

Hexapod Motion Controller with EtherCAT®

Control a 6-Axis Positioning System via Fieldbus Interface



C-887.53x

- Integration into an automation system
- Synchronous motion in 6 axes
- Cycle time 1 ms
- Commanding in Cartesian coordinates
- Analog interfaces and motion stop optional

Digital controller with EtherCAT fieldbus interface

Digital controller for hexapods (6-axis parallel kinematics) with DC motors. Additional control for two further single axes is integrated. Can be integrated seamlessly into automation systems in industry and research. Performs coordinate transformation for parallel kinematics. Customer requires a higher-level PLC control for position commanding and feedback in Cartesian coordinates (EtherCAT master with CoE protocol).

Supported operating modes

Reference move of the hexapods to the middle position of all six axes. Absolute positioning in six Cartesian axes. Cyclic position commanding via PLC for synchronization with further automation components. Operation is possible via TCP/IP or RS-232 without PLC master. The controller functionality then corresponds to a C-887.52x. Commanding of the hexapods is then done directly via the PI GCS.

Functions

Position input via Cartesian coordinates, coordinate transformation handled by the controller. To simplify integration of the hexapod, the reference system (Work, Tool) can be quickly and easily changed. The real-time operating system prevents jitter and therefore guarantees constantly low response times. Motion is vectored. Stable, virtual pivot point can be freely defined in space. Data recorder for recording operating parameters such as motor control, velocity, position or position errors. Macro programming. An autostart macro allows stand-alone operation. Connection of external input devices (HID) such as manual control unit. The controller supports motor brakes and absolute-measuring sensors with BiSS interface.

Interfaces

EtherCAT fieldbus interface. TCP/IP for remote control and remote maintenance. RS-232. USB connection for external input devices (HID).

Additional interfaces

- Motion stop: The supply voltage of the hexapod drive can be switched off using the external switch connected to the controller. The sensor technology remains active so that position information continues to be available and a reference move is not necessary when the drive is reactivated.
- Analog inputs

Optional

- Control via manual control unit
- Collision checking for restricted space with PIVeriMove software

Extensive software for commanding the hexapod directly

PIMikroMove user software. Common command set for all PI positioning systems. Full set of drivers for use with NI LabVIEW. GUI input interfaces, configuration software, and graphically displayed scan routines.

Scope of delivery

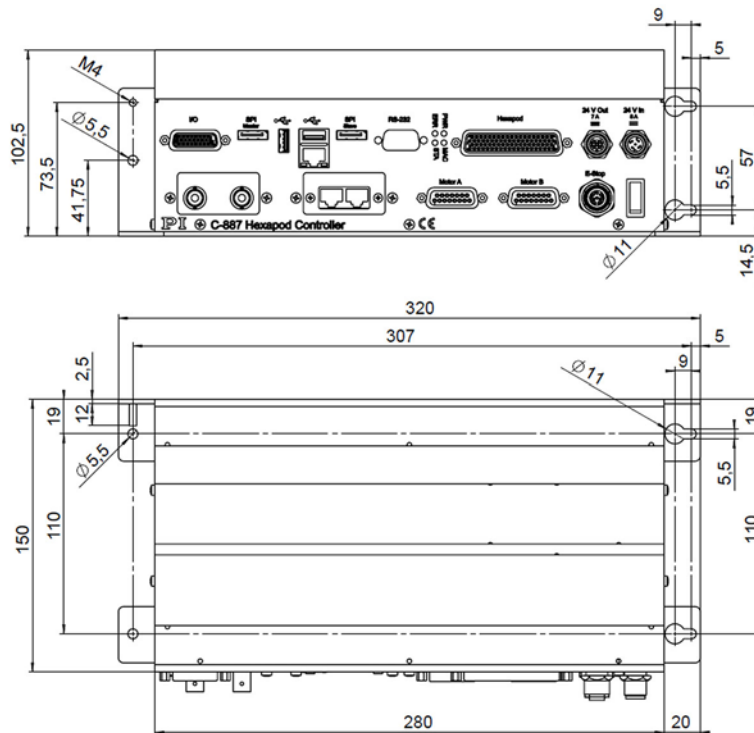
The order is made together with suitable hexapod mechanics. The scope of delivery includes the hexapod, controller with software package, cable set, and power adapter. A PLC master controller is not in the scope of delivery!

