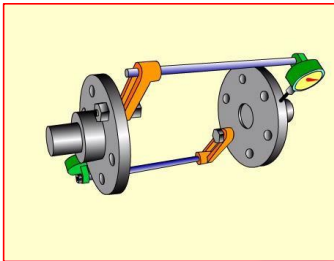
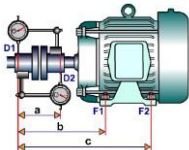


Mantener el dial del motor en la parte inferior

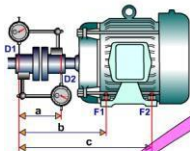
- I. Ajuste las abrazaderas de alineación de tal manera que los relojes de comparación lea los bordes de los acoplamientos.
- II. Mantenga siempre el indicador de dial de la bomba en la parte superior y el indicador de línea de motor en la parte inferior

MÉTODO DIAL INVERTIDO

En este alineamiento ambos acoplamientos deben ser girado juntos como se muestra a continuación



MÉTODO DIAL INVERTIDO

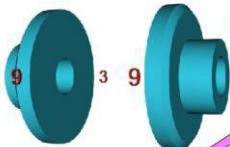


Bomba

Motor

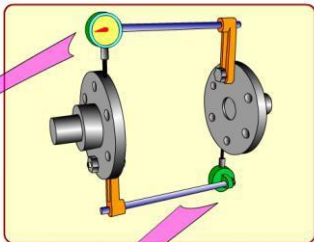
12

12



6

6

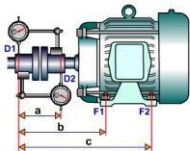


Readings
on pump

Readings
on motor

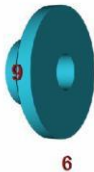
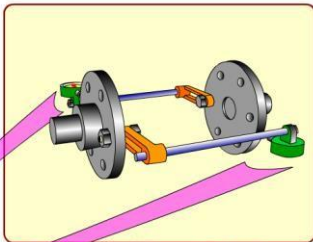


MÉTODO DIAL INVERTIDO

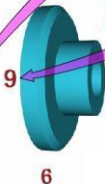


Bomba
12

Motor
12



3



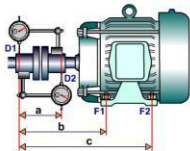
Readings
on pump
12



Readings
on motor

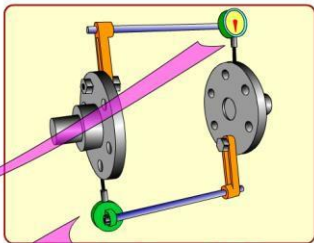
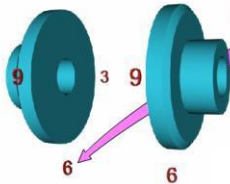


MÉTODO DIAL INVERTIDO



PUMP
12

MOTOR
12



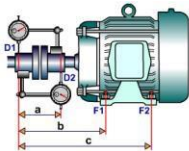
Readings
on pump
12



Readings
on motor
12

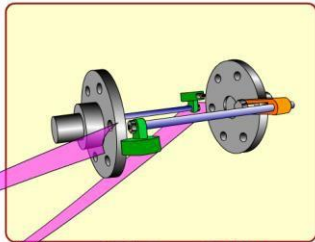
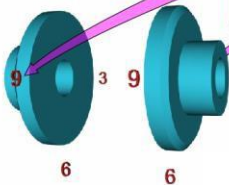


MÉTODO DIAL INVERTIDO



PUMP
12

MOTOR
12



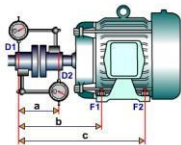
Readings
on pump



Readings
on motor



MÉTODO DIAL INVERTIDO

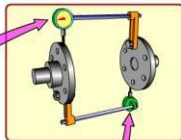


Émbolo del dial
sobre la bomba

Acople del
motor

Acople de
la bomba

Émbolo del dial
sobre el motor

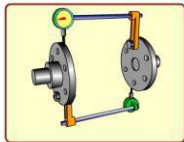
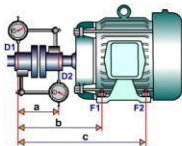


Readings
on pump

Readings
on motor



MÉTODO DIAL INVERTIDO



Émbolo del dial sobre la bomba



Lectura en la bomba

0



Lectura en el motor

0



Émbolo del dial sobre el motor

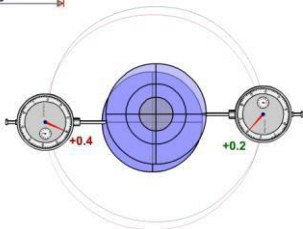
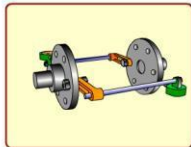
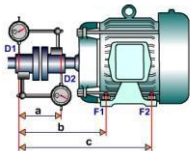


0

Now rotate the whole setup together in steps of 90° .

