

NC Joining Module NCFB

with Cost Optimized Standard Design

Type 2160A...

The joining module Type 2160A... (in two size available) with integral piezoelectric force sensor and measuring ranges of 5 ... 50 kN is for force-displacement assembly and joining processes. This extremely economically priced NC joining module NCFB allows the user to simulate standard joining processes cost-effectively using electromechanical joining modules.

- Force control
- Direction of measurement: compression
- Integral charge amplifier
- High measuring accuracy in two ranges
- Practical repeatability <0,01 mm
- High rigidity
- High level of sensor overload protection

Description

The NC joining module Type 2160A... consists of a robust case with integral piezoelectric force sensor. Its motor has an absolute encoder for exact positioning. The compression forces acting on the sensor's piezoelectric measuring element generate a proportional electric charge converted by the integral charge amplifier into an analog voltage signal.

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 such as block pressing, position pressing and force feedback controlled pressing as well as intermediate positioning are supported.

The NC joining module NCFB 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 and Type 2158A. 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 NCFB Type 2160A... is ideal for use in automated production systems.

Assembly is possible vertically and horizontally. The module can be flanged onto the frame of the production unit. Threaded bores of sufficient strength to hold tools are provided in the ram of the threaded spindle drive (Figure 1 and 2).

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Technical Data

Dimensions	mm	Fig. 1 and 2
Assembly options		flange assembly
Weight		
Type 2160A15...	kg	35
Type 2160A50...	kg	145
Max. tool weight Type 2160A15...		
without holding brake*	kg	10
with holding brake*	kg	50
Max. tool weight Type 2160A50...		
without holding brake*	kg	15
with holding brake*	kg	100
Holding brake	V/A	24/0,7
Direction of measurement		compression
Measuring range		
Type 2160A15...	kN	5, 15
Type 2160A50...	kN	25, 50
Length of stroke		
Type 2160A15...	mm	200
Type 2160A50...	mm	400
Tool holder	mm	Fig. 1 and 2
Max. movement speed		
Type 2160A15...	mm/s	250
Type 2160A50...	mm/s	150
Displacement sensor system		absolute encoder
Resolution	mm	0,001
Force sensor		piezoelectric
Temperature range	°C	10 ... 40

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

Protection class		IP54
Linearity in all ranges	%FSO	≤1
Service life of spindle (acc. to defined drive profile)	cycles	approx. 5 million
Short stroke		
Type 2160A15...	mm	≤70
Type 2160A50...	mm	≤120
Central lubrication connection (internal)		standard-lubrication 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 %

Evaluation Unit		
NC Compact Firmware		Type 2159A
Operating Panel		Type 2158A

** Dependent of system.

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Dimensions NC Joining Module NCFB Type 2160A...

