

NC Joining Module NCFH

Type 2151B...

1 ... 60 kN with Hollow Shaft Motor

The NC joining module Type 2151B... (in two sizes) with integrated piezoelectric force sensor for nominal forces of 1 ... 60 kN is excellent for use in assembly and joining processes monitored by force displacement.

- Force control
- Integrated Piezo charge amplifier
- High measuring accuracy in two ranges
- High velocity
- Practical repeatability <0,01 mm
- Active compensation of process compression for exact positioning
- High overload capacity up to 15x
- No external PC with special software required
- Absolute encoder, eliminates reference point determination
- Low maintenance due to central lubrication connector

Description

The NC joining modules NCFH Type 2151B... consist of a robust housing with the displacement sensor, integrated absolute encoder, piezoelectric tension/compression force sensor and charge amplifier. The compressive or tension forces that impact the sensor create a proportional electrical charge in the piezoelectric measuring element, which is converted into an analog voltage signal by the integrated charge amplifier.

The drive motor is an electrically commutated hollow shaft AC servo motor which is controlled by a servo controller. This servo controller provides constant speed independent of load. Standard functions like block pressing, position pressing and force feedback controlled pressing as well as intermediate positioning are supported.

The NC joining module NCFH can be operated with the IndraDrive servo controller in combination with the DMF-P A300 NCF Type 4734A..., DMF-P A310 Universal Type 4740A... or with the NC Compact Type 2159A. Monitoring of the work area of the screw drive is assumed the electronics in the servo controller.

The functional principle of the individual systems is described on the following pages. A field bus slave interface is used to connect the system to the system control, the Ethernet connection, including output of QA data.



Application

The NC joining module NCFH Type 2151B... is excellent for application in assembly and joining tasks in automated production plants.

Vertical and horizontal installation is possible and is performed by wall or flange assembly. Process tooling should be installed on the ram (please refer to Fig. 1 and 2).

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Technical Data

Dimensions	mm	Fig. 1 and 2
Assembly options		wall or flange assembly
Weight		
size 1, 10 or 15 kN	kg	17
size 2, 30 kN	kg	80
size 2, 60 kN	kg	87
Max. tool weight *		
size 1	kg	50
size 2	kg	100
Direction of measurement		tension/ compression
Measuring range		
size 1	kN	1, 2, 5, 10, 15
size 2	kN	15, 30, 60
Length of stroke		
size 1	mm	200
size 2	mm	400
Tool holder	mm	Fig. 1 and 2
Holding brake	V/A	24/1
Max. movement speed	mm/s	300
Displacement sensor system		absolute encoder
Resolution	mm	0,001
Force sensor		piezoelectric

* Possible radial forces must be considered independent of the mounting. Tool weight must be reduced using safety option in servo controller

Temperature range	°C	10 ... 40
Protection class		IP54
Linearity in all ranges	%FSO	≤1
Service life of spindle (acc. to defined drive profile)	cycles	approx. 10 million
Short stroke		
size 1	mm	≤60
size 2	mm	≤110
Lubrication connection (exterior)		standard- lubricating nipple

Servo Controller	Bosch-Rexroth Type IndraDrive	
Standard Interface**		Profibus
Control voltage	VDC/W	24 (19,2 ... 28,8) /24
Power connection	V	400 (400 ... 500) ±10 %
	Hz	50/60 ±2 %
	phase	3

Evaluation Unit	Type 4734A... or Type 4740A...	
Standard Interface		Profibus
Power supply	VDC	24 ±10 %

** Dependent of system

Comment about temperature:
According to the load profile the size 2 housing can heat up to 80 °C.
Cycle time <10 sec please contact technical service.

