TRINAMIC MOTION CONTROL

WHAT IS stallGuard™ AND HOW TO USE IT

MAR-2009

WEBINAR GG+TW

TRINAMIC MOTION CONTROL

WEBINAR: Speaker

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Sales Director

- responsible for the worldwide sales
- degree in electrical engineering
- working with TRINAMIC since 2001

TOBIAS WENDLANDT

Field Application Engineer

- responsible for the technical sales support
- degree in electrical engineering
- working with TRINAMIC since 2008

WHAT IS: stallGuard™

TRINAMIC
MOTION CONTROL

PATENTED FEATURE FOR STEPPER MOTORS

stallGuard™

- sensorless **stall** detection
- sensorless load detection

STALL DETECTION: Applications

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MOTION CONTROL

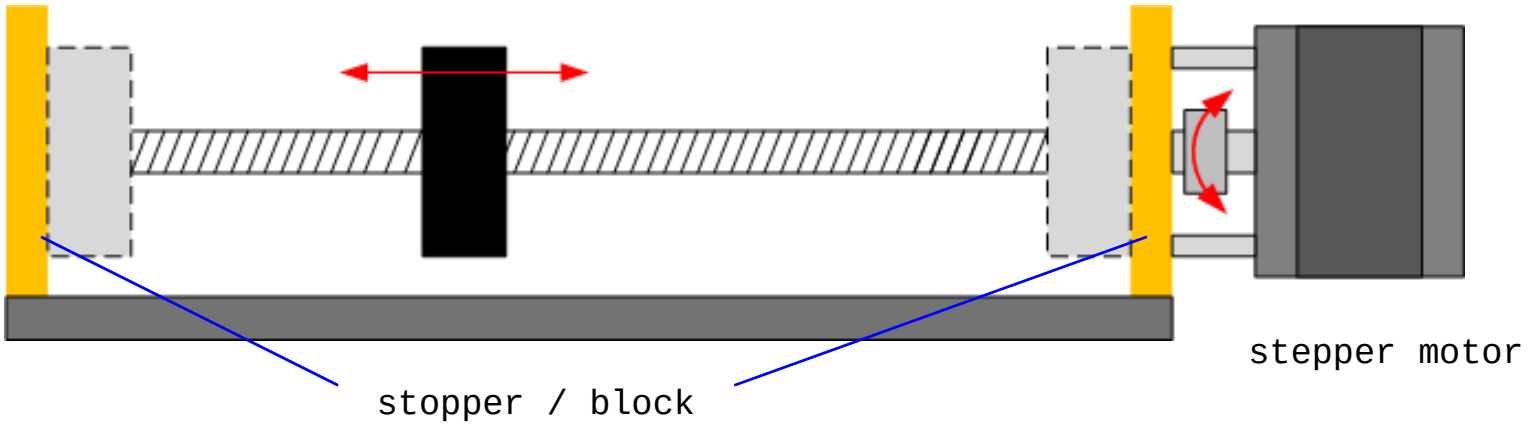
FOR OPTIMIZED AND SYMPLIFIED SYSTEMS

- **homing** without end- or reference switches
- **self-calibration**
- **distance measurement**

stallGuard™

APPLICATION: Homing

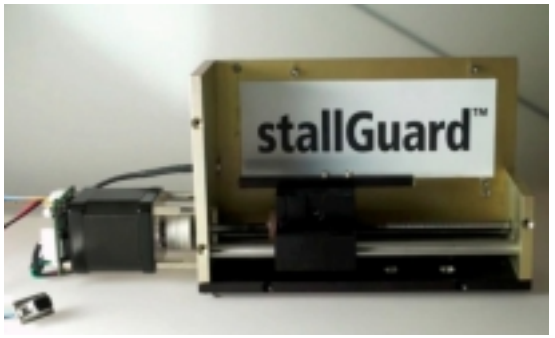
OF A LINEAR STEPPER MOTOR SYSTEM



Have a look at the YouTube video:

