Product Information
Torsion Testing

Pic 1: Zwick Z020 Materials Testing Machine with torsion drive

Units for torsion testing
Units for torsion testing can be mounted into the materials testing machine for multi-axis loading tests on materials and components.

The Concept
Testing tasks which impose high demands on the materials testing machine, require a clear, well-defined machine concept. This is true of the mechanics and electronics, as well as the software components.
The answer to these demands can be summarised in the following concepts:
• modular system principle
• supplemental upgrading
• correct software for the given testing task
• upgrading compatibility

Special testing possibilities
The following testing methods can be selected for the 1st axis (tensile/compression), as well as for the 2nd axis (torsion):
1. constant holding test
2. constant cycling
3. stepped loading

These selections allow a multitude of testing combinations:
• constant load with torsion testing
  test method "constant holding test" with holding type "force controlled" for 1st axis and constant cycling or stepped loading for the 2nd axis
• constant travel with torsion testing à test method "force controlled" with holding type "position controlled" for the 1st axis and constant cycling or stepped loading for the 2nd axis (Torsion)
• torque constant with tensile/compression testing à test method "force controlled" with holding type "torque controlled for the 2nd axis and constant cycling or stepped loading for the 1st axis
• torque angle constant with tensile/compression testing à test method "force controlled" with holding type "torque angle controlled" for the 2nd axis and constant cycling or stepped loading for the 1st axis
• superimposed tensile/compression and torsion testing
• pure tensile/compression testing (torsion axis idle)
• pure torsion testing (tensile/compression axis idle)

In addition, there are several possibilities for synchronisation of the testing axes:
• no synchronisation: after the start, both axes run independently of each other
• synchronisation to pre-load/pre-torque: the test sequence is only continued after a pre-load or pre-torque has been reached
• synchronisation to pre-load and reversal points
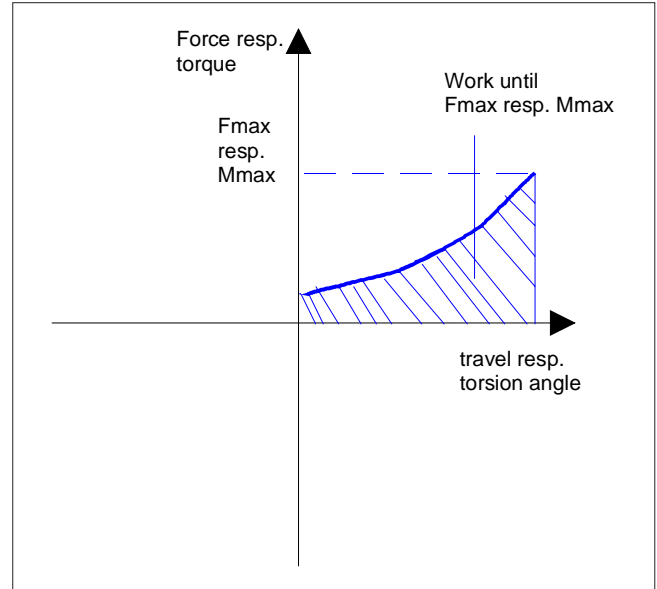• event-controlled synchronisation

Measurement and Control units
The DUPS-Allround electronic are available for realisation of the testing tasks.

