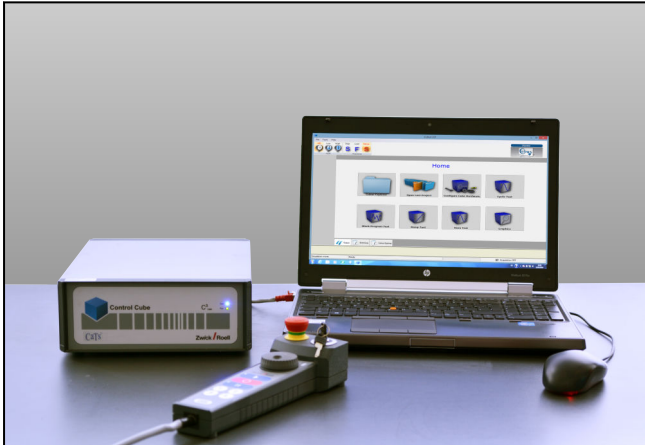


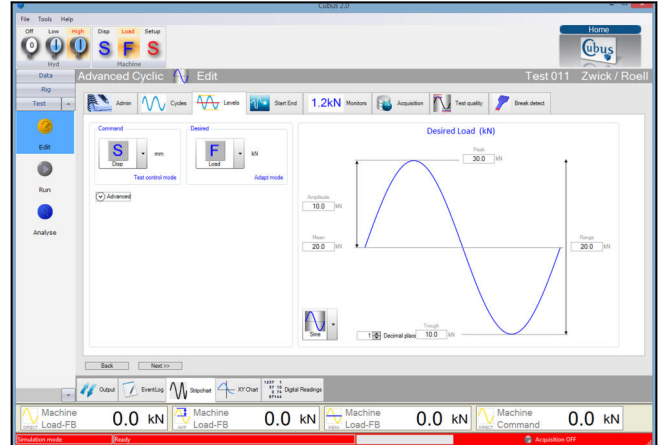
## Product Information

### Control Cube servo controller and Cubus testing software

CTA: 92282 92283



Control Cube und Cubus - compact and powerful



Cubus testing software

#### Applications

Servo-hydraulic testing systems are the preferred option for fatigue and fatigue strength tests. The performance of these systems is determined to a large degree by the measurement and control electronics used, together with the associated testing software. The Control Cube servo controller and Cubus testing software are ideal both for new testing systems and for retrofitting to existing servo-hydraulic testing systems, as well as for multiaxial applications.

This system was developed by ZwickRoell in collaboration with CaTs<sup>3</sup> (Consultants in Automated Test & Structural-dynamic Simulation Systems). The company's long-standing experience and expertise are reflected in a highly efficient product capable of handling customers' constantly expanding needs while at the same time meeting ZwickRoell's high safety and quality standards.

During development, special attention was paid to achieving a high degree of testing system flexibility and expandability. Impressive features of the Cubus software platform include outstanding versatility and an extremely user-friendly operating concept, especially when faced with frequently changing testing requirements. From configuration of the test bench to routine cyclic tests to advanced applications - there is a Cubus test program to suit all. For simulation of actual service loads QanTIM iteration<sup>®</sup> software is optionally available.

