PI

High-Precision Single-Sided Fiber Alignment System

Stacked Multi-Axis System for Aligning Fibers and Optical Components

F-712.MA1

- Integrated scan routines for fiber optic alignment
- Ideal for applications in silicon photonics
- Extensive software package
- Direct detection of the optical signal
- Position sensors for high accuracy and operational reliability
- Automatic alignment of several fibers in <0.2s

Fast and high-precision drives

The basis of the fiber alignment system is a very stiff XYZ setup consisting of three motorized linear stages and a P-616 NanoCube® nanopositioner. The low overall height simplifies integration in limited installation space. The motorized drives make longer travel ranges possible and at the same time, the NanoCube® nanopositioner ensures fast scanning motion and dynamic compensation of drift effects. Flexure guides and all-ceramic insulated PICMA® actuators guarantee a long lifetime. Because all drives are equipped with position sensors, it is possible for example, to reliably prevent collisions with expensive silicon wafers.

High-performance scan routines

The sophisticated scan routines are integrated directly into the controller. The performance is improved considerably and integration simplified. The system can manage all tasks in the field of fiber alignment. For example, this makes simultaneous alignment in several degrees of freedom possible.

Extensive software package

The software package supplied in the scope of delivery allows integration of the system into virtually any environment. All common operating systems such as Windows, Linux, and macOS as well as a large number of common programming languages including MATLAB and NI LabVIEW are supported. Thanks to sophisticated program examples and the use of software tools such as PIMikroMove, the time between starting integrating and productive operation is shortened considerably.

High-resolution analog input

The controller receives the optical intensity signal directly via a high-resolution analog input. Complex setups with cameras are not necessary. Various distribution functions are available for determining the maximum intensity.

Application fields

Alignment of optical components, automatic wafer tests, assembling technology in silicon photonics

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Specifications

Motion and positioning	F-712.MA1	Unit
Number of active axes	6	
Rough positioning		
Active axes	X, Y, Z	
Travel range in X, Y, Z	25, 25, 25	mm
Minimum incremental motion	3	µm
Max. velocity	20	mm/s
Sensor type	Rotary encoder	
Guide	Crossed roller guide	
Drive type	DC motor	
Fine positioning		
Active axes	X, Y, Z	
Travel range in X, Y, Z, closed loop	100	µm
Min. incremental motion, open-loop	0.3	nm
Min. incremental motion, closed-loop	2.5	nm
Linearity error, for the entire travel range*	2	%
Repeatability (bidirectional) 10% travel range	2	nm
Sensor type	Incremental	
Drive type	PICMA®	
Alignment		
Scanning time of spiraled area scan 500 µm Ø**	<3	s
Scanning time of spiraled area scan 100 µm Ø**	<0.3	s
Scanning time of spiraled area scan 10 µm Ø**	<0.2	s
Signal optimization with gradient search, randomized with ±5 µm (repeatability < 0.01 dB)***	<0.3	s

Miscellaneous	F-712.MA1	Unit
Operating temperature range, mechanics	-20 to 65	°C
Operating temperature range, controller	5 to 40	°C
Cable length	3	m

	Requirements for the optical power meter	Unit
Output signal	Analog output, ideally converted from linear to logarithmic	
Output voltage range, max.	-5 to 5	V
Bandwidth, min.	1	kHz
Noise level, max.	-60	dBm

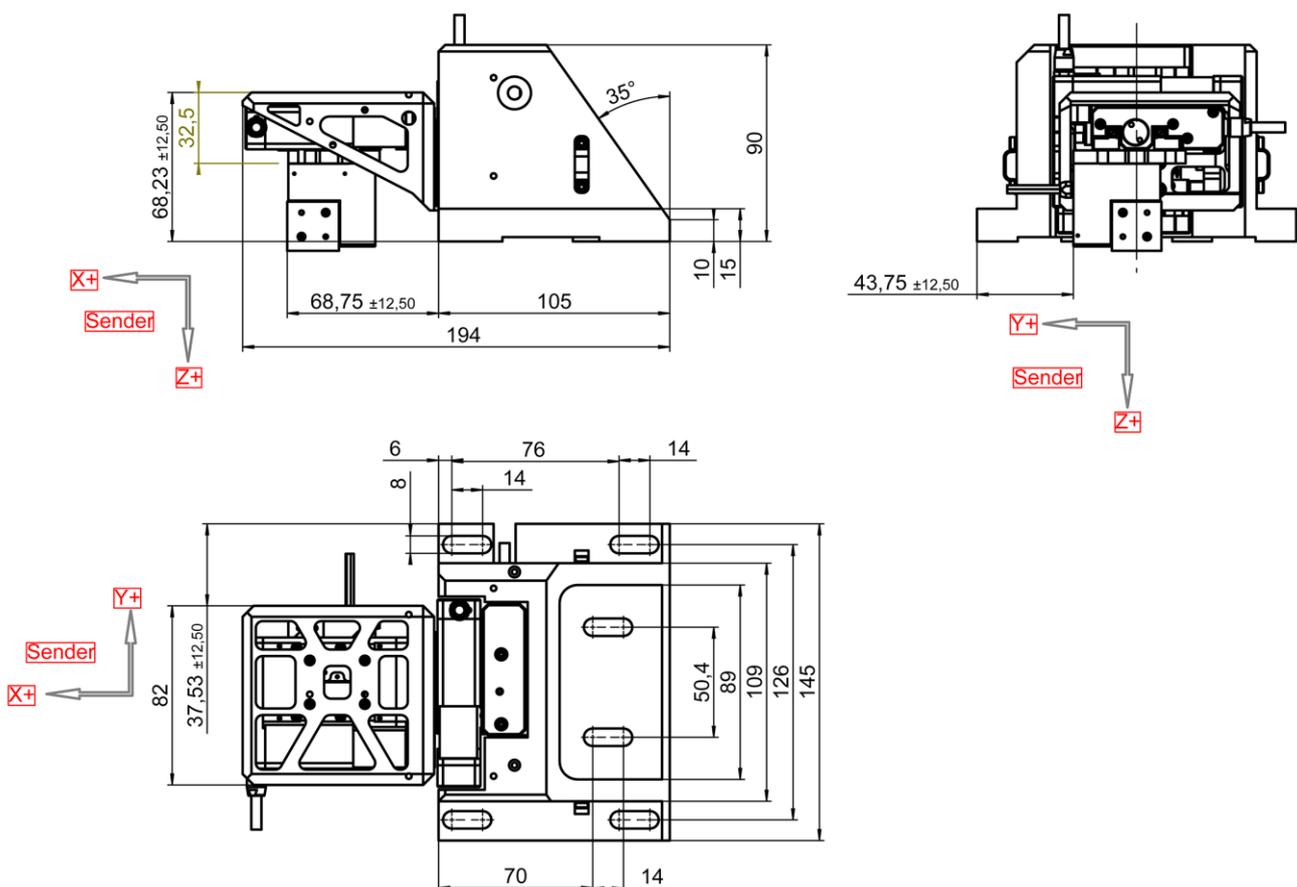Technical data specified at 20±3 °C.

* without polynomial linearization

** typical time span fod scanning the entire area and moving to the highest intensity

*** reaching the global maximum after first light has been found

Ask about customized versions.

Drawings / Images

F-712.MA1, dimensions in mm

Ordering Information

F-712.MA1

Single-sided Fiber alignment system with stacked XYZ linear stages and NanoCube® Nanopositioner, E-712 digital controller with 4 analog inputs, firmware routines for extremely fast alignment functions, software package