

NC Joining module NCFT for joining processes with low force

Type 2157B...

The NC joining module NCFT Type 2157B... with integrated piezoelectric force sensor for two predefined measuring ranges of 0,05 ... 1,5 kN is excellent for use in assembly and joining processes monitored by force displacement. Besides a straight version with 100 mm stroke, a compact angular version with 250 mm stroke is available.

- High-precision force measurement via telemetry
- Certified for ISO 14644-1 class 8 clean room use (7 possible)
- Extremely wide measuring range of 0,05 ... 1,5 kN
- High velocity for very short cycle times
- High overload capacity of sensor

Description

The NC joining modules NCFT Type 2157B... consist of a robust housing with an integral piezoelectric tension/compression force sensor. An absolute encoder for precise positioning is integrated in the drive motor.

The compressive or tension forces affecting the sensor create a proportional electrical charge in the piezoelectric measuring element, which is converted into an analog voltage signal by an integrated charge amplifier. The force sensor is installed directly in the tool connector for maximum precision of the force measurement. Signals are transmitted by telemetry. This means that no additional connection cables are required.

The motor of the NC joining module is an electronically commutated AC servo type controlled by a servo electronics to ensure constant rotational and therefore translational speed. Standard functions like block pressing, position pressing and force feedback controlled pressing, as well as intermediate positioning, are supported.

The NC joining module NCFT can be operated with the IndraDrive servo amplifier in combination with maXYmos NC Type 5847... . The communication between IndraDrive and maXYmos NC takes place in real-time via SERCOS III. Several field bus slave interfaces are available onboard for customer controlling. PROFIBUS, PROFINET, EtherNet/IP or even EtherCAT can be used with the maXYmos NC at the customer's choosing. Quality data can be transmitted via the Ethernet interface through different protocols and a visualization via VNC[®] or a data backup can be performed.



Application

The NC joining module NCFT Type 2157B... is well qualified for use as a linear actuator for assembly and joining tasks in automatic production systems and manual work places. Due to clean room qualification, the NC joining module is ideally qualified for production and product testing in medical technology. Another application area is precision manufacturing, such as the watch and small motor industry, and spring testing. The installation is possible vertically as well as horizontally. Fixation of the NC joining module at a machine frame is provided through wall mounting. A tool receptacle is available at the plunger (fig. 2 and 4, detail A).

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Technical data

Dimensions	mm	Fig. 1 to 4
Assembly options		wall assembly
Weight (straight NCFT)	kg	5,8
Weight (angular NCFT)	kg	7,8
Max. tool weight ¹⁾	kg	5
Direction of measurement		compress./tens.
Measuring range	kN	0,05
	kN	0,1
	kN	0,25
	kN	0,5
	kN	1,0
	kN	1,5
Length of stroke (straight NCFT)	mm	100
Length of stroke (angular NCFT)	mm	250
Tool holder	mm	Fig. 2, 4, detail A
Holding brake	V/A	24/0,4
Max. movement speed	mm/s	400

Displacement sensor system		absolute encoder
Resolution	µm	0,2
Practical repeatability	mm	<0,002
Practical repeatability 2157B...T250	mm	<0,01
Force sensor		piezoelectric
Temperature range	°C	10 ... 40
Protection class		IP54
Linearity in all ranges	%FSO	≤1
Accuracy class force sensor	%	0,5
Service life of spindle (acc. to defined drive profile)	cycles	>10 Mio.
Short stroke	mm	≤60
Lubrication connection (internal)		standard- lubrication nipple

Servo amplifier ²⁾	Bosch-Rexroth Type 2180...	
Standard interface	SERCOS III (internal bus)	

Evaluation unit ³⁾	maXYmos NC Type 5847...	
Standard Interface	PROFIBUS, PROFINET, EtherNet/IP, EtherCAT	
Power supply	VDC	24 ±5 %

¹⁾ Attention must be paid to possible radial forces independent of the installation position. Permissible tool weight may have to be reduced for manual feed.

A bending of the plunger depending on the tool weight must be considered for a horizontal installation.

²⁾ Servo amplifier see accessories data sheet 003-125 Type 2180...

