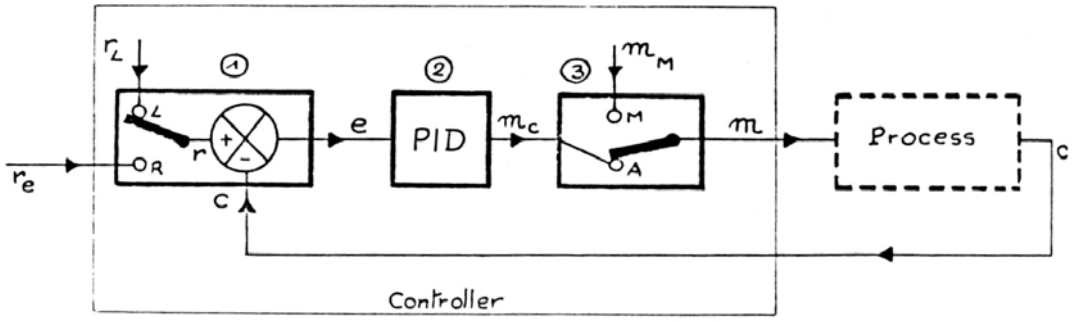
Endüstriyel Otomatik Kontrol Sistemleri
Y.Doç.Dr. Tuncay UZUN, EHM 1406105

Dersin Konusu: **Ayrık Devre Elemanlar ile Kontrol ve Uygulamaları**

Dersin Amacı:
Ayrık devre elemanları kullanılan endüstriyel otomatik kontrol sistemlerinin denetleyici özellikleri, iç donanımı ve elektronik devrelerinin incelenmesi, uygulama devrelerinin analizi, incelenmesi ve tasarlanmasının öğretilmesidir.

Elektronik Denetleyicilerin özellikleri, iç devreleri



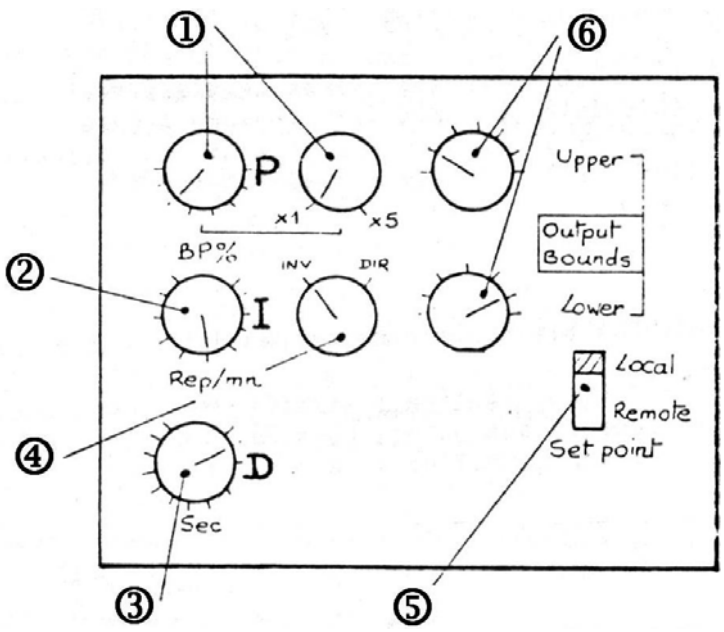
r : referans girişi (set-point)
r_L : iç referans girişi
r_e : dış referans girişi
e : hata işareti
m : denetlenen değişken (denetleyicinin çıkış işareti)
m_M: elle belirlenen çıkış işareti
m_C : hesaplanmış çıkış işareti
c : denetlenen sürecin değişkeni (denetleyicinin giriş işareti)