Dimensions

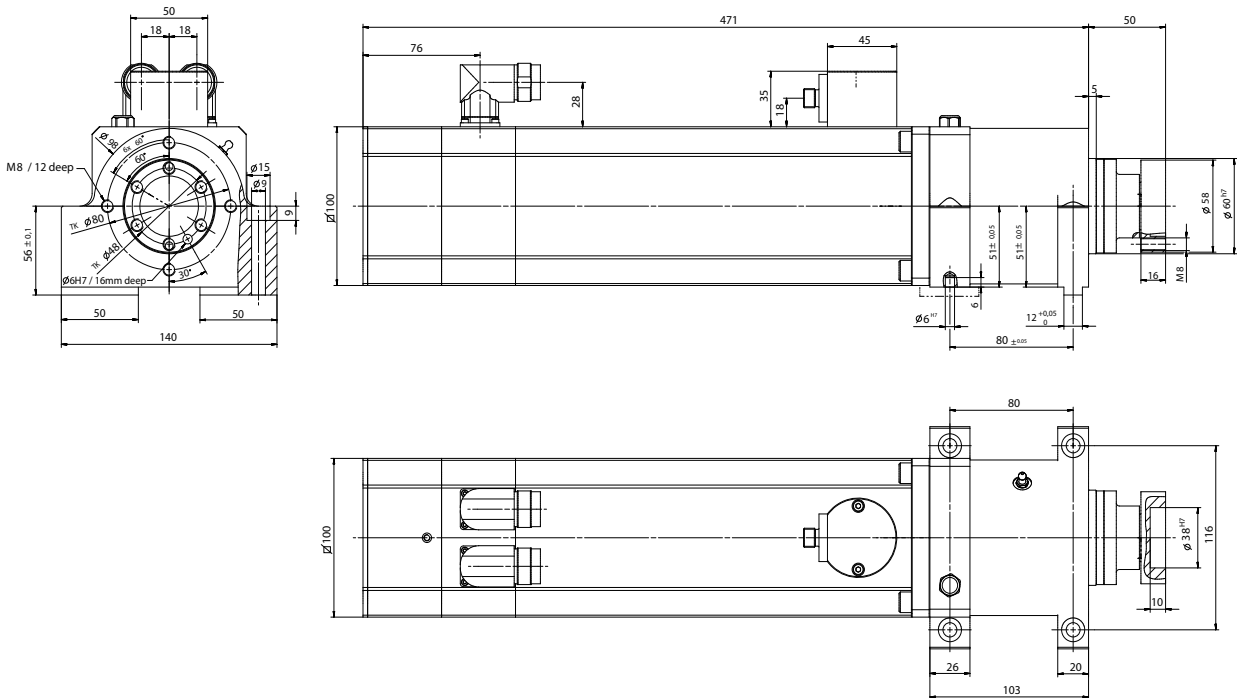


Fig. 1: Dimension NC joining module NCFH Type 2151B... size 1 for measuring range 1, 2, 5, 10 and 15 kN