³⁾ Evaluation unit maXYmos NC Type 5847B... see data sheet 003-272

Dimensions NCFT (straight version)

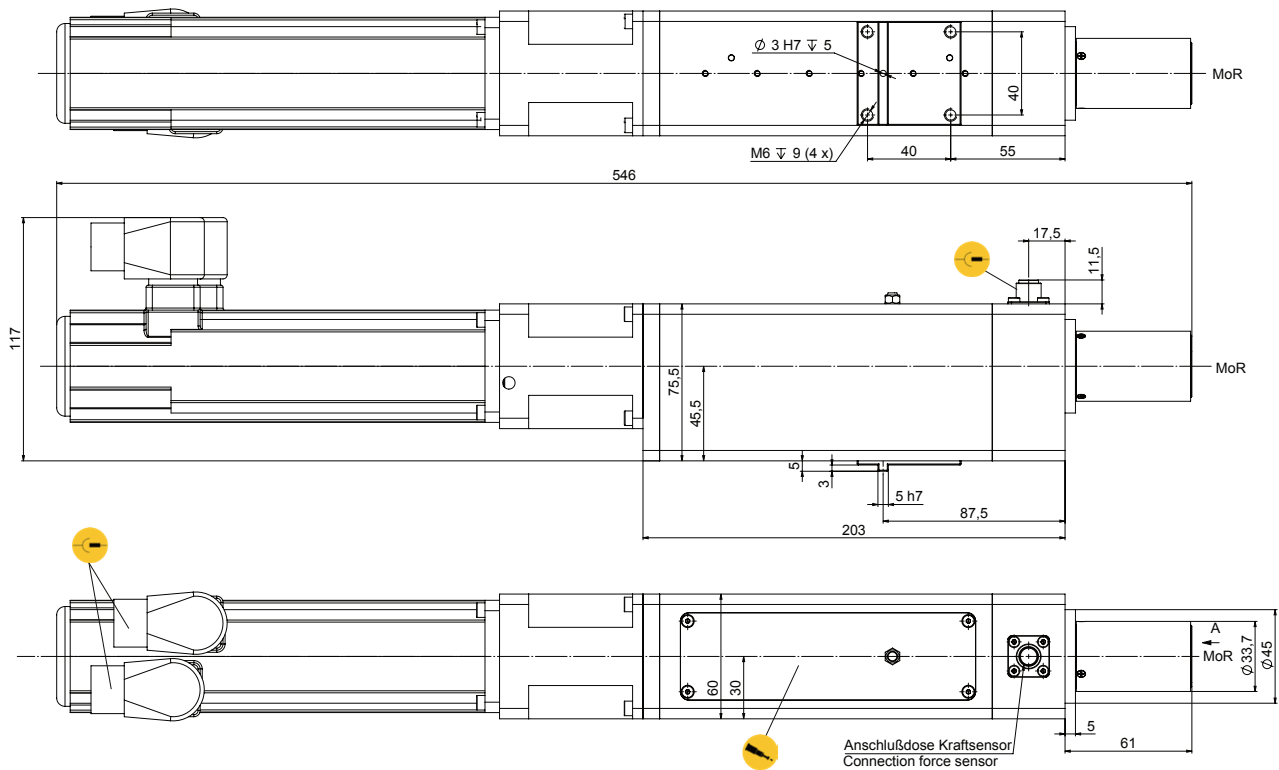




Fig. 1: Dimensions NC joining module NCFT Type 2157B1 ... 2157B8 for measuring range of 0,05 ... 1,5 kN

Warnings and Notes:

-  Lubrication points
Cover plate must be removed for lubrication
-  Electrical connection points

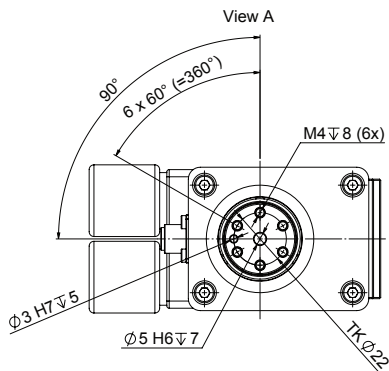


Fig. 2: Dimensions View A, NC joining module NCFT Type 2157B1 ... 2157B8 for measuring range of 0,05 ... 1,5 kN

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Dimensions NCFT (angular version)