Bir PID denetleyicinin ayarları

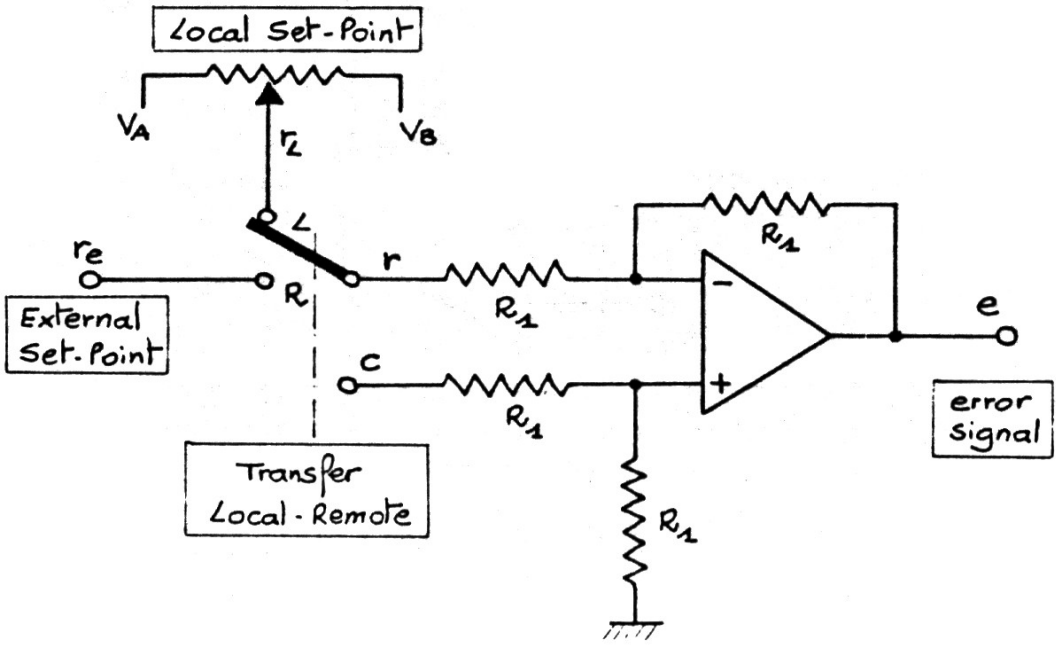
1) Oransal kontrol ayarı, P
2) Entegral kontrol ayarı, I
3) Türev kontrol ayarı, D
4) Normal/Ters anahtarı
5) İç/Dış anahtarı
6) Kontrol edilen değişkenin alt ve üst sınır ayarları

