



HEIDENHAIN

HEIDENHAIN INDIA **NEWS**

The HEIDENHAIN Newsletter keeps you informed!

Issue – June 2012

HEIDENHAIN India –
You can count on us!

- + TNC 620 Retrofit
- + Encoders for machining accuracy
- + HEIDENHAIN ID numbers / Certifications
- + TNCremo Tools
- + Training Schedule

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HEIDENHAIN

LOOKING FORWARD...

Dear Readers,

While India is the seventh largest consumer of machine tools in the world now, we are only 26th when it comes to machine tool exports. We export just 0.36% of what Japan does and only 1.7% of what China does! 70% of the machine tools, used in Indian factories, continue to come from overseas.

Most Indian machine tool manufacturers cater primarily to the large local market, though it is another matter that our machine tool consumption overall is still only about 7% of that of China. Less than 2% of the CNC machines used globally, are produced in India, even when 90% of all these machines get built in Asia. If India has to be a real global player. It is very clear that we need to develop our manufacturing base in terms of productivity and accuracy and enhance the crucial factor of global acceptance.

The immediate question that follows and can be answered within the scope of a short write up, is, what forms the core of a strategy to enhance machine tool accuracies? Though this is a vast topic, if I have to start with a key statement, I would start with an assertion that axis accuracies can be undoubtedly improved by **CLOSED LOOP OPERATION** and efficient compensation via Control Systems.

During early years of HEIDENHAIN operations in India, we had seen a tendency among some customers to bypass linear position feedback systems, on the slightest sign of difficulty in maintenance, which is no more the case. Thanks to our training efforts and service back up enhanced by HEIDENHAIN's outstanding contamination control technologies, machine tool users do

not compromise any more. They have also realized the advantages of using optically scanned angular encoders for rotary motions, resulting in superior interpolation accuracies.

In a tropical country like India, with machine tools constantly exposed to multiple heat sources like spindle, feed drives, radiation, convection and conduction, positioning errors are there for the asking, especially in large, growing machine structures. HEIDENHAIN today, is riding the crest of several technological trends in the machine building industry. Just to touch upon some examples, we can point to the trends of higher preference on safe and instant absolute position encoders, optimized resistance against contamination by imaginative use of superior scanning principles, filter systems and sealing ideas, functional safety etc.

We have no doubt in our minds that it is only cutting edge technology at today's global level, that will enhance India's relative ranking in the international canvas, whether you produce components or machine tools that make components.

We, at HEIDENHAIN India, will do everything possible to bring these elements to you as sincerely and efficiently as we can.



A.P. Jayanthram
Managing Director

Successful TNC retrofit at L&T

LARSEN & TOUBRO is one of the largest engineering and construction companies in the world.

The LTM business unit, based at Kanchipuram near Chennai, manufactures tyre and plastics machinery. This unit has an old SACEM machine which had a HEIDENHAIN TNC 415 control.



This control is now out-dated and L&T wanted to retrofit this machine with the current generation HEIDENHAIN controller.

For almost 30 years, TNC controls have been proving themselves in daily use on milling, drilling and boring machines, as well as machining centers. This success is due in part to their shop-oriented programmability, but also to their compatibility with programs of the predecessor models.

With the new **smarT.NC** operating mode, HEIDENHAIN has made yet another step forward towards greater ease of use. Well-structured input forms, straightforward graphic support, and comprehensive help texts combine with the easy-to-use pattern generator to form a compelling programming environment.

HEIDENHAIN controls are powerful, user-friendly, and upwardly compatible so they are prepared for the future and this made L&T choose **TNC 620** (picture below)



The project was started in March 2012 and was successfully handed over to L&T within schedule.



Needless to say, the operators were delighted with the functions of the new TNC. This culminated a successful project for HEIDENHAIN India. HEIDENHAIN India is ready to take up such challenging retrofits now and the proof of our success is the fact that L&T has asked us for retrofitting an old Juaristi machine as well with our TNC 620 control. **(Pictured below)**



With this experience behind us, we are ready to take up the next challenge of TNC retrofit on an Arboga machine at Pune as well!

If you feel its time for an upgrade of one of your older machines, please contact us!