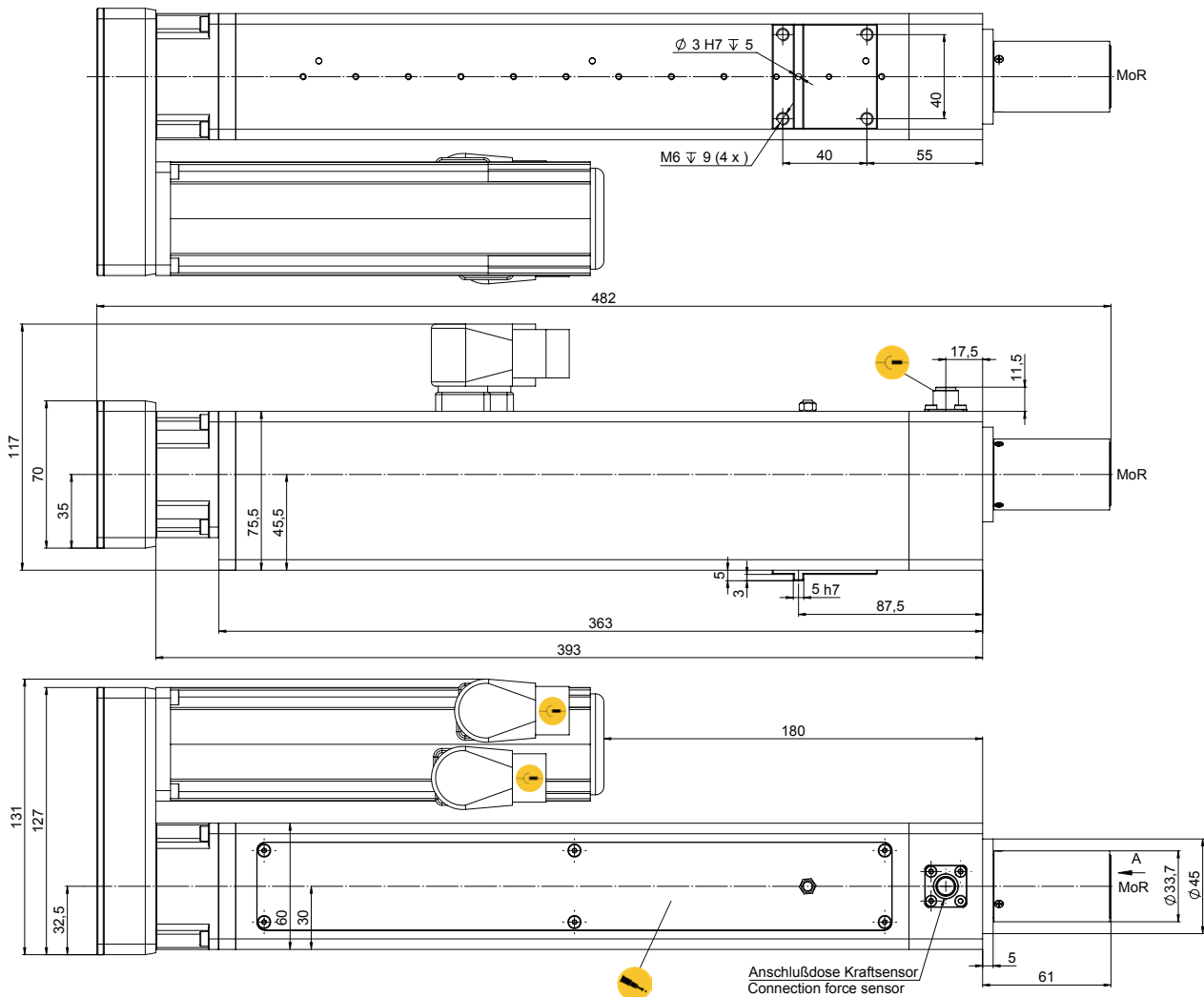




Fig. 3: Dimensions NC joining module NCFT Type 2157B1T250 ... 2157B8T250 for measuring range of 0,05 ... 1,5 kN

- Warnings and Notes:**
-  Lubrication points
Cover plate must be removed for lubrication
 -  Electrical connection points