www.youtube.com/watch?v=7eCLV7pALig

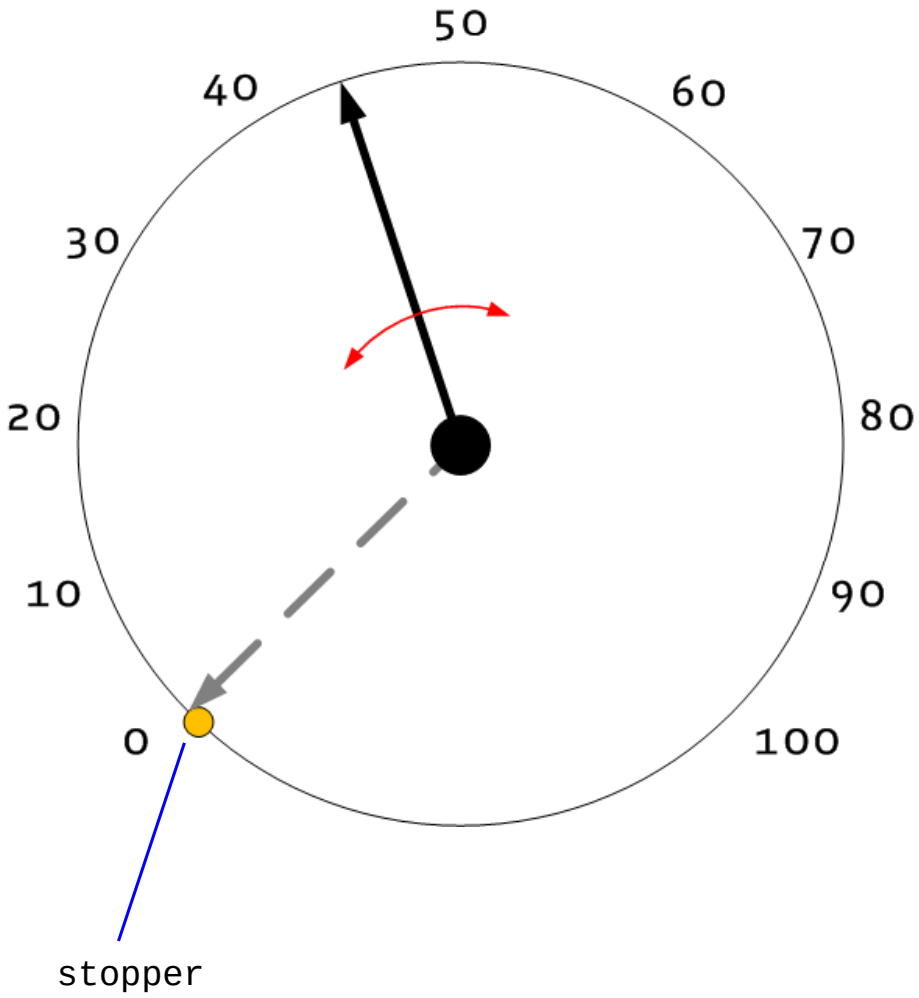
TrinamicMC



APPLICATION: Homing

TRINAMIC
MOTION CONTROL

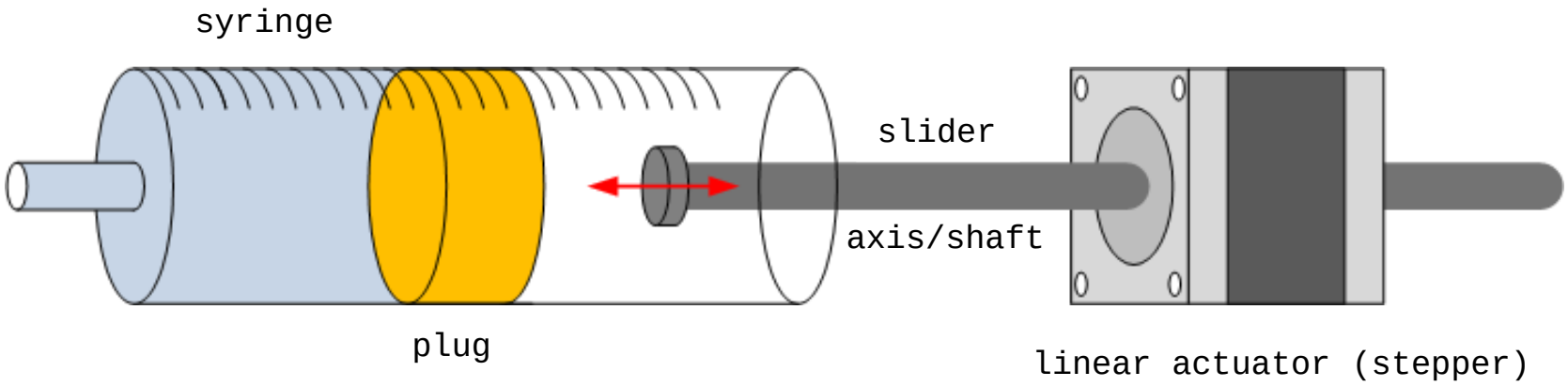
OF A ROTATIVE STEPPER MOTOR SYSTEM



APPLICATION: Self-Calibration

TRINAMIC
MOTION CONTROL

OF A LINEAR STEPPER MOTOR SYSTEM



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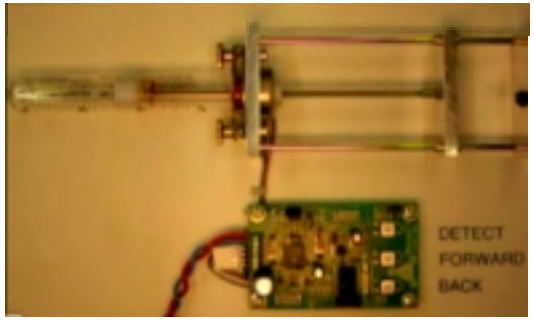
TrinamicMC