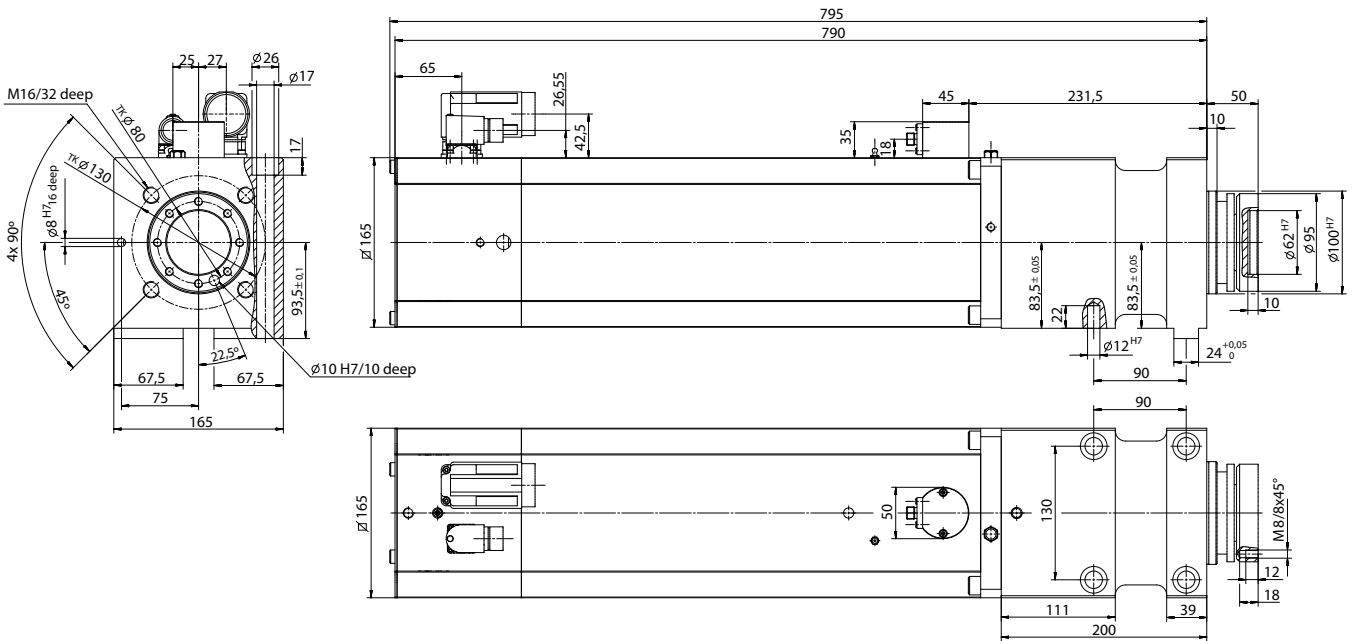


Fig. 2: Dimension NC joining module NCFH Type 2151B... size 2 for measuring range 15, 30 and 60 kN

Assembly may require an external guidance to the ram.
Radial forces such as tool weight must be observed.

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Functional Principle with DMF-P A300 NCF Type 4734A...

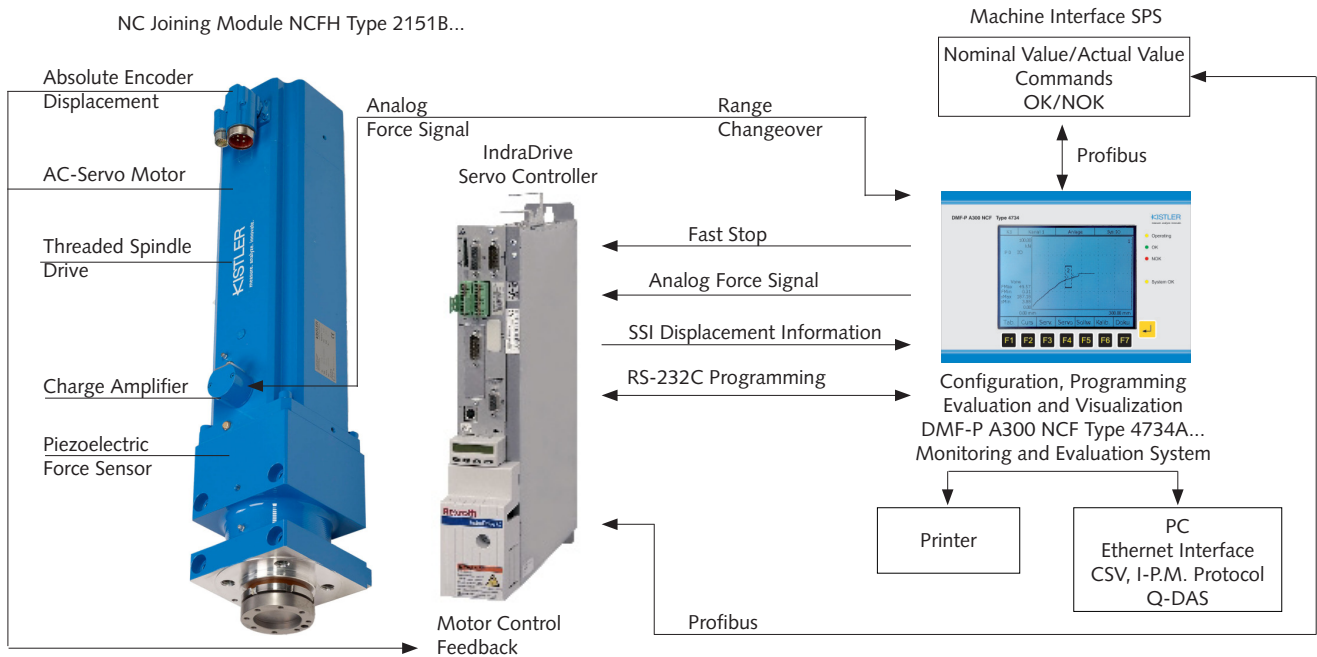


Fig. 3: Functional principle of NC joining system with NC joining module NCFH Type 2151B... and DMF-P A300 NCF Type 4734A...

