

A Overview

A 1 The capabilities of the ZLM 700/800 Software

The software for the ZLM 700/800/900 Laser Interferometer comprises two program groups:

Calibration Software: With the Calibration Software you can check and calibrate coordinate measuring machines and machine tools.

Dynamic Measurement Software: The Dynamic Measurement Software can be used for most of the measurement jobs that do not fall into the above category, and especially for laboratory measurements.

The acquisition and analysis of measurement data are effected in different ways with the various programs, while the documentation and archiving of measurement results are identical for all programs.

Documentation

The documentation of measurement results can be handled through a document (record) editor, which allows diagrams, tabled measurement data and comments to be compiled into a record and then printed or plotted.

The contents of a record may be transferred to word processors.

Archiving

Measured data together with the record are archived in a card file system. In addition, measured data can be filed as a list.

A 1.1 Calibration software

The programs can be used to determine position uncertainty, pitch angle, yaw angle, straightness, squareness and flatness according to standards and recommendations issued by national and international standardization panels.

In general these standards provide for static measurements, i.e. acquisition of measurement data is effected while the measured object is at rest. To a minor extent, the programs can also be used for dynamic measurements (with data acquisition frequencies up to 10 Hz).

The following overview shows which program can be used for what kinds of measurement task.

Program	Calibration software ZLM Position	Calibration software ZLM Angle/ Straightness	Calibration software ZLM Stat	Calibration software ZLM Flatness
Quantity	Position uncertainty according to - VDI/DGQ 3441, - VDI/VDE 2617, - ISO 230 and - NMTBA	Pitch angle, yaw angle, straightness and squareness according to VDI/VDE 2617, straightness according to ISO 1101	Position uncertainty according to - VDI/DGQ 3441, - VDI/VDE 2617, - ISO 230 and - NMTBA, pitch and yaw angles, and straightness acc. to VDI/VDE 2617	Flatness and straightness according to ISO 1101
Diagram	Standard diagram according to standard, and presentation of individual measuring cycles	Standard diagram according to standard, and presentation of individual measuring cycles	Standard diagram according to standard, and presentation of individual measuring cycles. Simultaneous presentation of data measured on several axes.	Dimetric, isometric and three-dimensional presentation with any pitch and yaw angles.
Number of axes	1	1	2 to 6	1
Optical components supported	Distance optics with cube corner or plane mirror reflector	Angle optics with cube corner or plane mirror reflector, 2m and 10m straightness optics	Distance and angle optics with cube corner or plane mirror reflector, 2m and 10m straightness optics. Individually selectable for each axis.	Angle optics with cube corner or plane mirror reflector, 2m and 10m straightness optics
Triggering of data reading	Automatic (with standstill control), TTL pulse and space bar	TTL pulse and space bar	Automatic (with standstill control), TTL pulse, space bar and incremental encoder	TTL pulse and space bar
Environmental compensation	Manual entry or automatic with AUK 500	Not necessary	Manual entry or automatic with AUK 500 (for distance measurement)	Not necessary

A 1.2 Dynamic measurement software

The programs can be used for the measurement of distances, velocities, accelerations, angles and angular velocities.

Data acquisition can be triggered by
 the pulse of a timer located on the ZLM counter card,
 external read-in signals or
 hitting a key of the PC keyboard.

The maximum sampling frequency is 70 kHz for the ZLM 500.
 Long-time measurements over hours and days are also possible.