APPLICATION: Self-Calibration

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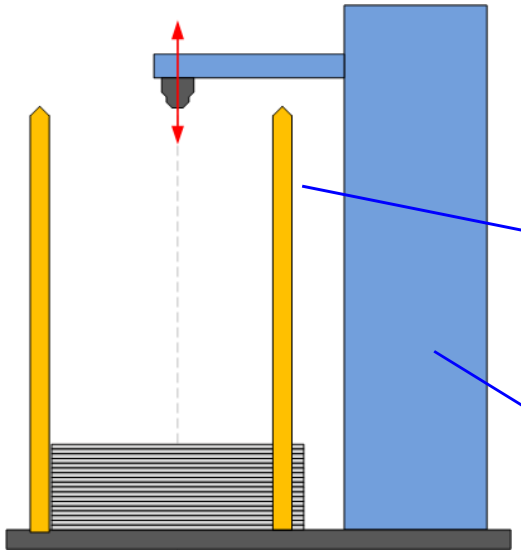
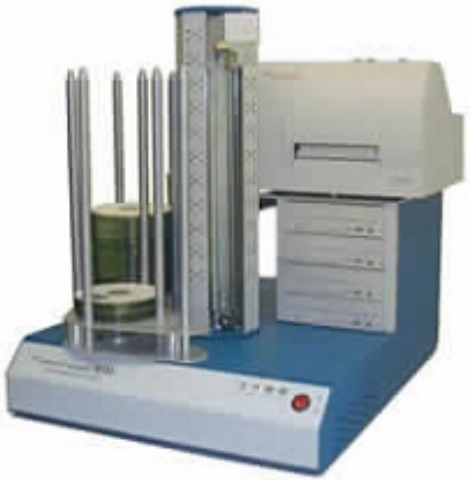
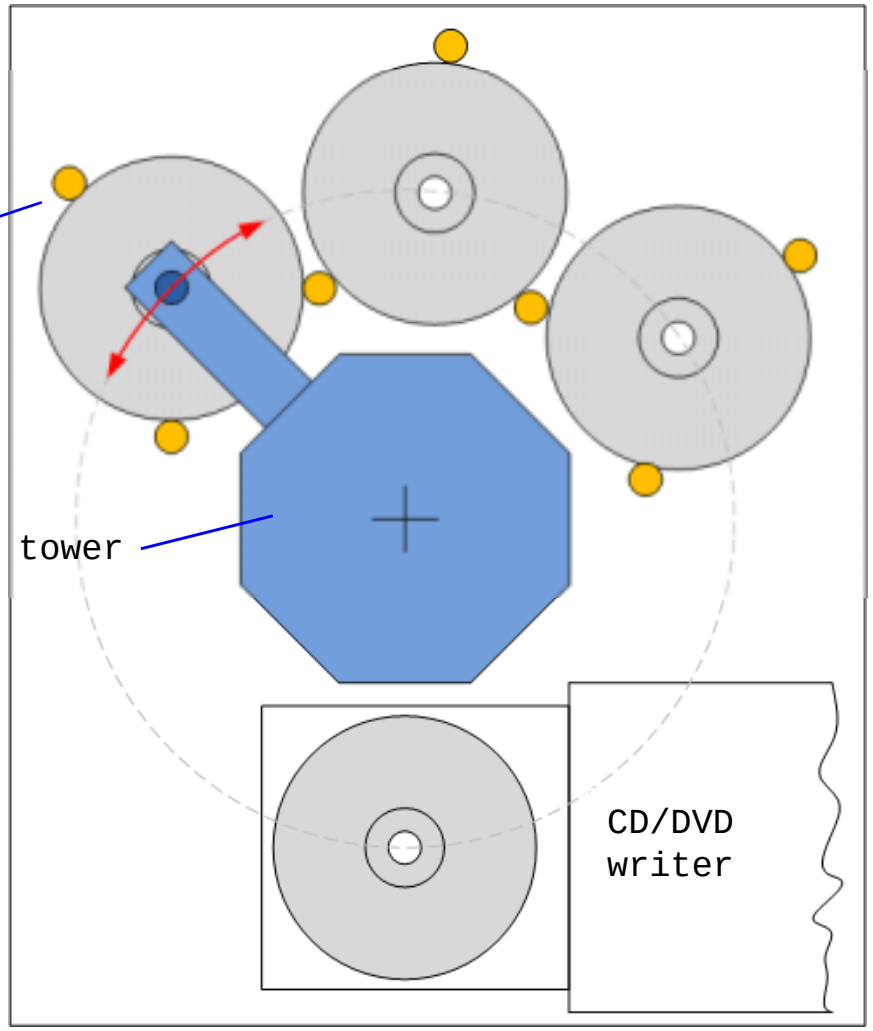
MOTION CONTROL