Included Accessories

- None

Optional Accessories

- | | |
|---|----------------|
| • Servo controller for Type 2151B... with integrated safety option
IndraDrive 54 A PB S2 MPH07 | KSM035372 |
| • Servo controller for Type 2151B... with integrated safety option
IndraDrive 70 A PB S2 MPH07 | KSM035361 |
| • Evaluation unit DMF-P A300 NCF | 4734A... |
| • Wall housing evaluation unit | 4734AWDY2X4... |
| • Desktop housing evaluation unit | 4734ATDY2X4... |
| • Panel housing evaluation unit | 4734AEDY2X4... |

Cable

- | | |
|--|-------------|
| • NCFH motor and feedback cable, length 5 m for size 1 | KSM301660-5 |
| • NCFH motor and feedback cable, length 5 m for size 2 | KSM307390-5 |
| • NCF cable SSI displacement
IndraDrive, length 5 m | KSM301750-5 |
| • Data cable IndraDrive, length 5 m | KSM301640-5 |
| • NCF cable force transmitter, length 5 m | KSM313720-5 |
| • NCF cable analog
force signal, length 5 m | KSM301760-5 |
| • NCF cable XTE, YTE
IndraDrive, length 5 m | KSM314030-5 |

Other length on request.

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Functional Principle with DMF-P A310 Universal Type 4740A...