Linear Encoders Improve the Machining Accuracy

The capability of a machine tool to cope with rapidly changing operating conditions is a decisive factor for its accuracy. A transition from roughing to finishing completely changes the mechanical and thermal load on the machine. Flexible machining of small manufacturing batches also results in rapid changes in the operating conditions. Particularly in small production runs, however, the profitable manufacturing of orders with narrow tolerances depends upon the accuracy of the first part. That's why the thermal accuracy of machine tools has become a prominent issue.

The feed drives are of particular importance in this context. High traversing speeds and accelerations put a heavy load on the feed drives, causing heat to be generated. Without suitable position measuring technology, this rise in temperature can lead to positioning errors of up to 100 μm within a few minutes

Thermal stability of machine tools

Solutions for avoiding thermally induced dimensional deviations of work pieces have become more crucial than ever for the machine tool building industry. Active cooling, symmetrically designed machine structures and temperature measurement are common practice today. Thermal drift is primarily caused by feed axes on the basis of recirculating ball screws. The temperature distribution along the ball screw can rapidly change as a result of the feed rates and the moving forces. On machine tools without linear encoders, the resulting changes in length (typically: 100 $\mu\text{m}/\text{m}$ within 20 min.) can cause significant flaws in the work piece.

Position Measurement of Feed Drives

The position of an NC feed axis can be measured through the ball screw in combination with a rotary encoder, or through a linear encoder. If the slide position is determined from the pitch of the feed screw and a rotary encoder (Figure 2), then the ball screw must perform two tasks: As the drive system it must transfer large forces, but as the measuring device it is expected to provide highly accurate values and to reproduce the screw pitch. However, the position control loop only includes the rotary encoder. Because

changes in the driving mechanics due to wear or temperature cannot be compensated, this is called semi-closed-loop operation.

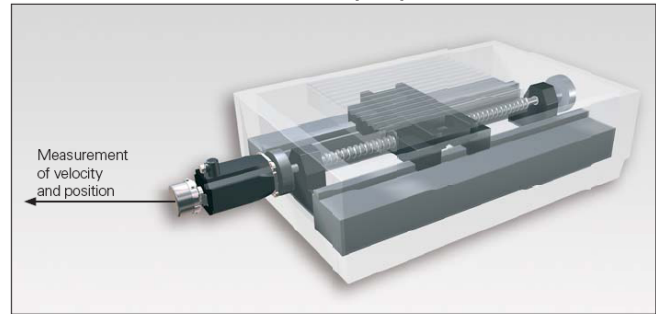


Figure 2 Position feedback control with a recirculating ball screw and a rotary encoder in semiclosed-loop mode

Positioning errors of the drives become unavoidable and can have a considerable influence on the quality of work pieces.

If a linear encoder is used for measurement of the slide position (Figure 3), the position control loop includes the complete feed mechanics. This is referred to as closed-loop operation. Play and inaccuracies in the transfer elements of the machine have no influence on position measurement. This means that the accuracy of measurement depends almost solely on the precision and location of the linear encoder.

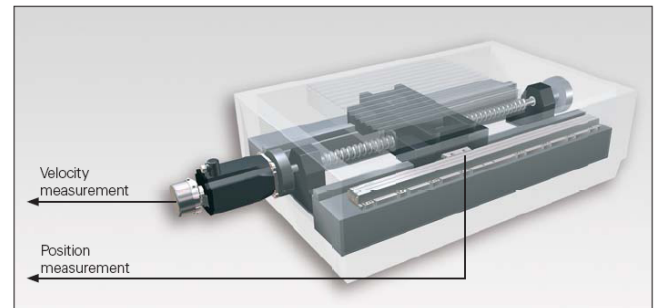


Figure 3 Position feedback control with a linear encoder in closed-loop mode

Summary

The successful fulfillment of manufacturing orders requires machine tools with high thermal stability. As a consequence, feed axes must achieve the required accuracy over the complete traverse range even with strongly varying speeds and machining forces.

Position errors may result if the slide position is only determined from the spindle pitch and a rotary encoder on the motor side. These errors can be completely eliminated by using linear encoders. Angle encoders used on rotary axes provide similar benefits since the mechanical drive components are also subject to thermal expansion.