$$K\left[1+\frac{1}{sT_I}\right]\left[1+sT_D\right]$$

$$K\left[1+\frac{1}{sT_I}+sT_D\right]$$

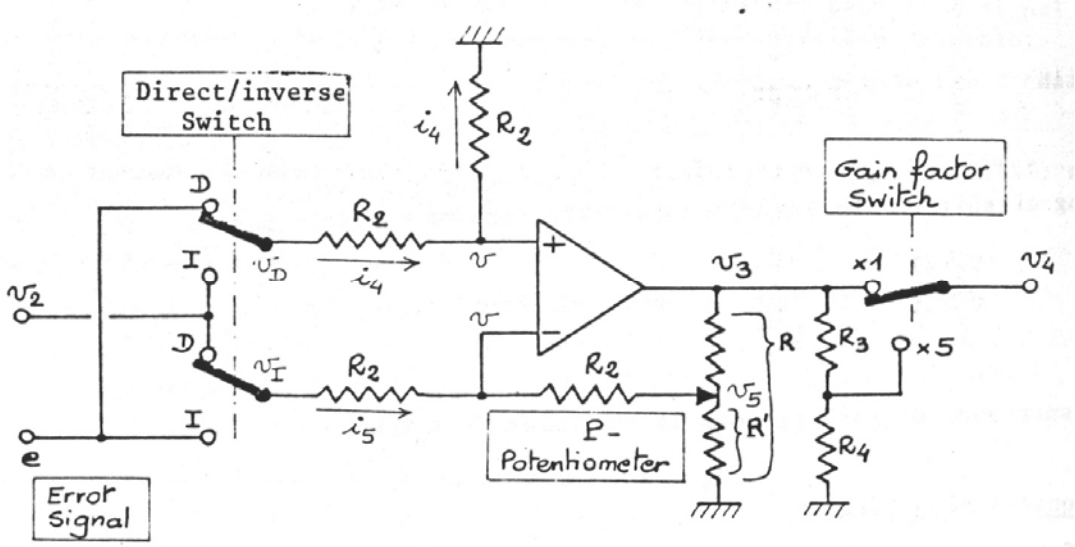


Giriş kontrol devresi



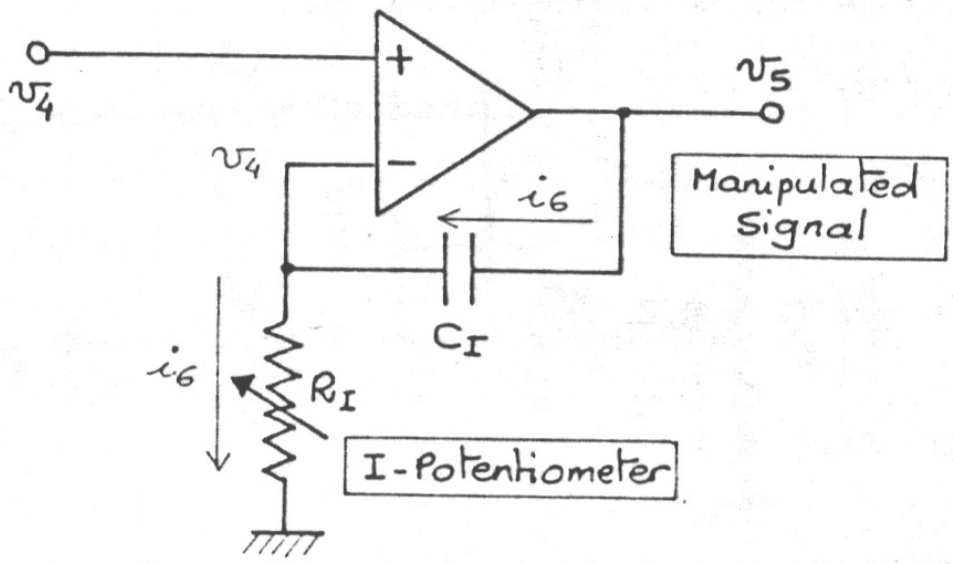
$$e = c - r$$

Oran kontrol devresi



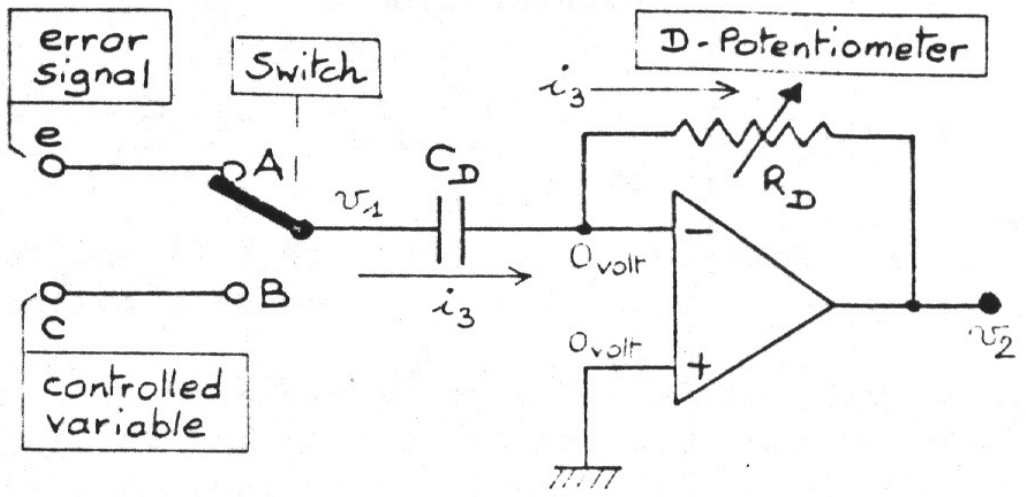
$$V_3 = K\,(V_e - V_2)$$
$$V_3 = (R/R')\,(V_e - V_2)$$