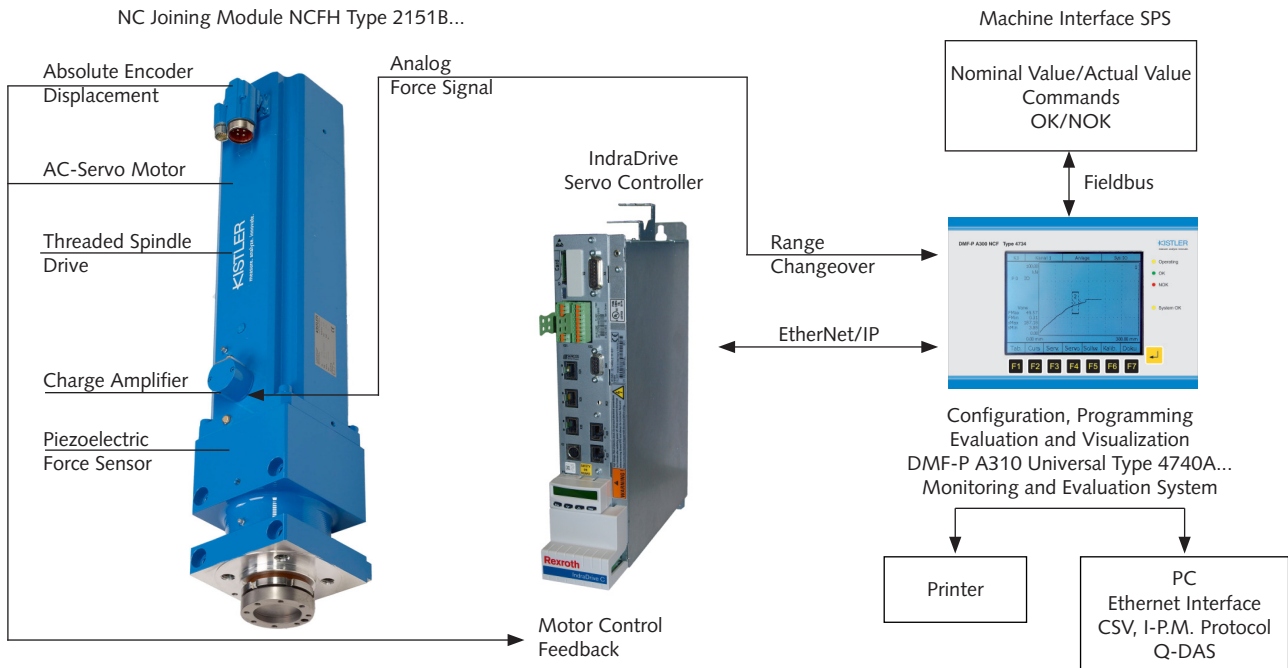


Fig. 4: Functional principle of NC joining system with NC joining module NCFH Type 2151B... and DMF-P A310 Universal Type 4740A...

Included Accessories

- None

Optional Accessories

- | | |
|--|-------------|
| • Servo controller IndraDrive 54 A EI S2 MPC07, NCFH 10/15/30 kN | KSM036438 |
| • Servo controller IndraDrive 70 A EI S2 MPC07, NCFH 60 kN | KSM036446 |
| • Evaluation unit DMF-P A310 Universal | 4740A... |
| • Wall housing evaluation unit | 4740AWY2... |
| • Desktop housing evaluation unit | 4740ATY2... |
| • Panel housing evaluation unit | 4740AEY2... |

Cable

- | | |
|--|--------------|
| • NCFH motor and feedback cable, length 5 m for size 1 | KSM301660-5 |
| • NCFH motor and feedback cable, length 5 m for size 2 | KSM307390-5 |
| • NCF cable force transmitter, length 5 m | KSM313720-5 |
| • Network cable A310 EtherNet/IP, length 5 m | KSM036457-5 |
| • Network cable A310 EtherNet/IP, length 10 m | KSM036458-10 |
| • Network cable A310 EtherNet/IP, length 20 m | KSM036459-20 |
| • Network cable A310 EtherNet/IP, length 30 m | KSM036460-30 |

Other length on request.

Type/Art. No.

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Functional Principle with NC Compact

