

Plasma / Laser Cutting - Safety

July 22, 2008

Issues / Problems / Challenges

- 1) Motion Safety issue occurred in existing system, need integrated safety in servo drives.
- 2) Need to meet European Safety Regulations
- 3) Need simple spare part handling and avail
- 4) Heavy competition from LENZE

Solution

Controller: Customer's own controller
Controller Software: Proprietary
Interface: +/-10V Speed Ref
Servo: Sigma-5 SGD5 (5-8 axis)
Power Level: 400 W up to 7.5 kW
Voltage Level: 400 VAC 3 Ph.

Performance Achieved:

Throughput: up to 30 m/min cut spd
Accuracy: ??
Auxiliary Functions: Safe torque off STO, SIL2, and Safety Category 3 achieved.

Customer Information

Industry: Machine Tool
Application: Plasma and Laser Cutting

Customer Controller

+/- 10V Analog
Velocity Reference
(5 to 8 Axis)

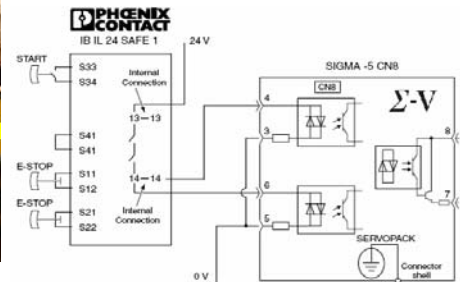
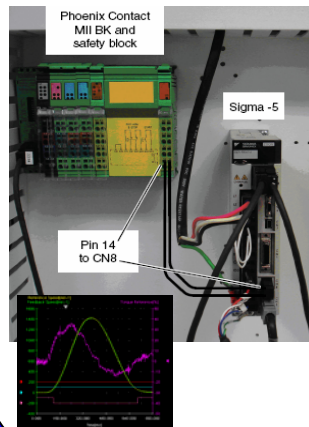
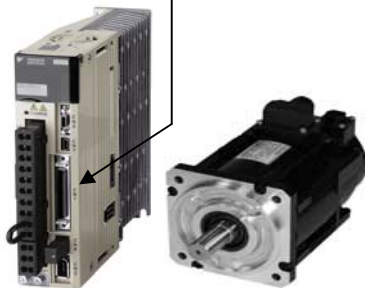
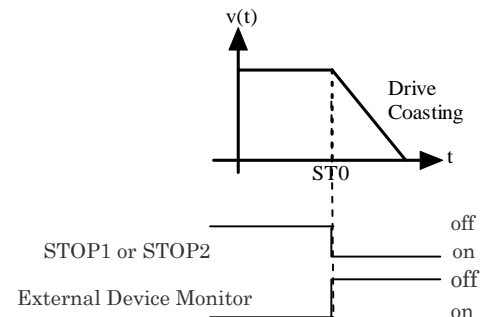


Figure 1: Connection diagram between Sigma-5 and IB IL 24SAFE 1 safety terminal

1: Safe Stop 0 (stop category 0)



Application Description:

This OEM builds Plasma/Laser cutting machines that cut steel, throughput depends on the cutting tool used. Experienced a watchdog problem in their own controller which led to uncontrolled motion. Several incidents occurred where the machine crashed because it didn't know to stop. Although nobody was hurt, the OEM views this as a serious safety concern that needed to be addressed. They requested integrated safety stop in the servo drive to act as a backup if the controller experienced an issue. The result is a safe machine with with increased performance. According to the customer, these machines deliver "exceptional unrivalled" cutting accuracy, productivity and quality throughout the plasma cutting thickness range from 0.75 to 30mm. In combination with its sophisticated process integration, it delivers the highest cut quality parts at the most economical price. Machine speeds up to 30m/min. Low maintenance and now with added safety requirements are additional features.

Differentiating Solution Features

- 20bit encoder, 1600Hz bandwidth, advanced and intelligent filter and load modeling.
- Built-in Safety features
- Globally supported products
- Established relationship between US and European facilities

Resulting Solution Benefits

- Settling time less than 2 msec!
- Able to meet European Safety Regulations.
- Motion Stopping interlock prevents human injury.
- Stock components that are available multi region
- Future plans to build Mechatrolink into controller to use Mechatrolink Sigma-5 versions for higher performance and data diagnostics.