Entergral kontrol devresi



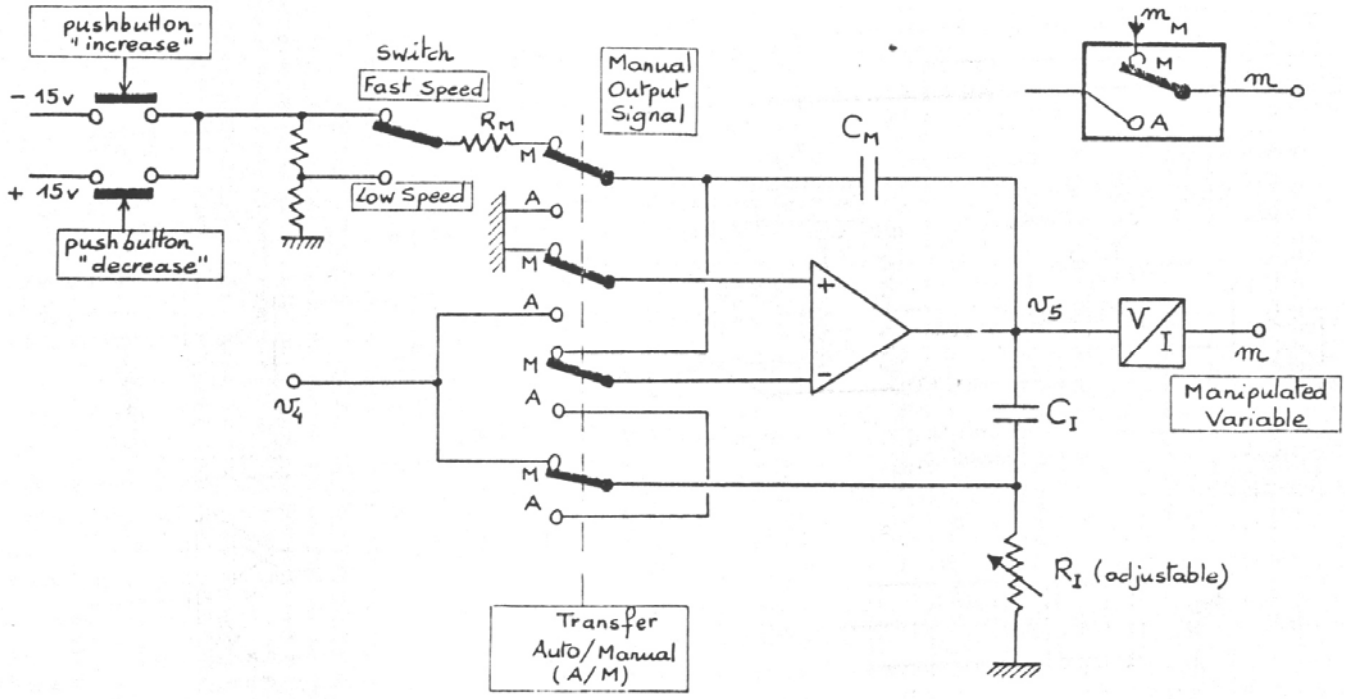
$$V_5(s) = \left[1 + \frac{1}{R_I C_I s}\right] V_4(s)$$