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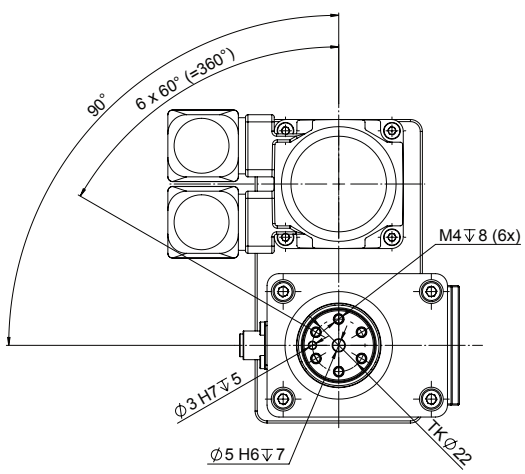


Fig. 4: Dimensions View A, NC joining module NCFT Type 2157B1T250 ... 2157B8T250 for measuring range of 0,05 ... 1,5 kN

Functional principle with maXYmos NC Type 5847...

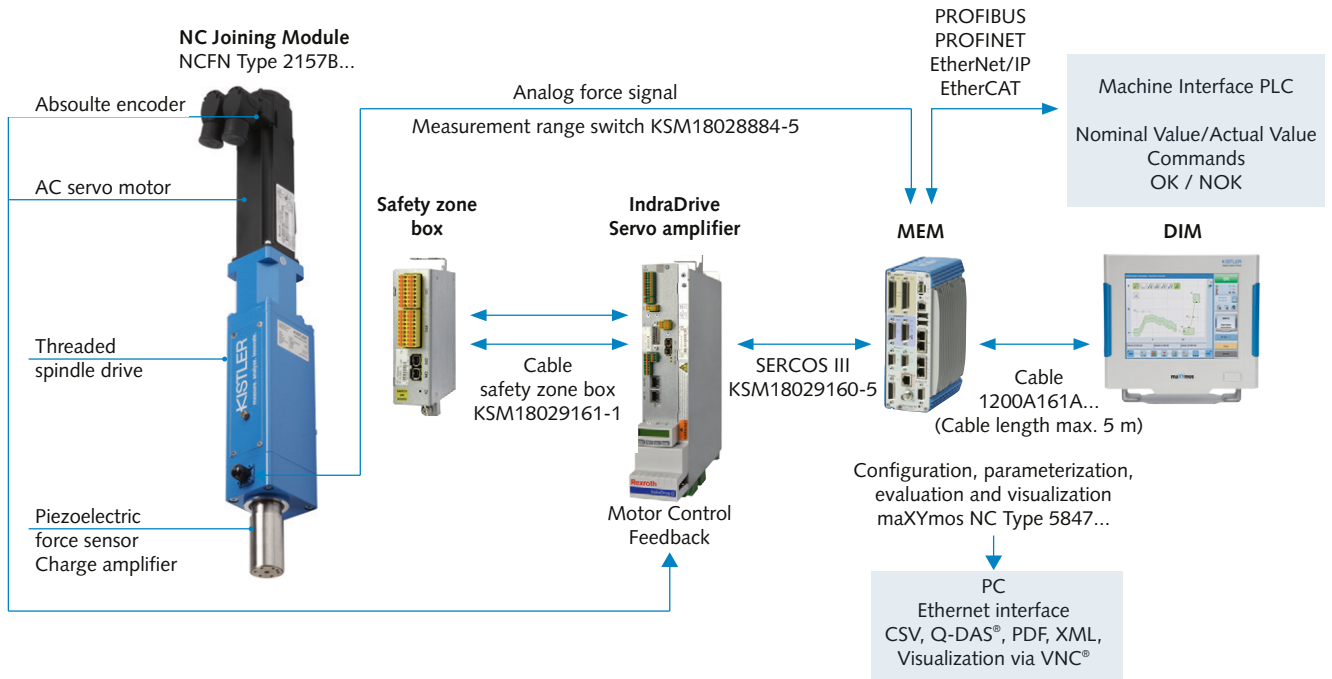


Fig. 5: Functional principle of NC joining system with NC joining module NCFT Type 2157B... and maXYmos NC Type 5847...

