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LAMPIRAN

Lampiran 1 Dokumentasi









Lampiran 2 Data Komponen

Motor DC G12-N20







PLC Siemens Simatic S7-300 CPU314C-2DP



- The figure shows the following
- integrated I/Os:
- (1) Analog I/Os
- (2) each with 8 digital inputs
- (3) each with 8 digital outputs
- (4) Front connectors (front doors are open)

"Petunjuk Penggunaan Konveyor Pemisah Barang Otomatis Berbasis PLC Siemens Simatic S7-300"



Muhammad Ihtisan D411 15 314

LABORATORIUM SISTEM TENAGA DAN INSTALASI LISTRIK DEPARTEMEN ELEKTRO FAKULTAS TEKNIK UNIVERSITAS HASANUDDIN 2020

Petunjuk Penggunaan Konveyor Pemisah Barang Otomatis Berbasis PLC Siemens Simatic S7-300

Sistem pemisah barang otomatis terdiri dari PLC (Programmable Logic Controller) Siemens S7-300 CPU 314 yang berfungsi sebagai pengontrol, dan rangkaian elektronik pendukung yang berfungsi sebagai pemberi sinyal masukan untuk digital input PLC serta rangkaian motor dc untuk digital output PLC. Sistem ini bekerja dengan cara membawa benda dengan menggunakan konveyor belt. Benda tersebut kemudian akan dipisahkan berdasarkan dimensi ketinggian dan jenis materialnya. Adapun langkah-langkah pengoperasian sistem konveyor pemisah barang otomatis adalah sebagai berikut:

A. Pembuatan Program Diagram Ladder

1. Buka software TIA Portal V14



 Setelah muncul tampilan awal TIA Portal V14, pada menu Start tekan Create new project. Isi Project name, Path (lokasi penyimpanan), Author, dan Comment jika diperlukan. Apabila program sudah dibuat sebelumnya, cukup tekan Open existing project dan buka program yang telah dibuat.



 Pada menu Devices & networks, tekan Add new device untuk memilih tipe PLC dan CPU yang digunakan. Pada sistem ini menggunakan PLC Siemens Simatic S7-300 dangan CPU 314C-2 PN/DP.

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 Selanjutnya mengatur alamat input dan output agar mempermudah dalam proses pembuatan diagram ladder. Untuk alamat digital i/o diubah menjadi 0 sedangkan alamat analog i/o diubah menjadi 10.

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5. Pembuatan PLC tags. PLC tag berisi daftar input, output, dan memory yang digunakan dalam program. Daftar ini terdiri dari nama, tipe data, dan alamat program.

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6. Pembuatan ledder diagram.

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Adapun ladder diagram konveyor pemisah barang otomatis, yaitu:









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B. Mendownload Program ke PLC

Sebelum mendownload program ke PLC, terlebih dahulu kita hubungkan komputer ke PLC dengan menggunakan kabel Ethernet. Setelah komputer dan PLC terhubung, kita dapat melakukan proses download pada software TIA Portal V14.

1. Tekan tombol download, kemudian akan muncul jendela seperti pada gambar. Pilih Type of PG/PC interface dan PG/PC interface seperti pada gambar dan tekan Start search untuk mencari perangkat.

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3. Setelah muncul jendela Load preview, tekan Load dan program akan terdownload ke perangkat PLC.

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Untuk menampilkan proses yang sedang berlangsung pada program diagram ladder, dapat dilihat dengan menekan Go online kemudian aktifkan tombol monitoring. Untuk mematikannya cukup menekan tombol Go offline.

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- C. Rangkaian Perangkat Keras (Hardware)
 - 1. Rangkaian Sistem





2. Rangkaian DC-DC Stepdown IC LM317T dan Relay

3. Gambar Conveyor Belt



D. Cara Kerja Sistem Conveyor Pemisah Barang Otomatis

Sistem konveyor pemisah barang otomatis ini bekerja memisahkan jenis barang yang berbahan metal dan barang yang memiliki ukuran tinggi 6 cm. Pada sistem ini terdapat tiga buah tombol yang berfungsi untuk mengatur kerja dari konveyor. Tombol start berfungsi untuk menjalankan sistem, tombol stop berfungsi untuk menghentikan konveyor, dan tombol emergency berfungsi sebagai pengaman ketika terjadi kesalahan pada sistem dengan cara menghentikan semua proses yang sedang berlangsung.

Pada saat tombol start ditekan, konveyor akan berada pada posisi awal yaitu motor pendorong 1 dan motor pendorong 2 akan bergerak mundur sampai menyentuh limit switch 2 dan 4. Setelah konveyor telah berada pada posisi awal maka motor konveyor (channel %Q0.0) akan aktif. Ketika sensor metal (channel %I1.0) mendeteksi benda berbahan metal yang lewat, maka data akan di kirim ke PLC kemudian PLC akan mulai menghitung delay waktu sampai benda berada di depan pendorong 1. Setelah delay waktu tercapai, motor pendorong 1 akan berputar maju (channel %Q0.1) sampai menyentuh limit switch 1. Ketika limit switch 1 tertekan, motor pendorong 1 akan berputar mundur (channel %Q0.2) dan akan berhenti ketika menyentuh limit switch 2. Proses ini sama dengan ketika sensor infrared (channel %I1.1) mendeteksi benda yang tinggi (lebih dari 6 cm), data akan di kirim ke PLC kemudian PLC akan mulai menghitung delay waktu sampai benda berada di depan pendorong 2. Setelah delay waktu tercapai, maka motor pendorong 2 akan berputar maju (channel %Q0.3) sampai menyentuh limit switch 3. Ketika limit switch 3 tertekan, motor pendorong 2 akan berputar mundur (channel %Q0.4) dan akan berhenti ketika menyentuh limit switch 4. Proses ini akan terus berjalan sampai kita menekan tombol stop untuk menghentikan konveyor.