OF A ROTATIVE STEPPER MOTOR SYSTEM





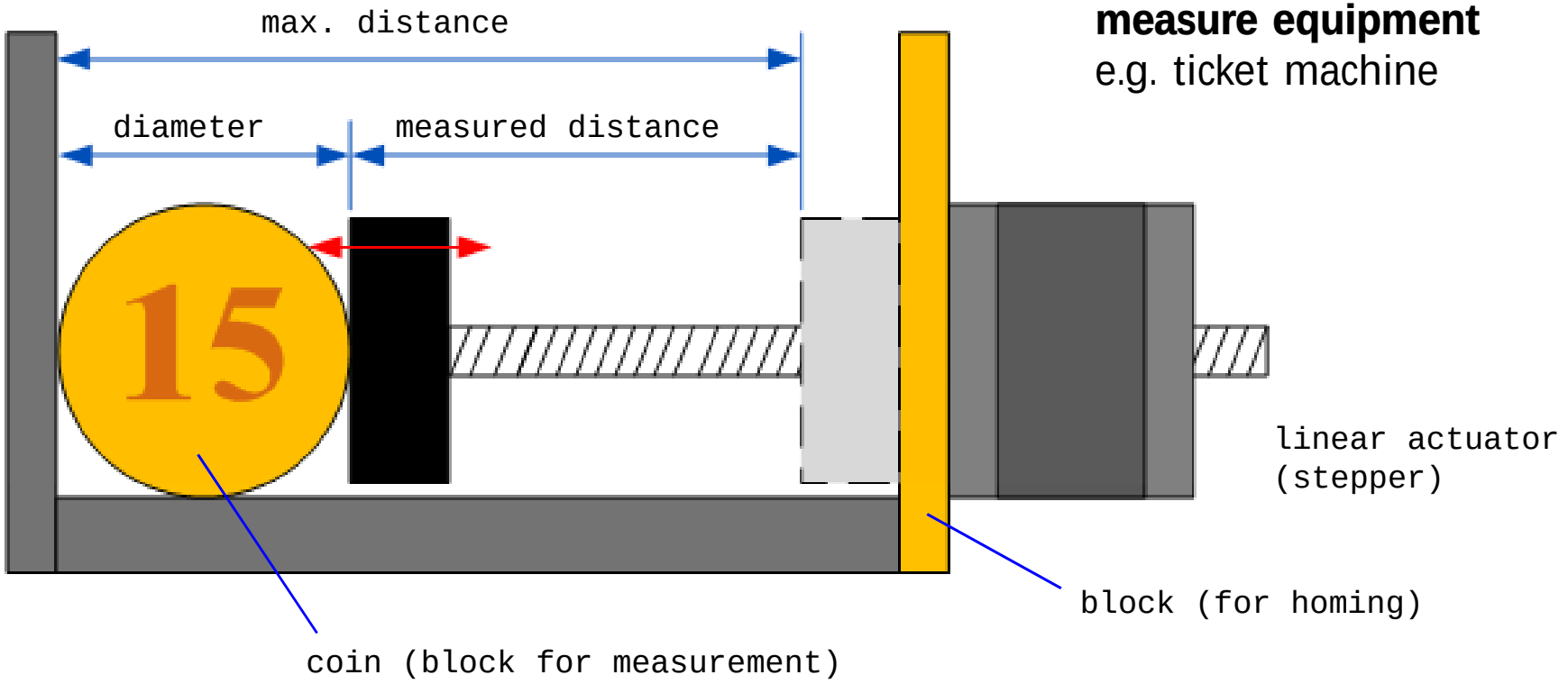
CD/DVD COPY ROBOT



APPLICATION: Measurement & Homing

OF A LINEAR STEPPER MOTOR SYSTEM

coin diameter measure equipment
e.g. ticket machine