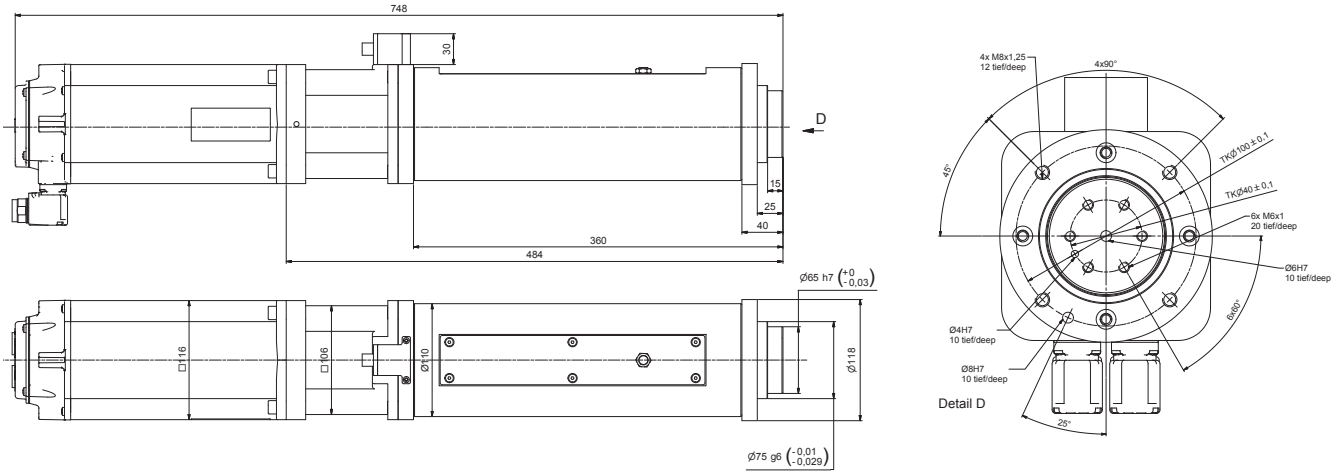


Fig. 1: Dimensions NC joining module NCFB Type 2160A15... measuring range 1: 15 kN and measuring range 2: 5 kN

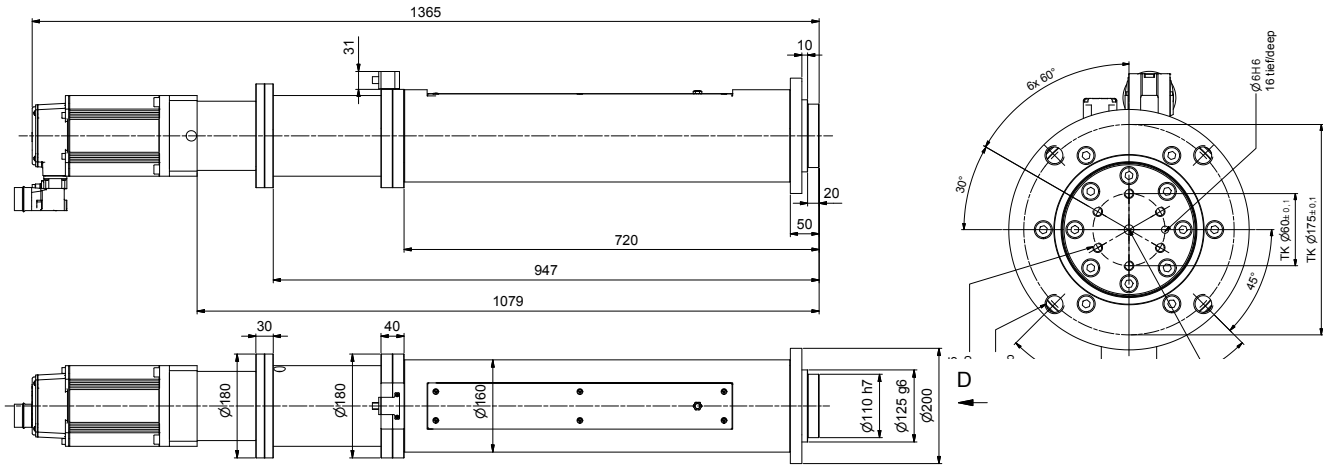


Fig. 2: Dimensions NC joining module NCFB Type 2160A50... measuring range 1: 50 kN and measuring range 2: 25 kN

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

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Functional Principle with NC Compact