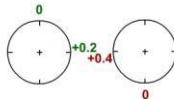
Start noting the respective readings observed in the dial gauges.

MÉTODO DIAL INVERTIDO



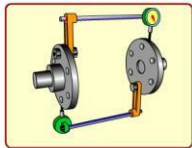
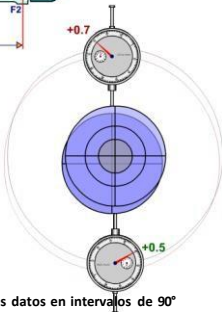
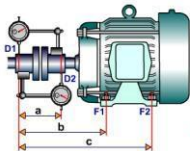
Lectura en
la bomba

Lectura en
el motor

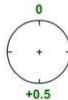


Proceder a tomar los datos en intervalos de 90°

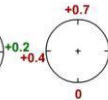
MÉTODO DIAL INVERTIDO



Lectura en
la bomba

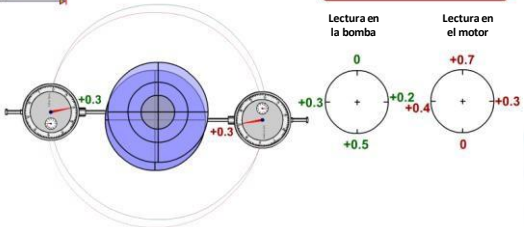
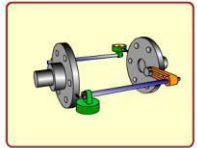
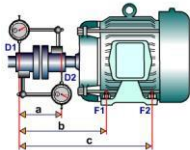


Lectura en
el motor



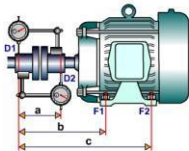
Proceder a tomar los datos en intervalos de 90°

MÉTODO DIAL INVERTIDO

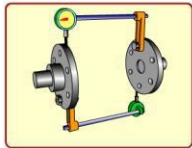
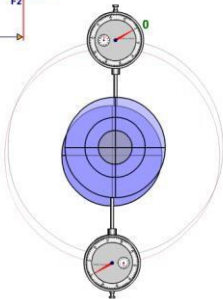


Proceder a tomar los datos en intervalos de 90°

MÉTODO DIAL INVERTIDO



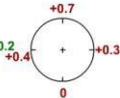
La lectura debe llegar a cero de nuevo para completar el procedimiento



Lectura en la bomba

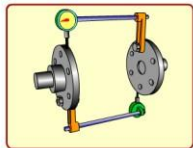
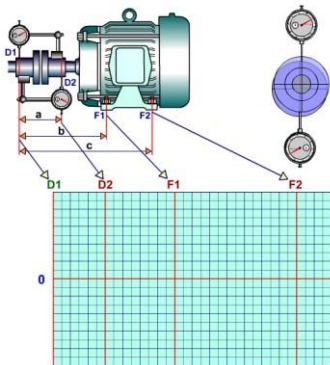


Lectura en el motor

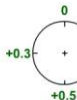


MÉTODO DIAL INVERTIDO

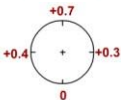
MÉTODO GRÁFICO (VERTICAL)



Lectura en la
bomba



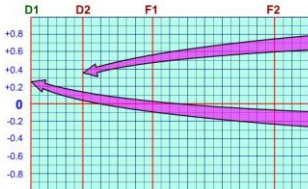
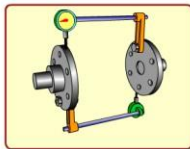
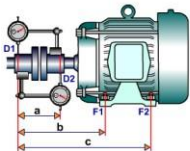
Lectura en el
motor



Se procede a enviar las dimensiones a,b,c , con su respectiva escala

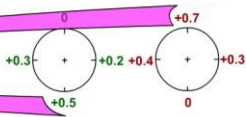
MÉTODO DIAL INVERTIDO

MÉTODO GRÁFICO (VERTICAL)