#### Advantages and features

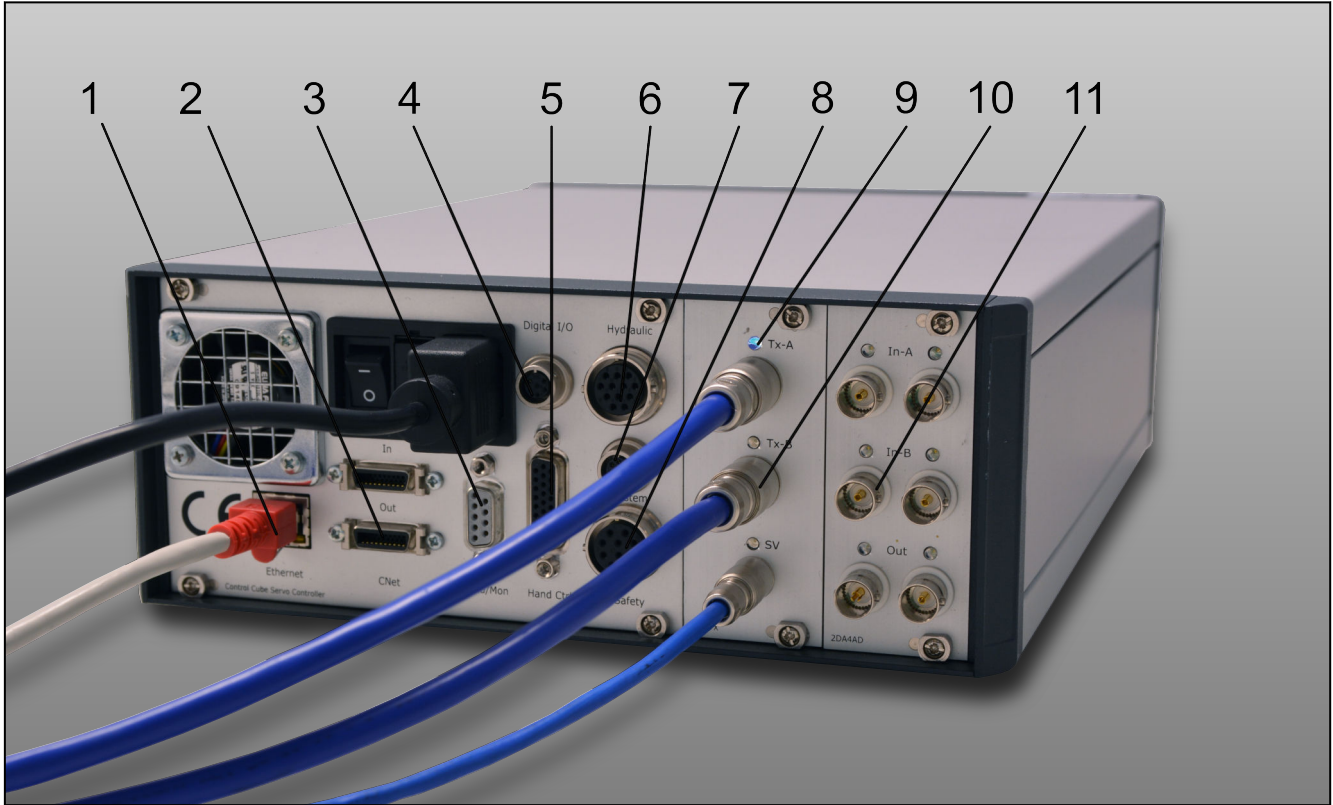
A measurement and control system consisting of the Control Cube servo-controller and Cubus testing software includes the following outstanding features:

- simple, intuitive and well-structured user interface shortens familiarization times
- flexible, modular design allows straightforward system configuration to accommodate both simple and complex testing requirements
- easily expanded from 1 to 32 control channels for multi-channel applications
- flexible and space-saving with compact 1/2 19" housing with integral signal generator - the world's smallest servo controller
- safety concept includes integrated safety interface for Emergency STOP
- basic unit available as 1 or 2-channel version
- optimized 4 kHz data acquisition and control frequency for cyclic testing requirements
- 19-bit resolution for reliable, highly accurate test data acquisition
- reliable PC connection and high data transfer rate via Ethernet
- Cubus<sup>light</sup> basic software and Cubus testing software for wide range of customer-specific testing situations
- QanTIM<sup>®</sup> software package for simulation of actual operating loads.

## Product Information

### Control Cube servo controller and Cubus testing software






CITA: 92289



Technical features of Control Cube at a glance

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li><b>1</b> PC connection via Ethernet interface</li> <li><b>2</b> Multi-channel connection up to 32 control channels</li> <li><b>3</b> Optional <math>\pm 10V</math> set-value selection/monitor channels</li> <li><b>4</b> Digital I/O connection</li> <li><b>5</b> Remote control connection</li> <li><b>6</b> Hydraulic connection</li> </ul> | <ul style="list-style-type: none"> <li><b>7</b> System connection, e.g. for safety door</li> <li><b>8</b> Safety connection for integration of Emergency STOP circuit</li> <li><b>9</b> Channel identification via LED</li> <li><b>10</b> Universal measurement amplifier for AC or DC sensors</li> <li><b>11</b> Analog I/O module (option)</li> </ul> |
|---|---|

### Modular configuration versions of Control Cube

Configuration versions					
Control channels	1	2	2	-	1
Universal measurement amplifiers for sensors	2	4	4	-	8
Analog $\pm 10V$ outputs (configurable)	2	2	4	6	2
Analog $\pm 10V$ set-value inputs	1	2	2	-	1
Analog $\pm 10V$ measurement inputs	2	2	4	12	2
Digital inputs	2	2	2	-	2
Digital outputs	2	2	2	-	2
Item No.	<b>007991</b>	<b>007998</b>	<b>007991, 008023</b>	<b>008002, 008023 (3x)</b>	<b>007991, 008022, 008023</b>

## Product Information

### Control Cube servo controller and Cubus testing software

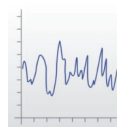
#### Cubus<sup>light</sup> basic software

Each Control Cube servo controller is supplied with Cubus<sup>light</sup> basic software. This contains all functions required to configure the test bench and adapt it to the testing situation involved. Cubus<sup>light</sup> also includes a test module which allows simple cyclic tests to be performed.