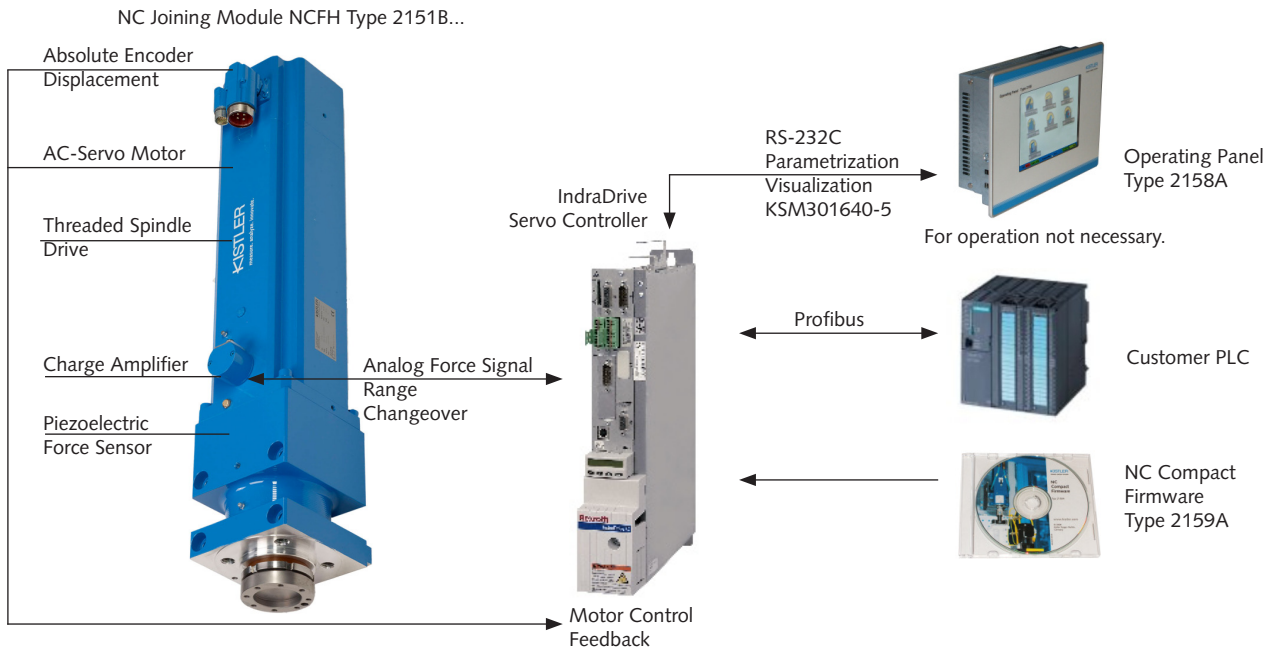


Fig. 5: Functional principle of NC joining system with NC joining module NCFH Type 2151B... and Operating Panel Type 2158A

Included Accessories

- None

Optional Accessories

- | | |
|---|-----------|
| • Servo controller for Type 2151B... with integrated safety option
IndraDrive 54 A PB S2 MPH07 | KSM035372 |
| • Servo controller for Type 2151B... with integrated safety option
IndraDrive 70 A PB S2 MPH07 | KSM035361 |
| • NC Compact Firmware | 2159A |
| • NC Compact Operating Panel | 2158A |

Cable

- | | |
|--|-------------|
| • NCFH motor and feedback cable, length 5 m for size 1 | KSM301660-5 |
| • NCFH motor and feedback cable, length 5 m for size 2 | KSM307390-5 |
| • Data cable IndraDrive, length 5 m | KSM301640-5 |
| • NCF cable force transmitter, length 5 m (NC Compact) | KSM313710-5 |

Other length on request.

Note:
Other Fieldbus Interfaces e.g. EtherNet/IP, Profinet, etc. on request.

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Application Example

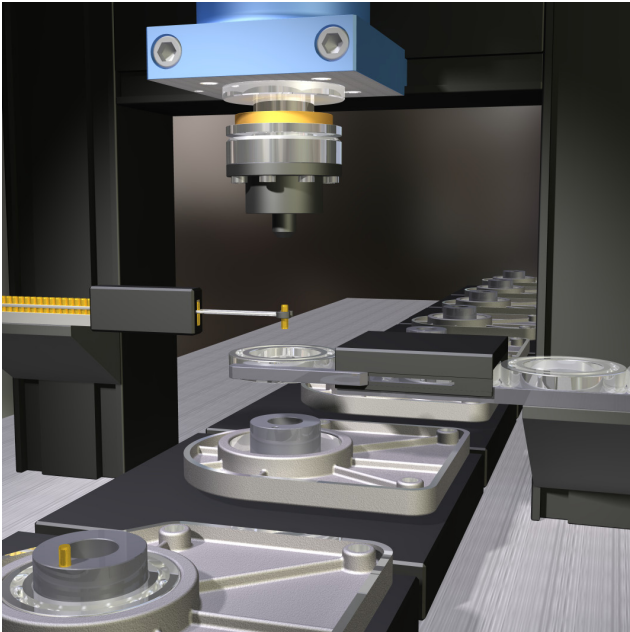


Fig. 6: Application example for joining process of bearing and pin

Ordering Key

Type 2151B

Meas. range 1	Meas. range 2	Stroke	Size	
2 kN	1 kN	200	1	02012001
5 kN	1 kN	200	1	05012001
5 kN	2 kN	200	1	05022001
10 kN	1 kN	200	1	10012001
10 kN	2 kN	200	1	10022001
10 kN	5 kN	200	1	10052001
15 kN	2 kN	200	1	15022001
15 kN	5 kN	200	1	15052001
30 kN	15 kN	400	2	30154002
60 kN	30 kN	400	2	60304002
60 kN	15 kN	400	2	60154002

Ordering Example

Type 2151B05022001

NC joining module NCFH **Type 2151B...**, measuring range 1: **5 kN**, measuring range 2: **2 kN**, stroke: **200 mm**, overall size: **1**

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