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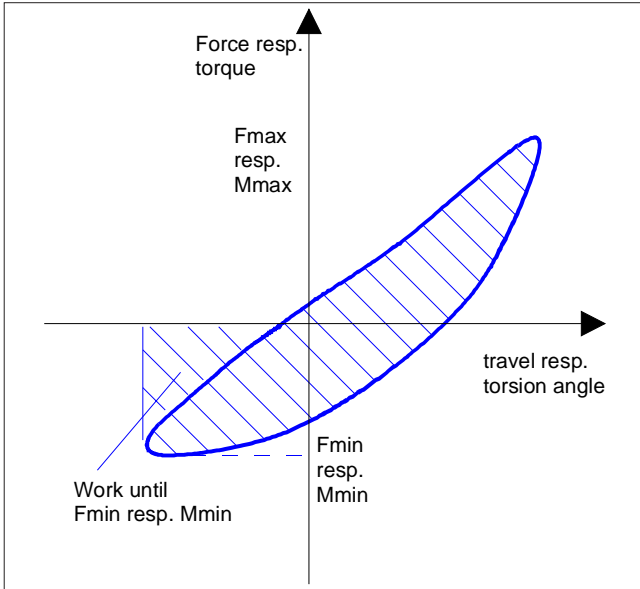
Pic 2: Hysteresis test

Pic 3: Plain test with permanent load

System requirements
Pentium-PC
128 MB RAM-Storage
Microsoft Windows NT 4.0 / 2000
2 free serial interfaces for the testing machine

Software realisation
The torsion units can be controlled under the Zwick applications software, testXpert, in connection with the basic software for a 2nd test axis. During this time, the 1st drive axis performs the tensile and compression testing.

Zwick testXpert from Version 6.01

Additionally required items
Zwick testXpert TPI BX069804.00.10
Zwick testXpert test sequence BX069902.00.10-01
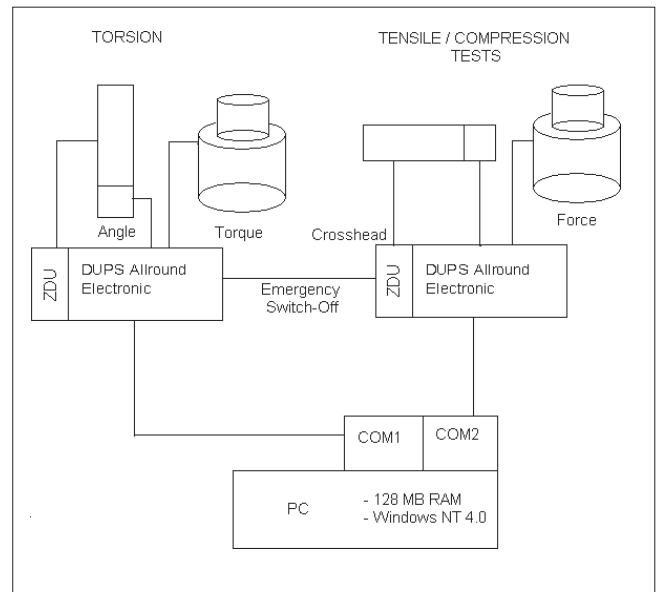
Pic 4: Principle sketch of the Zwick Torsion solution

Mmax (Nm)	Fmax (kN)	Torsion	Speed in RPM Actuator	Torque load cell	Zwick Materials Testing Machine Zxxx/xxxx
100	20 kN	B020111	0,002 - 10	B066164, B066165	Zwick Z005 / Z010 / Z020 / Z030 Table-top/Floor Model
100	250 kN	B020121	0,002 - 10	B066164, B066165	Zwick Z050 / Z100 / Z150 / Z250 Table-top/Floor Model
200	250 kN	B020131	0,001 - 5	B066163	Zwick Z050 / Z100 / Z150 / Z250 Table-top/Floor Model
500	250 kN	B020141	0,0002 - 2	B066162	Zwick Z050 / Z100 / Z150 / Z250 Floor Model
500	250 kN	B020151	0,001 - 10	B066162	Zwick Z050 / Z100 / Z150 / Z250 Floor Model
1000	250 kN	B020161	0,0005 - 5	B066161	Zwick Z050 / Z100 / Z150 / Z250 Floor Model
2000	250 kN	B020171	0,0002 - 2	B066160	Zwick Z050 / Z100 / Z150 / Z250 Floor Model

Tab 1: Overview of Zwick Torsion drive units ref. Torque load cells

All Data at ambient temperature.