Included accessories

- None

Optional accessories

	Type/Art. No.
• Evaluation unit maXYmos NC ⁴⁾ (MEM)	5847...
• Bearing rail adapter for 35 mm Cap rail including 2 fastening screws M3x10	5700A31
• Display module (DIM) with pedestal	5877AZ000
• Connection cable maXYmos MEM on DIM, length 5 m	1200A161A5
• Servo amplifier ²⁾	2180...

²⁾ Servo amplifier see accessories data sheet 003-125 Type 2180A...

⁴⁾ Evaluation unit maXYmos NC Type 5847B... see data sheet 003-272

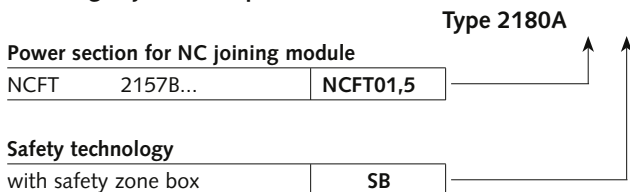
Cable

- NCFT motor cable, length 5 m RKL4302 KSM315330-5
- NCFT MSK Feedback cable, length 5 m RKG4200 KSM303500-5
- maXYmos Force transmitter cable, length 5 m KSM18028884-5
- SERCOS III connection cable, length 5 m KSM18029160-5
- Safety zone box cable, 2 cables required), length 1 m KSM18029161-1

Other length on request.

Type/Art. No.

Ordering key servo amplifier for NCFT



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Application example



Fig. 6: Application example for the watch-and-clock industry

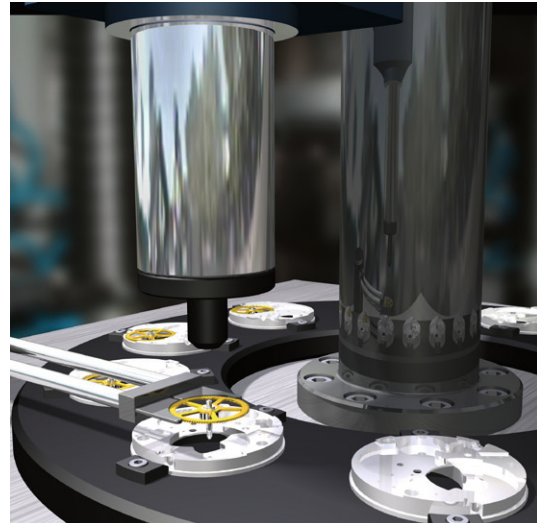


Fig. 8: Detail view watch-and-clock industry

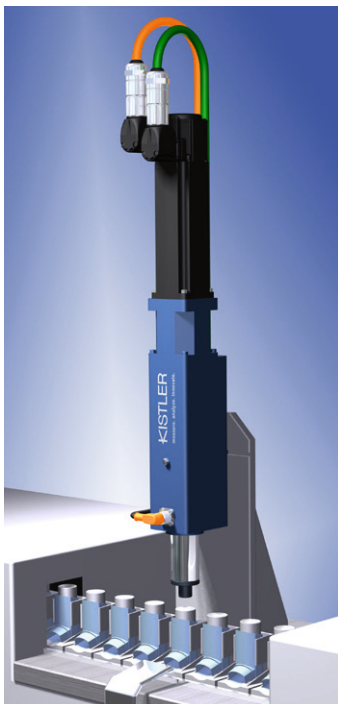


Fig. 7: Testing an inhaler

Ordering key

Type 2157B

Meas. range 1 [kN]	Meas. range 2 [kN]	
0,25	0,05	1
0,25	0,10	2
0,50	0,10	3
0,50	0,25	4
1	0,25	5
1	0,50	6
1,50	0,10	7
1,50	0,50	8

NCFT straight version Stroke 100 mm (NC joining module straight)	
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NCFT angular version Stroke 250 mm (NC joining module angular)	T250
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Ordering example (straight version) **Type 2157B5**
NC joining module NCFT **Type 2157B...**, measuring range 1: **1 kN**, measuring range 2: **0,25 kN**, choice: **5**

Ordering example (angular version) **Type 2157B5T250**
NC joining module NCFT **Type 2157B...**, measuring range 1: **1 kN**, measuring range 2: **0,25 kN**, choice: **5**, stroke 250 mm (angular) **T250**

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