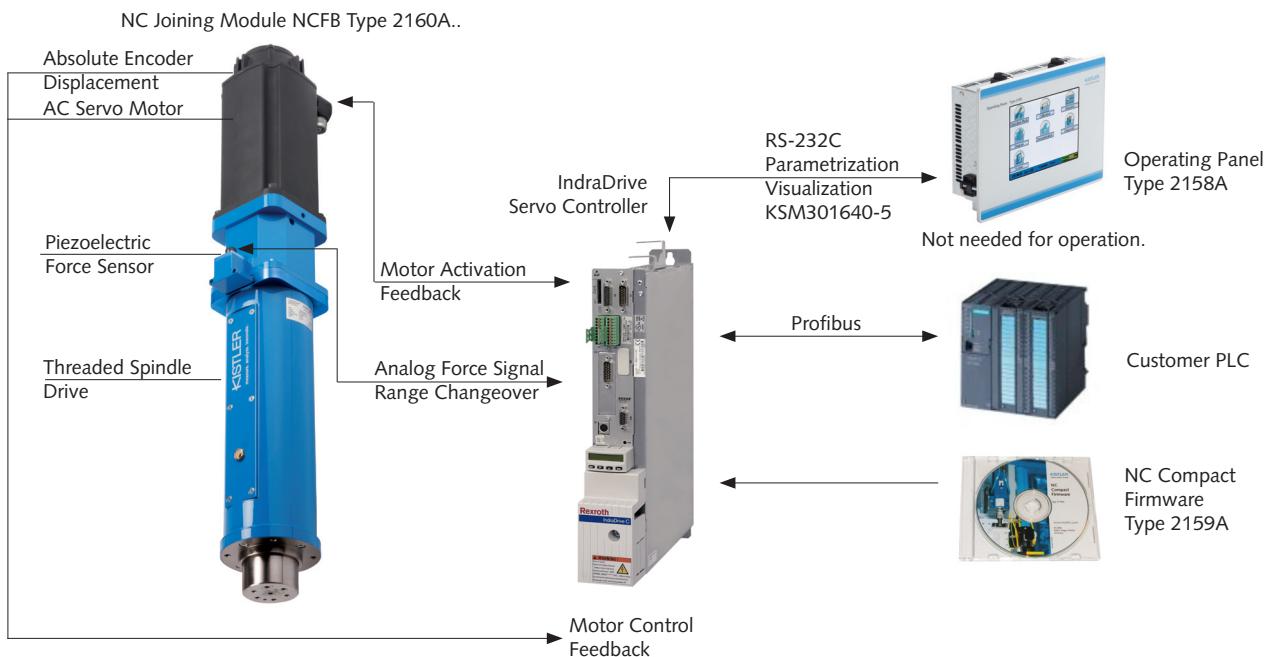


Fig. 5: Functional principle of NC joining system with NC joining module NCFB Type 2160A... and NC Compact Type 2158A and Type 2159A

Included Accessories

- None

Optional Accessories

- | | |
|---|-----------|
| • Servo controller for Type 2160A15... with integrated safety option
IndraDrive 12 A PB S2 MPH07 | KSM038526 |
| • Servo controller for Type 2160A... with integrated safety option
IndraDrive 28 A PB S2 MPH07 | KSM035371 |
| • NC Compact Firmware | 2159A |
| • NC Compact Operating Panel | 2158A |

Cable

- | | |
|--|-------------|
| • NCFB 15 motor cable, length 5 m RKL4302 | KSM341600-5 |
| • NCFB 50 motor cable, length 5 m RKL4306 | KSM347990-5 |
| • NCFB MSK feedback cable, length 5 m RKG4200 | KSM303500-5 |
| • 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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Functional Principle with DMF-P A310 Universal Type 4740A...