coin diameter = max. distance – measured distance

LOAD DETECTION: stallGuard™ Bargraph

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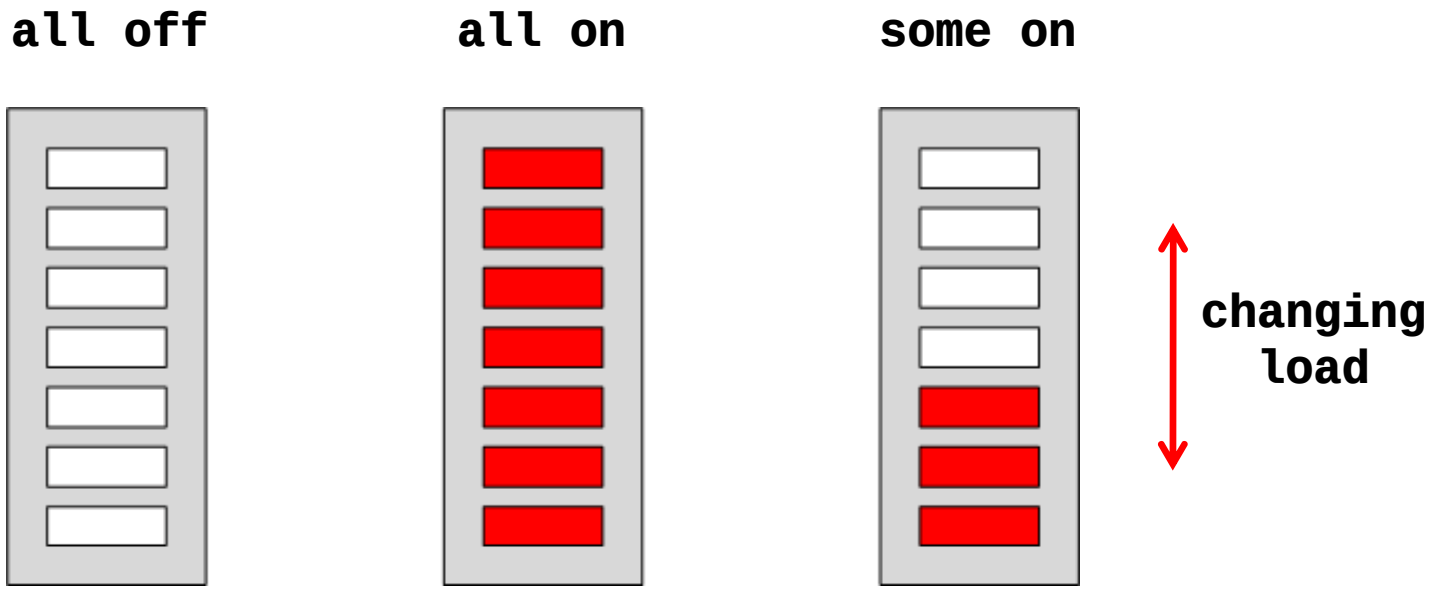
3-BIT VALUE = 8 DIFFERENT LOAD LEVEL



