YASKAWA

Successful Solution

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 availability
4) Heavy competition from LENZE

Solution

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

Performance Achieved

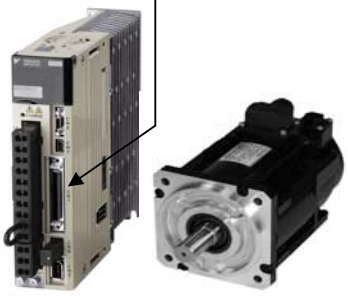
Throughput:	30 m/min cut speed
Auxillary Functions:	Safe torque off STO, SIL2, EN954-1 Cat 3 Safety

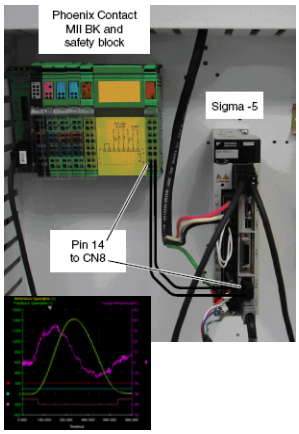
Customer Information

Industry:	Machine Tool
Application:	Plasma and Laser Cutting

Customer Controller

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





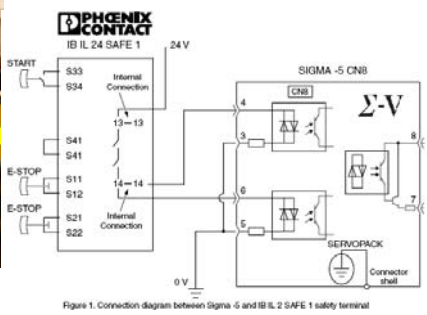
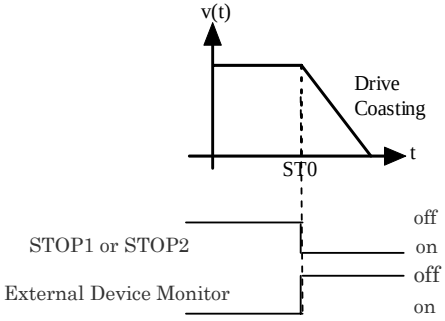


Figure 1. Connection diagram between Sigma -5 and IB IL 2 SAFE 1 safety terminal

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 did not know to stop. Although nobody was hurt, the OEM viewed 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 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, the Sigma-5 delivers the highest quality parts at the most economical price. Machine speeds up to 30m/min. New features provide for Low maintenance and added safety.

Differentiating Solution Features	Resulting Solution Benefits
- 20-bit encoder, 1600Hz bandwidth, advanced and intelligent filter and load modeling.	- Settling time less than 2 msec!
- Built-in Safety features	- Able to meet European Safety Regulations. - Motion Stopping interlock prevents human injury.
- MECHATROLINK-II digital motion network	- Higher performance and data diagnostics
- Globally supported products	- Stock components that are available multi-region