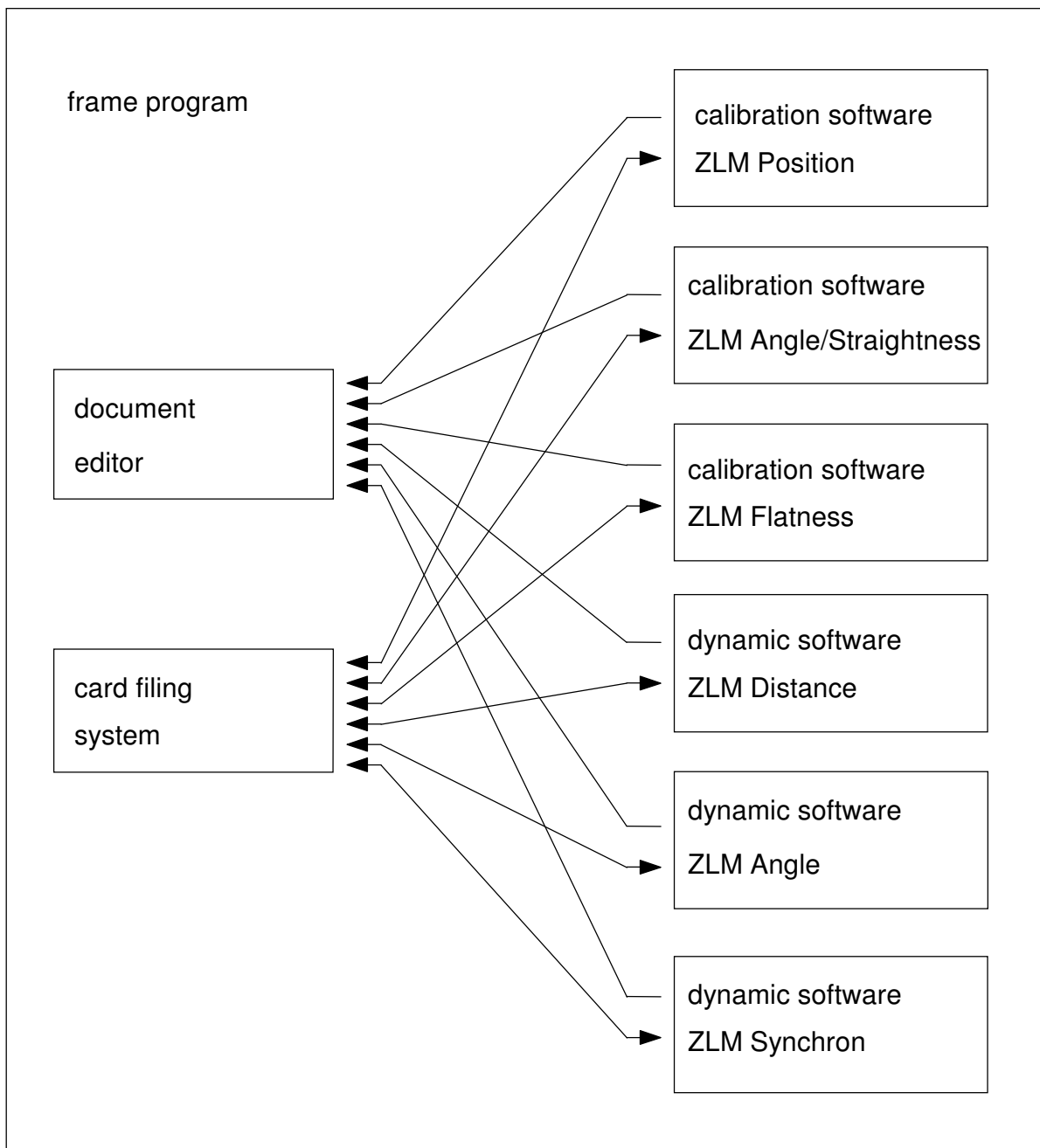
Program	Dynamic software ZLM Distance	Dynamic software ZLM Angle	Dynamic software ZLM Synchron
Quantity	- Distance - Velocity - Acceleration	- Angle - Angular velocity	- Distance - Velocity - Acceleration - Angle - Angular velocity
Diagram	Distance-vs.-time, velocity-vs.-time, acceleration-vs.- time, distance deviation from expected val- ues, Fourier analysis	Angle-vs.-time, angular velocity-vs.-time, angle deviation from expected values, Fourier analysis	Distance-vs.-time, angle-vs.-time, angular velocity-vs.-time, deviation from expected values, Fourier analysis Simultaneous presentation of data measured on several axes. Data measured on several axes as a function of the data meas- ured on one axis.
Number of measuring axes	1	1	2 - 6
Optical compo- nents supported	Distance optics with cube corner or plane mirror reflector	Angle optics with cube corner or plane mirror reflector	Distance and angle optics with cube corner or plane mirror re- flector, 2m and 10m straightness optics Separate selection for each axis
Environmental compensation	Manual entry or automatic with AUK 500	Not necessary	Manual entry or automatic with AUK 500 (for distance measure- ments)
Comment			Data acquired by an incremental encoder with digital "A quad B" output can be pro- cessed.

A 2 Software structure

Since the ZLM 700/800 Laser Interferometer is designed for many different tasks, the software structure is modular. The management program "Esox" contains all program sections that are required for every kind of measurement. These are the framework program, the document (record) editor and the card filing system. The management program is extended by various measurement programs as required for a particular measurement task. This modularity has the following advantages for the user:

- ### more straightforward installation of the software,
- ### less hard disk space required by the program,
- ### similar operation of all modules in the management program, and
- ### quick change between measurement programs.

The management program "Esox" has been given a highly generalized configuration so that it will even support measurement programs for other measuring instruments.



A 3 What do I find where in the manuals?

This manual describes the calibration software and the dynamic measurement software. The **Manual of the basic equipment**, which has been supplied together with the equipment, should be read first.

The following table gives an overview of where to find what information.

Subject	Important for ...	Where to be found?
Laser handling Measuring principle of ZLM 700/800 Starting the instrument Assembling measurement set-ups	... all programs	Manual of the basic equipment
Installation of the software	... all programs	Section B
Starting the software Basic information on program handling	... all programs	Section C
Dynamic distance measurement	Dynamic software ZLM Distance	Section D
Dynamic angle measurement	Dynamic software ZLM Angle	Section E
Synchronized multiple-axis measurement	Dynamic software ZLM Synchron	Section F
Measurement of position uncertainty	Calibration software ZLM Position	Section G
Static measurement of angle Static measurement of straightness Squareness measurement	Calibration software ZLM Angle/Straightness	Sections G and H
Multiple-axis measurement of position uncertainty, angle (static) and straightness (static)	Calibration software ZLM Stat	Section I
Flatness measurement	Calibration software ZLM Flatness	Section J
Archiving of results	... all programs	Section K
Compiling measurement records (documents)	... all programs	Section L

Sections D to J describe the measuring programs. As you will presumably use one of the measuring programs, i.e. ZLM Distance, ZLM Position, ZLM Synchron or ZLM Stat, these programs are described in great detail in the respective sections. Several Instructions, such as how to analyse measurements made some time back, will be found in several of these sections. The manual is organized in such a way that you only need to read the sections describing the measurement program you want to work with.