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ADJUSTING TOOL: Integrated Circuits

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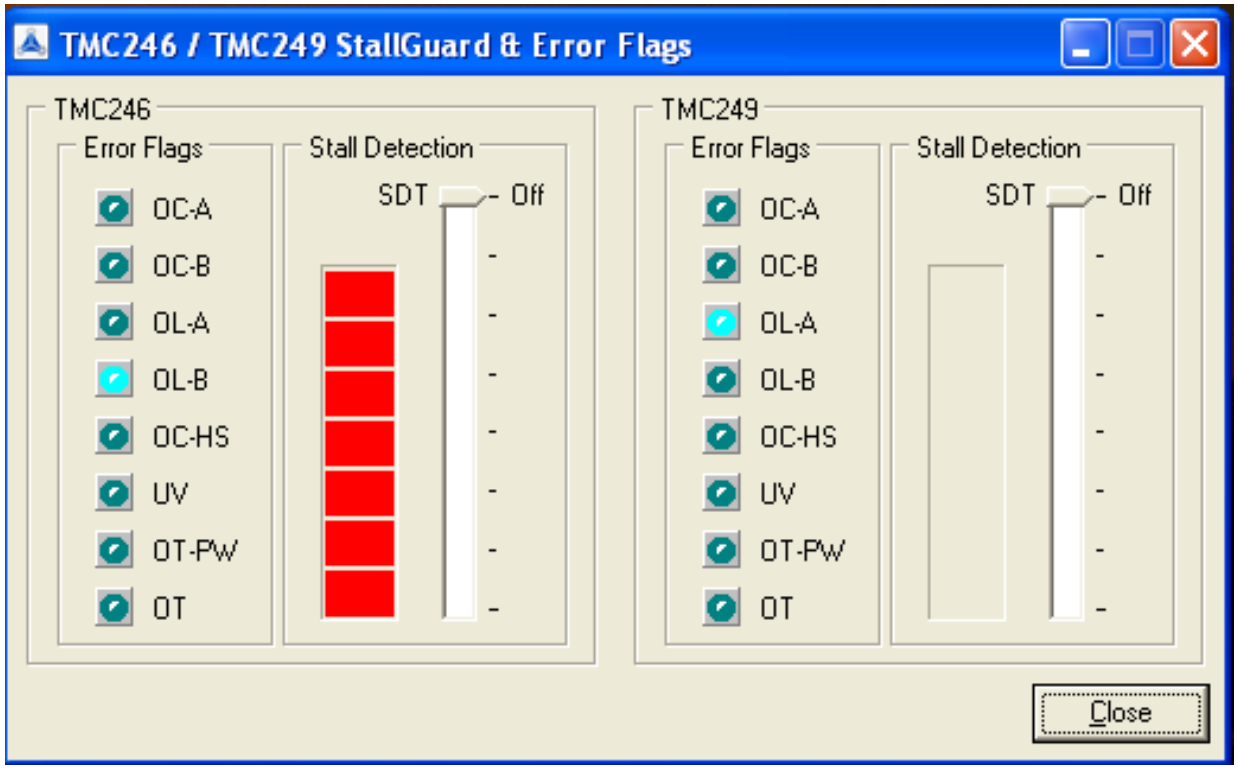
EVALBOARD SOFTWARE: TMC428A-EVAL