Linear and angle encoders ensure high precision of the components to be manufactured even under strongly varying operating conditions of the machine tools.

Identification numbers at HEIDENHAIN

Model designation / ID number / serial number

Every HEIDENHAIN product features an ID label. On this label, you can find the data identifying the unit.

Example:



Which numbers are important?

Model designation

This is the name of the device.

I.D. Number

Also referred as the part number, this consists of the basic ID number (6 digits) and the variant (2 digits after the hyphen). This number provides exact specification for the product and is necessary when you need a replacement unit.

Serial Number

This is a consecutive number for unique identification of products within the same ID number. From this number, the product can be traced and warranty and guarantee periods can be derived.

HEIDENHAIN CERTIFICATIONS

- Quality management system as per ISO 9001.
- Environmental management as per ISO 14001.
- Environmental management as per ecological audit regulation EEC 1836/93.
- German calibration service (DKD) laboratory for digital linear and angle encoders as per DIN EN ISO/IEC 17025
- All products bear the CE mark as per EMC Directive 89/336/EEC and the low voltage directive 73/23/EWG
- Download from:
http://www.heidenhain.in/hi_IN/company/quality-and-environment/



Control diagnosis tools

TNCremo v2.8 / TNCremoPlus

TNCremo

To be able to read out data from your control, HEIDENHAIN offers the diagnosis tool TNCremo as a free download.

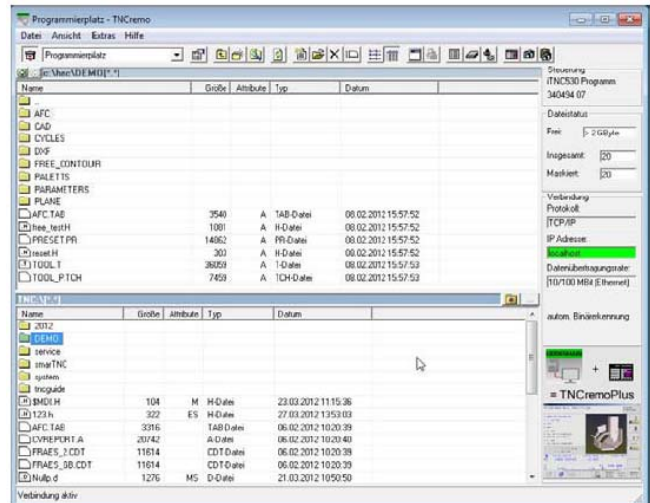
What functions does the new version TNCremo v2.8 offer?

The new version 2.8 offers a revised user interface as well as small, very useful functions.

In addition to the normal data transfer in both directions via network of RS232, you can also:

- Create a backup of the NC programs
- Read out the log, or
- Store a screenshot

For connections to the older TNC controls, such as the TNC 155, the TNCserver has been integrated.



TNCremo - Main window

TNCremoPlus

With the TNCremoPlus, which is available for a fee, you can view your control's screen from your desk in real time.

Further information on our home-page!

You can download the TNCremo v2.8 from our homepage free of charge:

www.heidenhain.de

- Documentation and information
- Documentation
- Software
- Software Download
- PC software
- TNCremo
- TNCremo v2.8

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- Documentation and information
- Documentation
- Software
- Software downloads
- NC service Handbooks
- SHB (= service manual) data interfaces for HEIDENHAIN controls

Training Schedule:

As you may be aware, HEIDENHAIN India is conducting these training courses at our state of the art Training Centre located at Chennai with a mix of theoretical and practical classes since our inception in 2008. These courses focus on two major branches, measuring systems and controls systems. The course on measuring systems spans 3 days while controls spans 4 days.

This programme has been very popular in the past with participants from major OEMs and end-users who use our products. The reviews have been excellent and most companies repeat nominations. The participants are either from service / maintenance functions or machine users.

The detailed schedule is given below. We look forward to your nominations!

TRAINING PROGRAMMES SCHEDULE FOR 2012 (2nd half)

TRAINING ON MEASURING SYSTEMS

MONTH	DATES
June	27-29
August	29-31
October	17-19
December	19-21

TRAINING ON iTNC 530 CONTROL

MONTH	DATES
July	17-20
September	11-14
November	20-23

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