Türev kontrol devresi

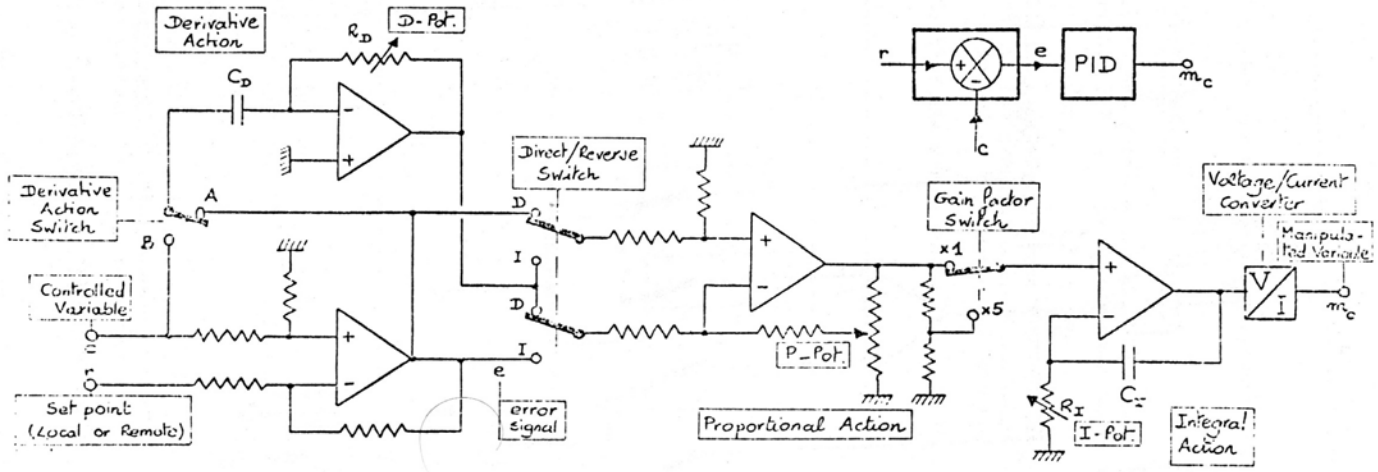


$$V_2(s) = -R_D C_D s V_1(s)$$

Diğer ayarların devresi

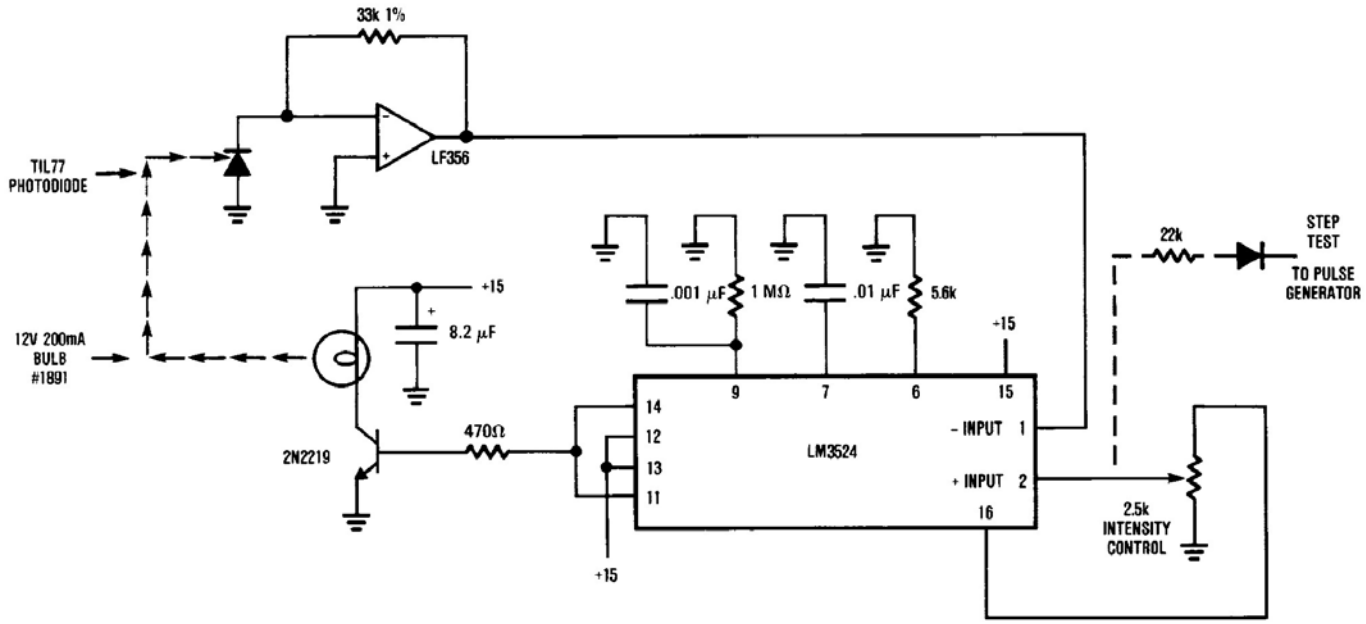