Specifications

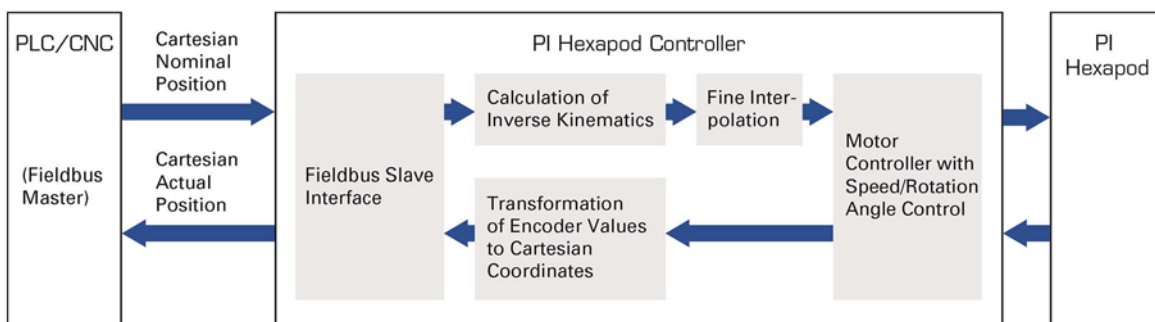
	C-887.53 / C-887.531 / C-887.532 / C-887.533
Function	6-axis controller for hexapods, incl. control of two additional single axes Compact benchtop device with EtherCAT interface Extending the functionality of C-887.53: C-887.531: Additional analog inputs C-887.532: Additional motion stop C-887.533: Additional motion stop and analog inputs
Drive type	DC motors (hexapod and single axes)
EtherCAT Specifications	C-887.53 / C-887.531 / C-887.532 / C-887.533
Fieldbus protocol	EtherCAT (CoE = CANopen over EtherCAT)
Drive profile	CIA402 drive profile (IEC 61800-7-201)
Cycle time	≥1 ms
Supported modes of operation	Reference move (homing mode) Positioning mode with cyclic target position via the PLC (cyclic synchronous position mode) Safe basic state for activating coordinate systems
Supported synchronization modes	Distributed clocks (DC), synchronous with SYNC0 event
Motion and servo controller	C-887.53 / C-887.531 / C-887.532 / C-887.533
Controller type	32-bit PID controller
Trajectory profiles	Jerk-controlled generation of dynamics profile with linear interpolation
Processor	Intel Atom dual core (1.8 GHz)
Servo cycle time	100 μs
Encoder input	AB (quadrature) differential TTL signal, 50 MHz BiSS
Stall detection	Servo off, triggered by position error
Reference switch	TTL

Electrical properties	C-887.53 / C-887.531 / C-887.532 / C-887.533
Hexapod control	12-bit PWM signal, TTL, 24 kHz
Hexapod power supply	24 V
Maximum output current	7 A
Interfaces and operation	C-887.53 / C-887.531 / C-887.532 / C-887.533
Communication interfaces	2 x RJ45 for EtherCAT (In/Out) TCP/IP, RS-232 USB (HID, manual control unit)
Hexapod connection	HD D-sub 78 (f) for data transmission M12 4 (f) for power supply
Connectors for single axes	D-sub 15 (f)
I/O lines	HD D-sub 26 (f): 4 x analog input (-10 to 10 V, via 12-bit A/D converter) 4 x digital input (TTL) 4 x digital output (TTL)
Analog inputs	C-887.531 and C-887.533 only: 2 x BNC, -5 V to 5 V, via 16-bit A/D converter, 5 kHz bandwidth
Input for motion stop	C-887.532 and C-887.533 only: M12 8 (f)
Command set	PI General Command Set (GCS)
User software	PIMikroMove
Application programming interfaces	API for C / C++ / C# / VB.NET / MATLAB / Python, drivers for NI LabVIEW
Manual operation	Optional: C-887.MC2 control unit for hexapods
Miscellaneous	C-887.53 / C-887.531 / C-887.532 / C-887.533
Operating voltage	24 V (external power adapter for 100 to 240 V AC, 50 / 60 Hz included in the scope of delivery)
Maximum current consumption	8 A
Operating temperature range	5 to 40 °C
Mass	2.8 kg
Dimensions	280 (320) mm x 150 mm x 103 mm

Drawings / Images



C-887.53x, dimensions in mm. Version-dependent interfaces



Integration of the hexapod motion controller into an automation system



Example configuration: H811.D2 miniature hexapod with C-887.532 motion controller with EtherCAT interface and motion stop. The EtherCAT master, here a Beckhoff controller, is provided and programmed by the customer.

Ordering Information

C-887.53

6-axis controller for hexapods, TCP/IP, RS-232, benchtop device, incl. control of two additional axes, EtherCAT interface

C-887.531

6-axis controller for hexapods, TCP/IP, RS-232, benchtop device, incl. control of two additional axes, EtherCAT interface, analog inputs

C-887.532

6-axis controller for hexapods, TCP/IP, RS-232, benchtop device, incl. control of two additional axes, EtherCAT interface, motion stop

C-887.533

6-axis controller for hexapods, TCP/IP, RS-232, benchtop device, incl. control of two additional axes, EtherCAT interface, motion stop, analog inputs

Accessories

C-887.MC2

Manual control unit for hexapods, USB connector with 3 m connection cable, rotary knobs for all Cartesian axes, buttons for motion stop and referencing, position display

C-887.VM1

PIVeriMove hexapod software for collision checking