Lectura en la bomba

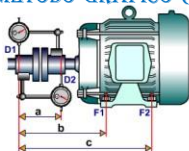
Lectura en el motor



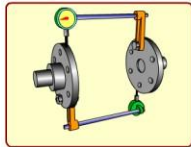
Ubicar la medida vertical "lectura de la bombas y lectura del motor" en su respectivo eje "D1 D2"

MÉTODO DIAL INVERTIDO

MÉTODO GRÁFICO (VERTICAL)

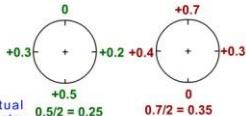


- Actual Vertical offset existing along D1 = $0.5/2 = 0.25$
- Actual Vertical offset existing along D2 = $0.7/2 = 0.35$



Lectura en la bomba

Lectura en el motor



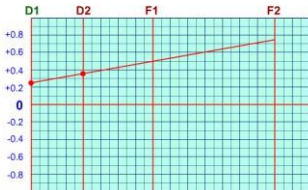
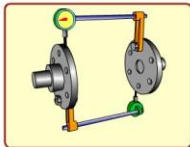
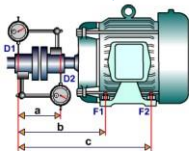
Actual offsets:

$$0.5/2 = 0.25$$

$$0.7/2 = 0.35$$

MÉTODO DIAL INVERTIDO

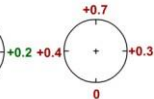
MÉTODO GRÁFICO (VERTICAL)



Lectura en la
bomba



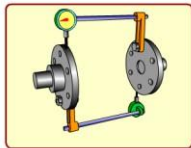
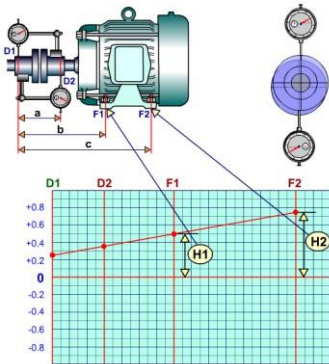
Lectura en el
motor



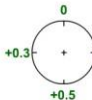
Dibujar una línea uniendo los puntos hasta intersectar a los ejes de las patas delanteras y traseras

MÉTODO DIAL INVERTIDO

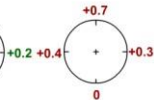
MÉTODO GRÁFICO (VERTICAL)



Lectura en la
bomba



Lectura en el
motor

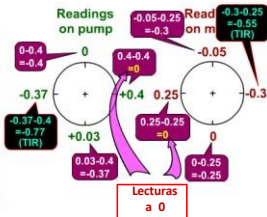
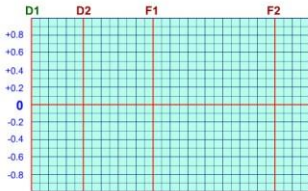
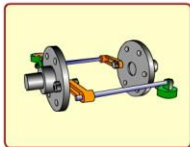
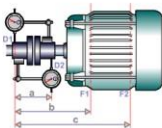


Ubicar las distancias H1 patas delanteras y H2 patas traseras

MÉTODO DIAL INVERTIDO

MÉTODO GRÁFICO (HORIZONTAL)

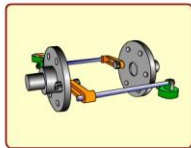
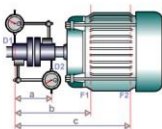
Vista superior



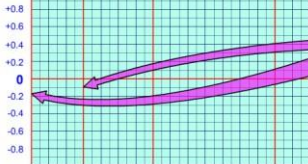
MÉTODO DIAL INVERTIDO

MÉTODO GRÁFICO (HORIZONTAL)

Vista superior

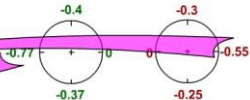


D1 D2 F1 F2



Lectura en la bomba

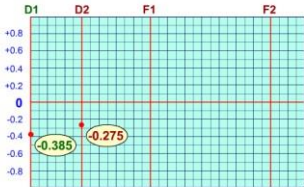
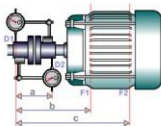
Lectura en el motor



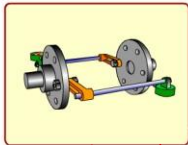
MÉTODO DIAL INVERTIDO

MÉTODO GRÁFICO (HORIZONTAL)

TOP VIEW

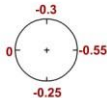
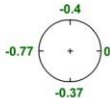