PID kontrol devresi

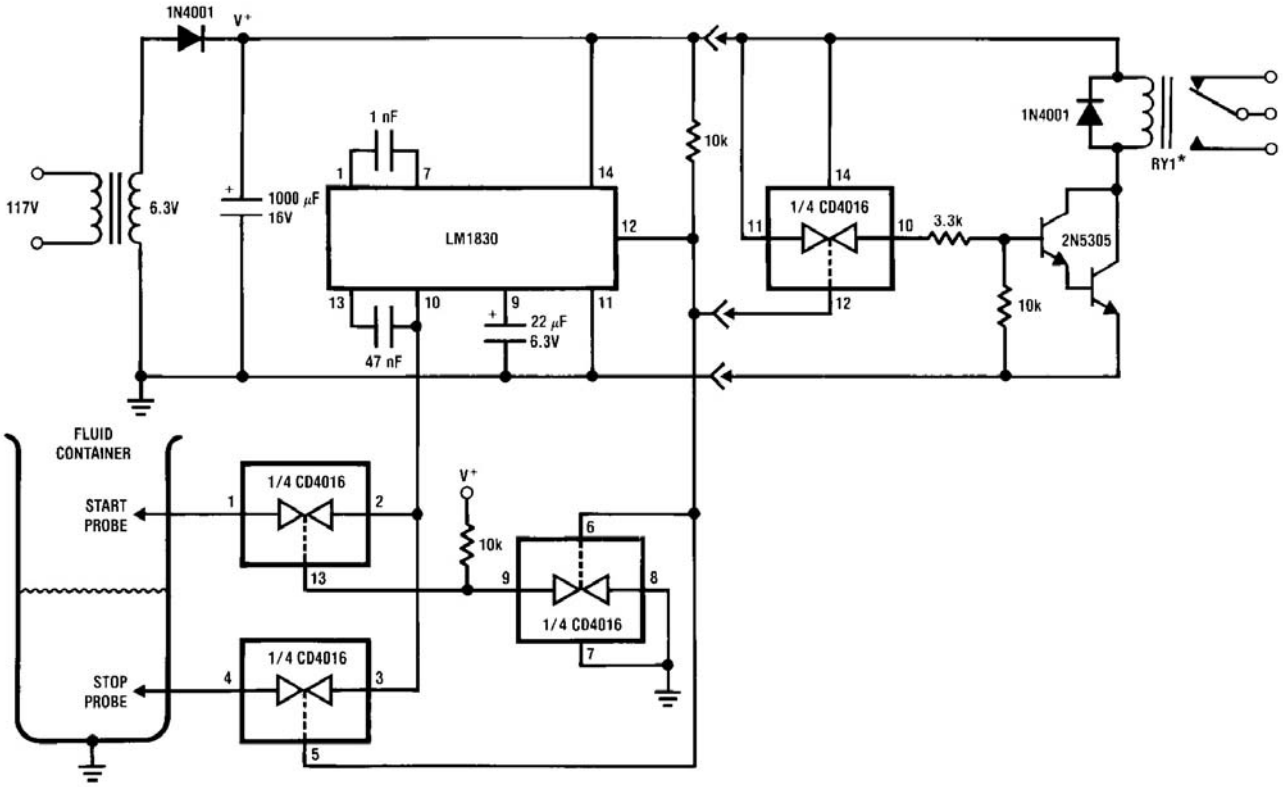


Ayrık devre elemanları kullanılan kontrol Uygulamaları

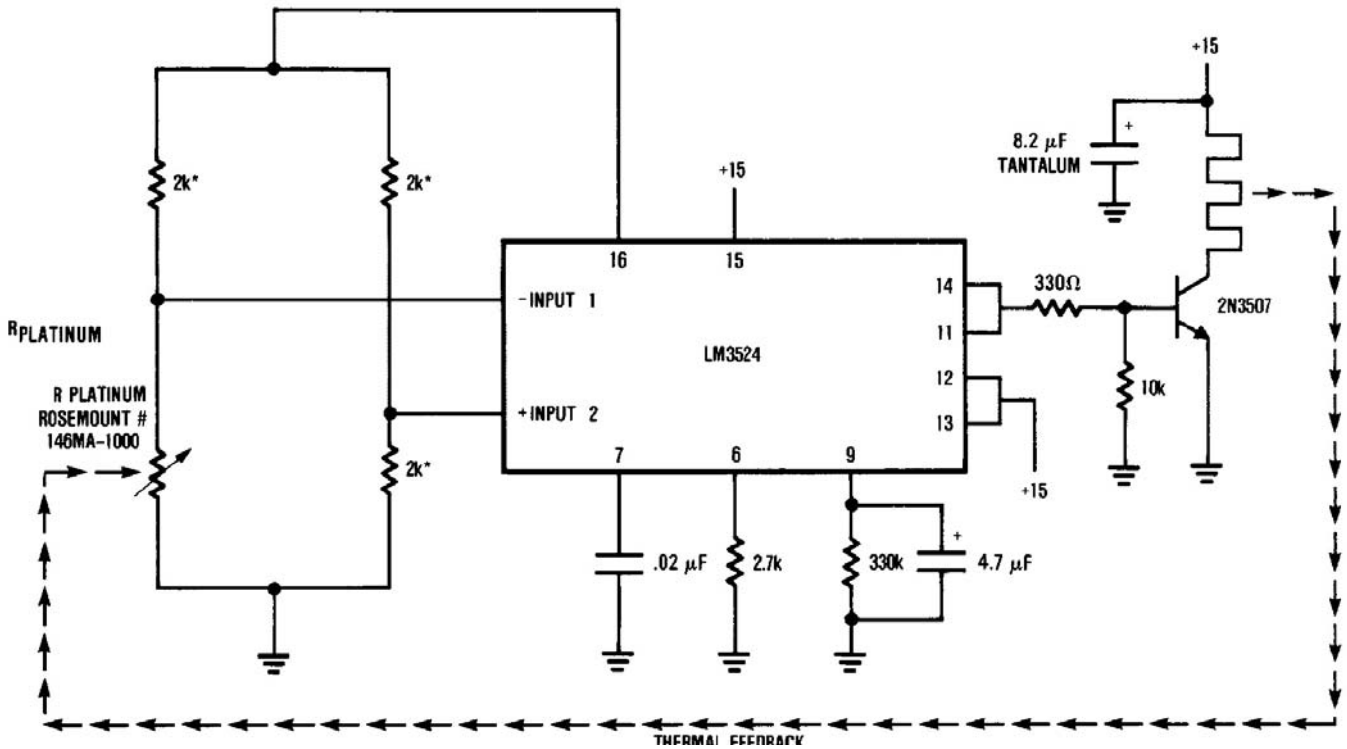
Parlaklık kontrol devresi