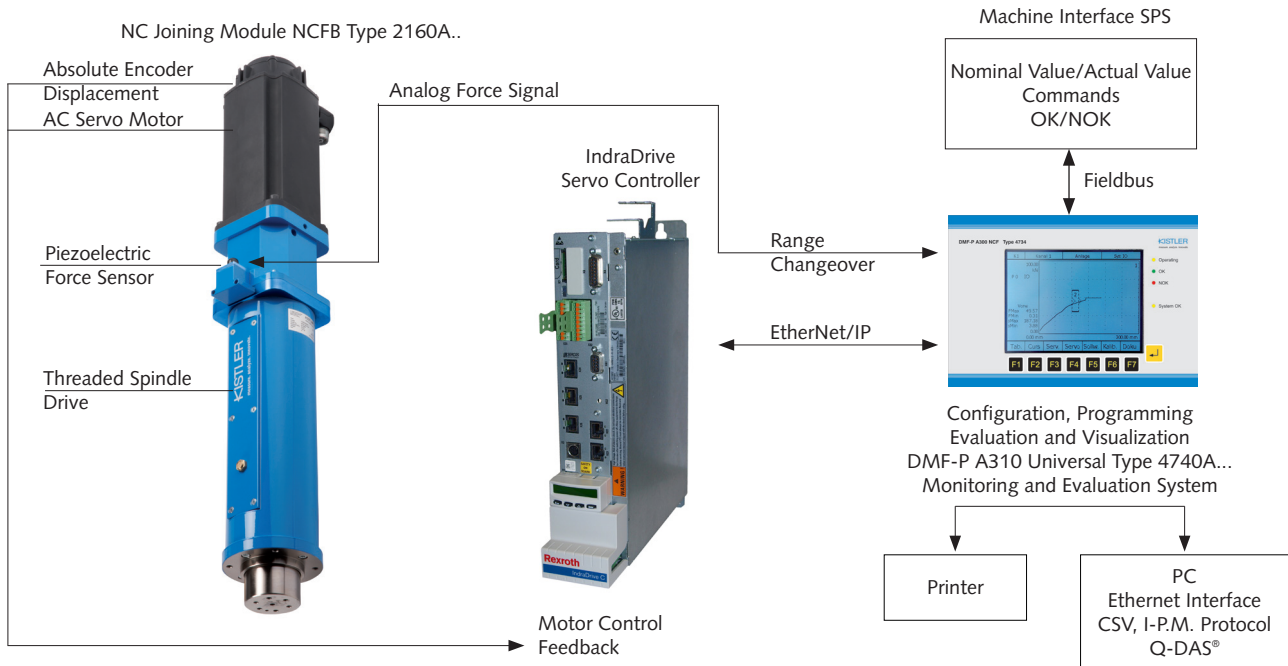


Fig. 4: Functional principle of NC joining system with NC joining module NCFB Type 2160A... and DMF-P A310 Universal Type 4740A...

Included Accessories

- None

Optional Accessories

	Type/Art. No.
• Servo controller IndraDrive 12 A EI S2 MPC07, NCFB 15 kN	KSM038528
• Servo controller IndraDrive 28 A EI S2 MPC07, NCFB 50 kN	KSM036436
• Evaluation unit DMF-P A310 Universal	4740A...
• Wall housing evaluation unit	4740AWY2...
• Desktop housing evaluation unit	4740ATY2...
• Panel housing evaluation unit	4740AEY2...

Cable

	Type/Art. No.
• NCFB 15 motor cable, length 5 m RKL4302	KSM341600-5
• NCFB 50 motor cable, length 5 m RKL4306	KSM347990-5
• NCFB MSK Feedback cable, length 5 m RKG4200	KSM303500-5
• 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.