- Actual Horizontal offset existing along D1 = $-0.77/2 = -0.385$
- Actual Horizontal offset existing along D2 = $-0.55/2 = -0.275$



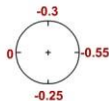
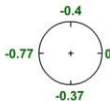
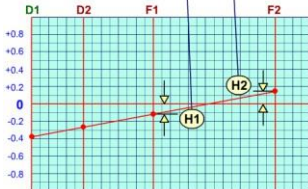
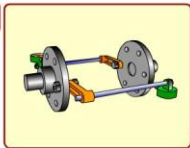
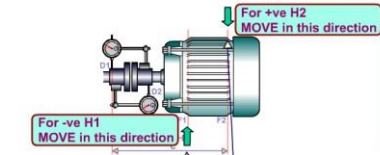
Lectura en la
bomba

Lectura en el
motor



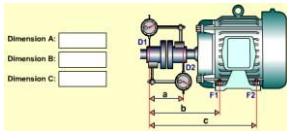
MÉTODO DIAL INVERTIDO

MÉTODO GRÁFICO (HORIZONTAL)



MÉTODO DIAL INVERTIDO

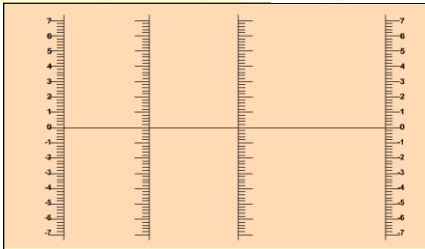
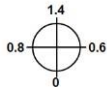
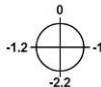
EJERCICIO N° 1



A = 72mm

B = 160mm

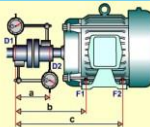
C = 420mm



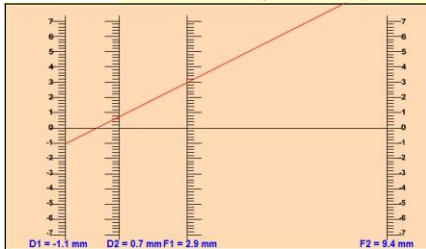
MÉTODO DIAL INVERTIDO

EJERCICIO N° 1 SOLUCIÓN VERTICAL

Dimension A: 72
Dimension B: 160
Dimension C: 420



D1			D2		
			TIR		
0			1.4		
-1.2	DN	-1.0	0.8	DR	0.6
-2.2			0		
TIR					



REMOVE
2.9mm

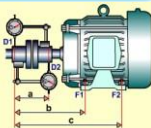
REMOVE
9.4mm

Poor Alignment

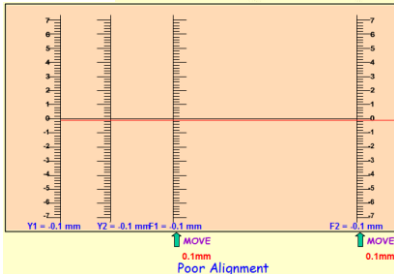
MÉTODO DIAL INVERTIDO

EJERCICIO N° 1 SOLUCIÓN HORIZONTAL

Dimension A: 72
Dimension B: 160
Dimension C: 420

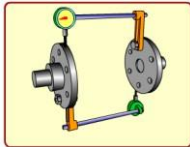
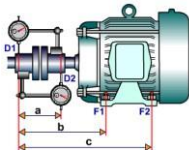


D1			D2		
	0			TIR	
-1.2	DN	-1.0	0.8	DR	0.6
	-2.2			0	
TIR					



MÉTODO DIAL INVERTIDO

MÉTODO MATEMÁTICO



$$\text{Patas delanteras} = \frac{B}{A} \times \frac{SM - MM}{2} - \frac{SM}{2}$$

$$\text{Patas traseras} = \frac{C}{A} \times \frac{SM - MM}{2} - \frac{SM}{2}$$

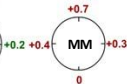
SM = TIR de la máquina estacionaria

MM = TIR de la máquina móvil

Lectura en la
bomba



Lectura en el
motor

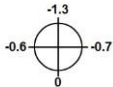
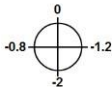
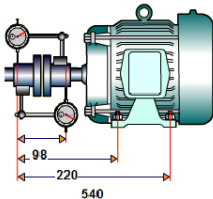


Signo (+) Agregar shims

Signo (-) Quitar shims

MÉTODO DIAL INVERTIDO

EJERCICIO





GRACIAS