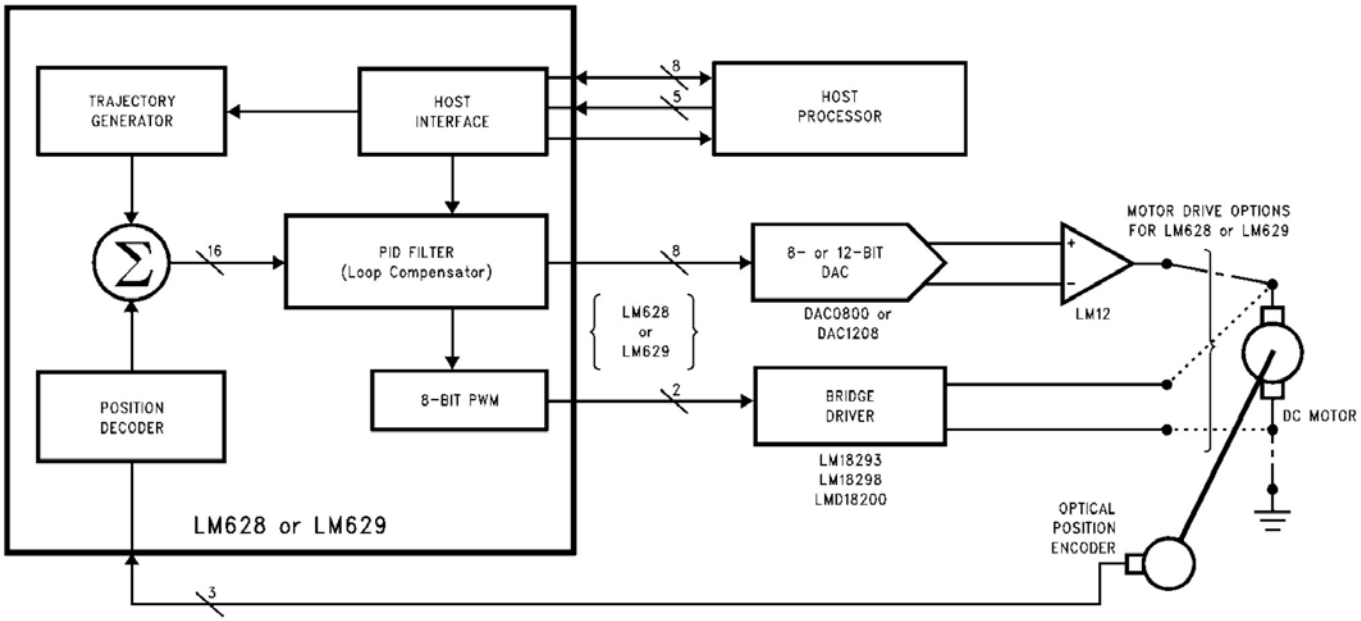
Sıvı seviye kontrol sistemi



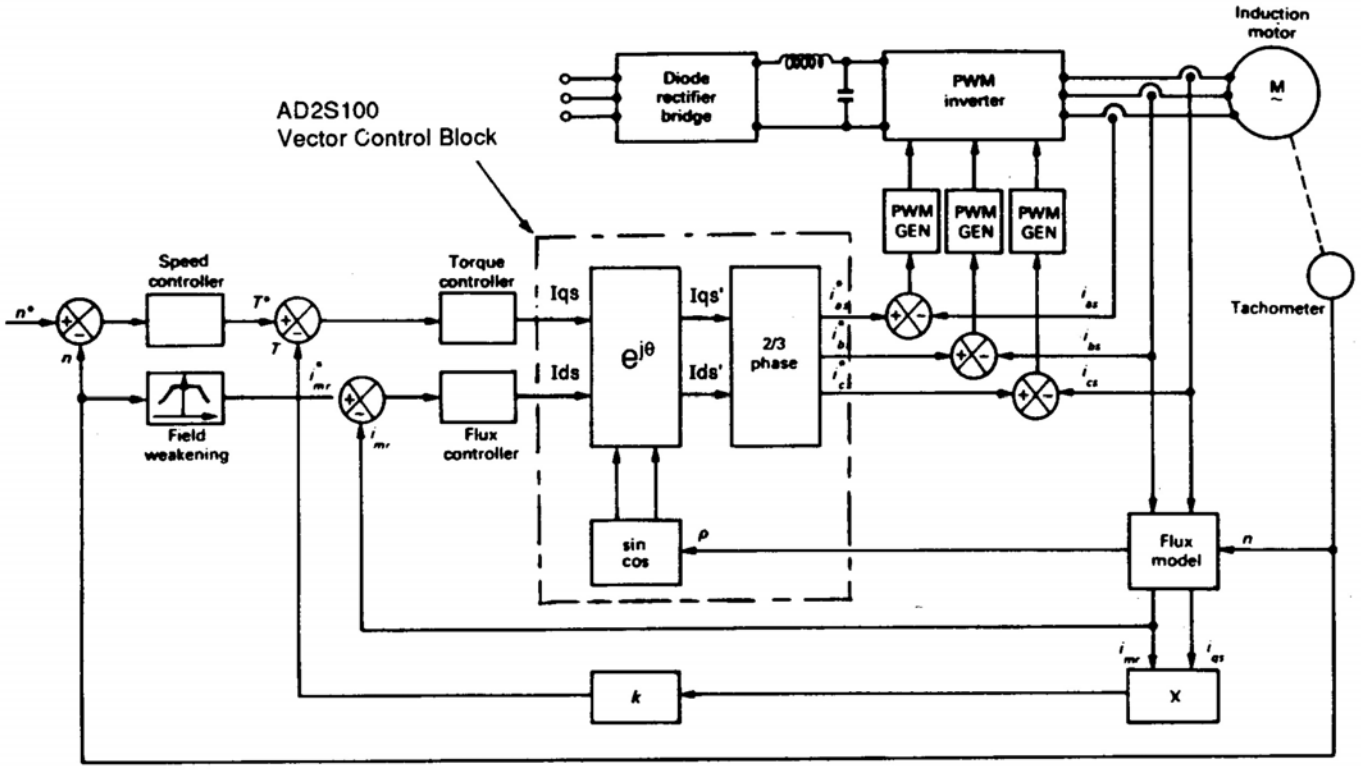
Sıcaklık kontrol sistemi