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

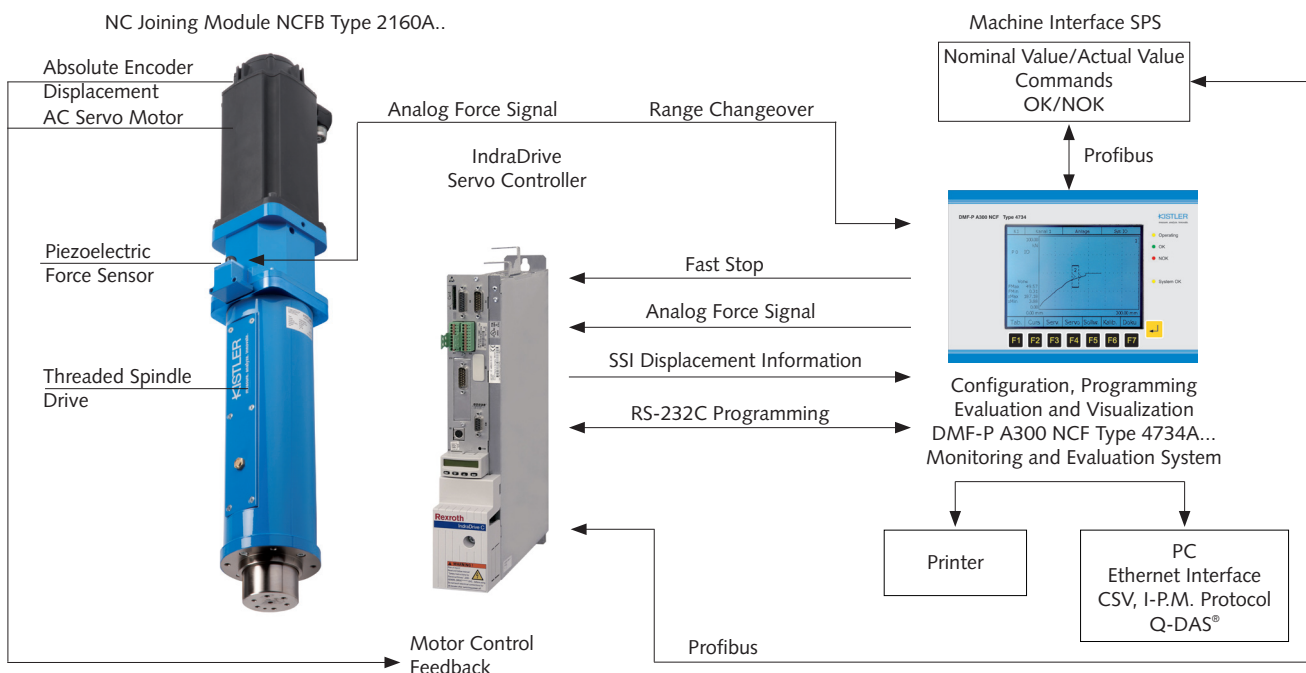


Fig. 3: Functional principle of NC joining system with NC joining module NCFB Type 2160A... and DMF-P A300 NCF Type 4734A...

Included Accessories

- None

Optional Accessories

- | | |
|---|----------------|
| • Servo controller for Type 2160A15... with integrated safety option
IndraDrive 12 A PB S2 MPH07 | KSM038526 |
| • Servo controller for Type 2160A50... with integrated safety option
IndraDrive 28 A PB S2 MPH07 | KSM035371 |
| • Evaluation unit DMF-P A300 NCF | 4734A... |
| • Wall housing evaluation unit | 4734AWDY2X4... |
| • Desktop housing evaluation unit | 4734ATDY2X4... |
| • Panel housing evaluation unit | 4734AEDY2X4... |

Cable

- | | |
|---|-------------|
| • NCFB 15 motor cable, length 5 m RKL4302 | KSM341600-5 |
| • NCFB 50 motor cable, length 5 m RKL4306 | KSM347990-5 |
| • NCFB MSK Feedback cable, length 5 m RKG4200 | KSM303500-5 |
| • 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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Ordering Key

Type 2160A

Mating Force [kN]

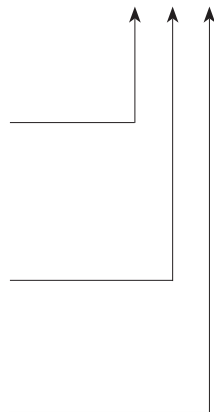
Measuring range 1	15	15
Measuring range 2	5	
Measuring range 1	50	50
Measuring range 2	25	

Stroke [mm]

200 (only 15 kN)	200
400 (only 50 kN)	400

Holding Brake

Without	N
With holding brake	H



Ordering Example

Type 2160A50400N

NC joining module NCFB **Type 2160A...**, measuring range 1: **50 kN**, stroke: **400 mm**, without holding brake: **N**.

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