CORRIGENDUM

Analysis of a laser-Doppler anemometer

To cite this article: R J Adrian and R J Goldstein 1971 J. Phys. E: Sci. Instrum. 4 1088

View the article online for updates and enhancements.

Related content
- A simple programmer for process control
  P A Cottrell
- Stabilization of the HCN laser
  D T Llewellyn-Jones and M D James
- Reconnection of Twisted Flux Tubes
  M. G. Linton, R. B. Dahlburg and S. K. Antiochos
Notes on experimental technique and apparatus

Figure 1  Circuit diagram: RL1 and RL2 balance relays  
Ericson D/DC A 049; RL3, RL4, RL5 and RL6, Varley  
CAA/12H; semiconductors, DZ1 zener IS207; DZ2 and  
DZ3 zener IS208; D1 and D5, 15130; T1, T2, T3 and T4,  
25382

gearied to the output spindle and spring-loaded to take up  
backlash.

Figure 1 shows the circuit in balance. A change in phototransistor current puts relay RL1 off balance, and further  
change puts relay RL2 off balance as well, causing the motor  
to run from the 5 V or 15 V line respectively. A change in  
the opposite sense produces the reverse effect.

To reduce overshoot at balance the motor is braked by  
the armature shunting effect of RL3/A and RL4/A, thus  
reducing the dead zone to 1% fsd. Zener diodes stabilize  
the lamp supply. To facilitate cam design, the meter (figure 2)  
indicates the extremities of the wiper traverse on the pro-  
grammed potentiometer.

The time for full scale deflection is 7.5 s. This imposes an  
upper frequency limit dependent on the accuracy and amplitude  
required. Periodic adjustment is necessary to maintain the  
relays in balance.

To test linearity, five runs were made using a cam (similar  
to figure 2) with 20 equal steps. A plot of desired against  
actual voltage gave a straight line with a standard deviation  
of 0.85%, which is good considering this included errors in  
plotting, cam cutting, potentiometer nonlinearity if any, and  
measuring equipment.

Figure 2  Paper cam and follower

The instrument works well and is suitable for many process  
control applications.

Acknowledgments

The author acknowledges the constructional help of Mr C  
Cook and the encouragement of Mr L J Moulsley.

Printed in Great Britain

Corrigendum

*Analysis of a laser-Doppler anemometer* by R J Adrian and  
R J Goldstein  

In the third line above equation (9) $1/\Delta \omega_{12}$ should be replaced  
by $1/\Delta \omega_{1}$

Equation (30) should read

$$\langle |F_x|^2 \rangle = \frac{4}{\pi \Delta \nu \Delta \tau_{\eta}} \int N_{10} |F(\omega)|^2 \, d\eta \, dz_0$$

(30)