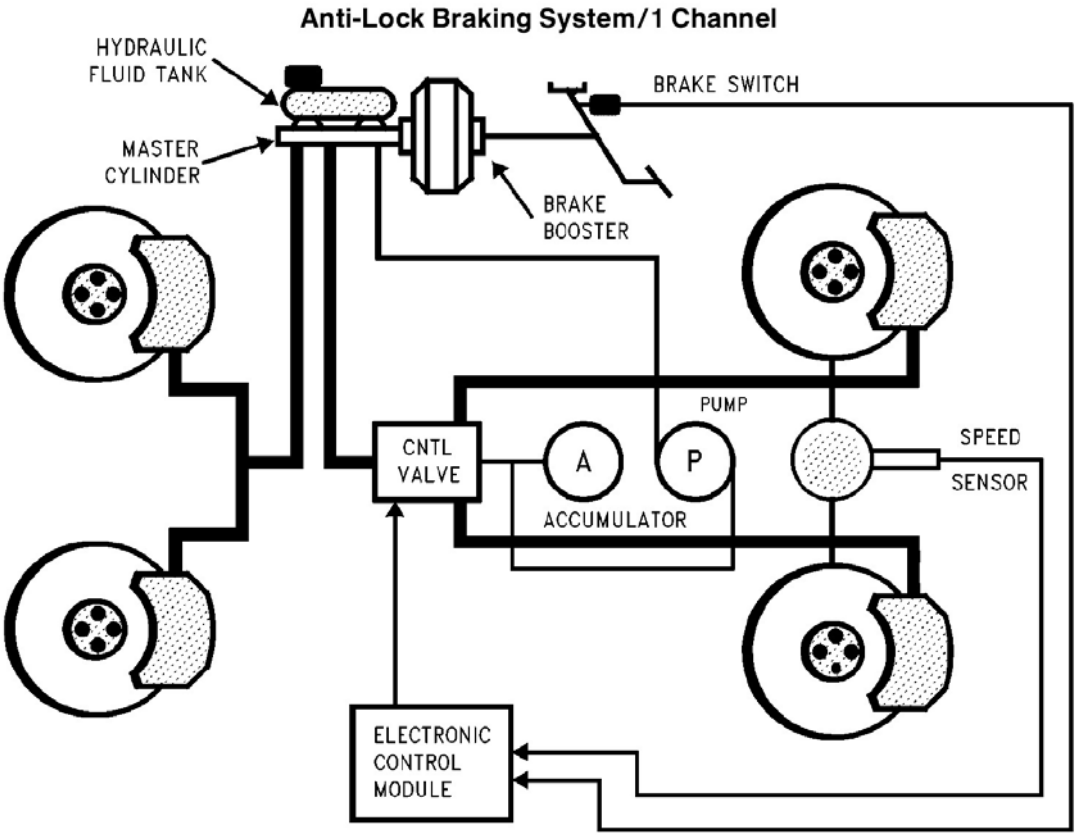
Konum kontrol sistemi



AC motor vektör kontrol sistemi



Fren kontrol sistemi



KAYNAKLAR

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