Cubus testing software is arranged in three modules.

- **Setup**  
configuration of test bench and set-up of all control parameters and settings
- **Data**  
data acquisition, data display and data export
- **Test**  
determination and performance of tests

This organized structure simplifies rapid location of all functions.



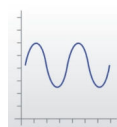
#### Dura fatigue tests

- playback of pre-defined elapsed-time drive files
- linking multiple drive files together in a test sequence
- trend monitor.



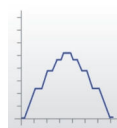
#### External tests

- external control without using the controller's own function generator
- command source can be either an external analog drive or PC-controlled drive.



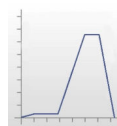
#### Cyclic Pro

- specimen management
- data acquisition
- peak-value acquisition
- break detection
- test-quality monitoring with tolerance bands
- strain control for LCF
- inspection interval
- test parameters, e.g. frequency, amplitude, mean value, can be changed while test is running
- adaptive peak-value control
- mixed mode, e.g. displacement-controlled after force peaks
- graphical failure envelope with limit monitoring
- signal waveforms: sinusoidal, rectangular, triangular, trapezoidal, sawtooth



#### Ramps

- graphical editor for test sequence
- easy insertion of elements into test sequence
- ideal for structure tests
- break detection at force drop
- elements for extended ramp functions, dwell phases, data acquisition etc.



#### Customized tests

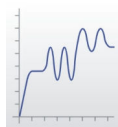
- Cubus' plug-in architecture allows development and integration of individual tests
- examples include seat-belt anchorage test and side intrusion test

CTA: 103435



Cubus<sup>light</sup> basic software - Autotune function

#### Cubus test options



##### Block programs

- graphical editor for test sequence
- easy insertion of different block elements into test sequence
- elements: cyclic, ramps, hold stages, data acquisition, digital I/Os, procedures etc.
- sub-sequences allow nested and user-specific repeats
- test position within the sequence can be moved

## Product Information

### Control Cube servo controller and Cubus testing software



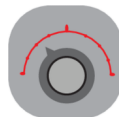
#### General functions

- event recording
- virtual channels
- password protection / user management
- transducer linearization
- external analog set-value specification
- external monitor outputs, e.g. force, displacement
- Language Swap



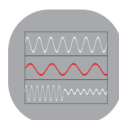
#### Measured value acquisition and display

- X-Y graph
- data export / data display
- time sequence
- user-configurable digital displays: real time, max, min, amplitude, mean value, peak, trough, cycle counter
- peak-value acquisition



#### Control

- PID auto-tune
- adaptive, integrated PID control
- compensation, cascade control



#### Multi-channel applications

- hydraulic grouping
- global and local gain factor
- automatic synchronized master/slave operation



#### Procedures

- action to be performed in response to defined events
- editor for procedures
- event-action matrix

### Technical data

Description	Value	
Control frequency	4096	Hz
Measured-value acquisition (max. sampling rate)	4096	Hz
Expansion slots	3	
PC interface	Ethernet	
Universal measurement-amplifier	2x universal digital signal converter, can be increased to 8 per Control Cube; 19-bit resolution at 64 kHz oversampling and averaging	
Analog inputs and outputs	2x analog $\pm 10$ V inputs, available for external commands or external measurement amplifiers 2x analog $\pm 10$ V outputs, available for synchronized control of external devices; also available for monitor signals, e.g. for an external oscilloscope expansion option	
Digital inputs and outputs	2x optically coupled digital inputs 2x digital outputs; expansion option	
Electrical supply	85 to 264 V AC, 47 to 63 Hz / 150 W	
Dimensions (H x W x D), approx.	94 x 233 x 315	mm
Approx. weight	8	kg

### Optional accessories

Description	Item number
Remote control unit with Emergency STOP key and key switch to change between set-up and testing modes	<b>008010</b>
Universal measurement amplifier for 4 additional sensors	<b>008019</b>
Analog I/O card with 4 analog $\pm 10$ V inputs (controllable) and 2 analog $\pm 10$ V outputs	<b>008023</b>
Digital I/O card with 8 digital inputs and 8 digital output	<b>008025</b>
Cable set for testing actuator, length 5 meters	<b>008006</b>