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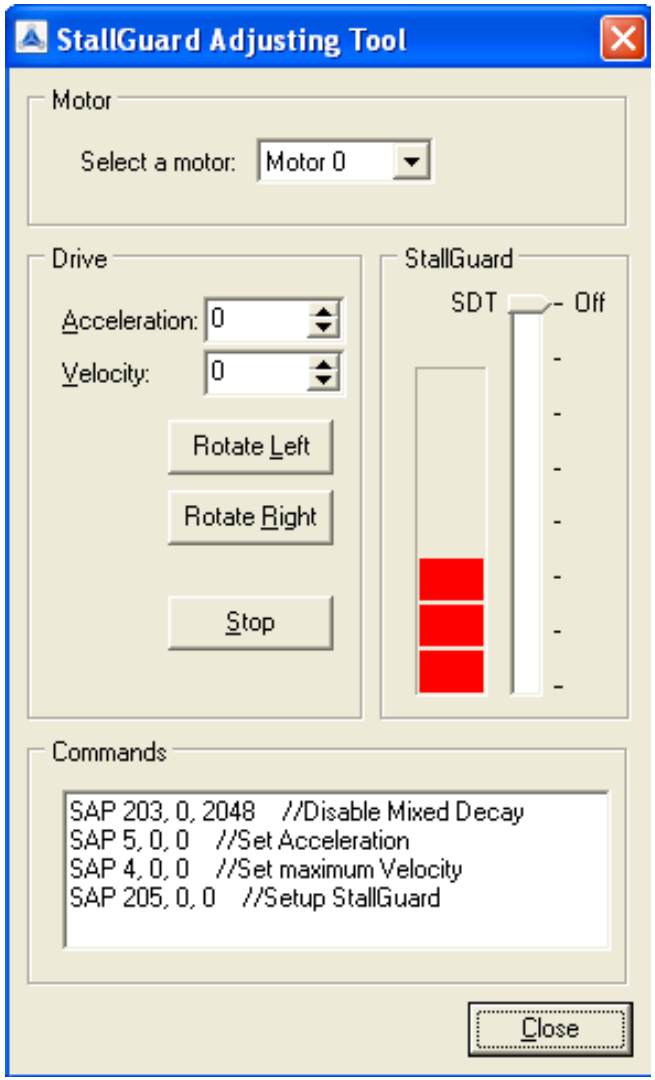
IC products with stallGuard™

TMC246 and **TMC249**

ADJUSTING TOOL: Modules & PANdrives

TMCL-IDE (INTEGRATED DEVELOPMENT ENVIRONMENT)



- most Trinamic modules (TMCM)
- most Trinamic PANdrives™

OPERATING CONDITIONS: Requirements

TO USE THE STALL AND LOAD DETECTION

- minimum velocity ➔ stallGuard™ needs BACK EMF
- constant velocity ➔ stallGuard™ level depends on velocity

stallGuard™ is not an encoder replacement!

for evaluation and optimization of system conditions

➔ **stallGuard™ profiler software tool**

PROFILER TOOL: Scanning the system

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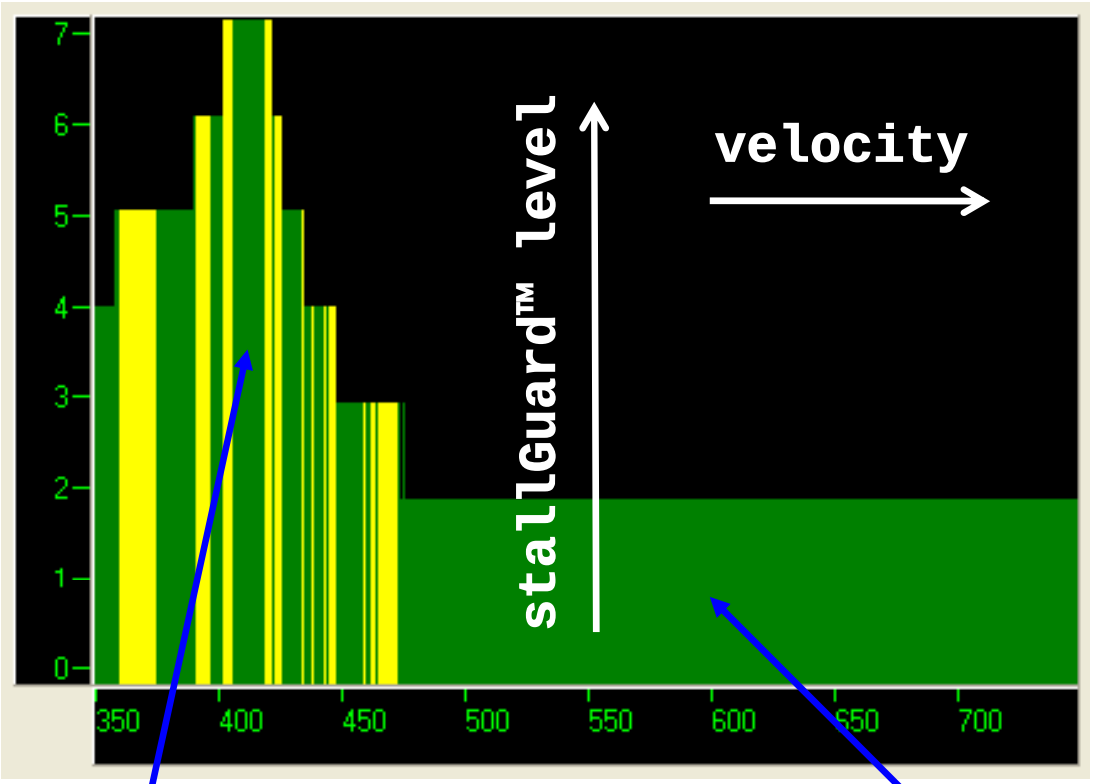
LOAD LEVEL ON DIFFERENT VELOCITIES



10 measurements
per velocity:

- green →
10 equal values
- yellow →
1 bit variation
- red →
more than 1 bit variation

best operating condition

system resonances
(stepper motor system should not be operated in resonance condition)

MARKETS: stallGuard™

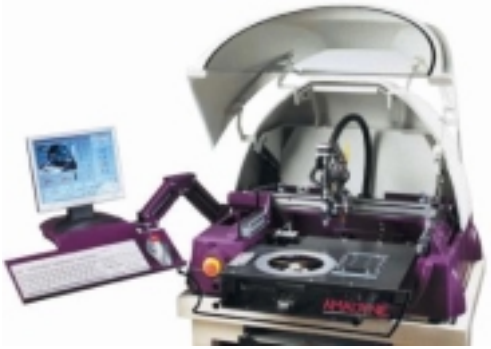
STEPPER MOTOR SOLUTIONS

The stallGuard™ feature gives advantage in many markets like:

- lab automation / biotec / medical equipment
- banking / card reader / POS
- semiconductor equipment
- high end office automation / printing
- robotics

blood analyzer

cash recycler / ATM



die bonder

skinning / strip equipment

CONCLUSION: why stallGuard™

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MOTION CONTROL

BENEFITS

- reduce cost - save money
- increase precision
- raise reliability
- simplify solutions

be more competitive with stallGuard™

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