

## NC Joining Module NCFN Standard Design for Medium to High Force

Type 2153A...

The NC joining module NCFN Type 2153A... with integrated strain gage force sensor for nominal forces of 5 ... 300 kN is excellent for use in assembly and joining processes monitored by force displacement.

- Force feedback control
- High velocity
- High measuring accuracy for all ranges
- Active compensation of process compression for exact positioning
- Available for compression/tension application

### Description

The NC joining modules NCFN Type 2153A... consist of a robust housing with an integral strain gage tension/compression force sensor. An absolute encoder for precise positioning is integrated in the drive motor. The motor is an electrically commutated AC servo motor which is driven by a servo amplifier. This servo amplifier 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 NCFN 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

NC joining module NCFN Type 2153A... is excellent for applications in assembly and joining tasks in automated production plants and manual-work places.

Vertical and horizontal installation is possible and is performed by flange or wall mounting. Fixation of the joining units at a machine frame is provided through flange or wall mounting. Tapped holes for tool mounting are located at the tappet of the ball bearing screw (Fig. 1).



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## Technical Data

Dimensions	mm	Page 3 + 4
Assembly		Wall or flange assembly
Weight	kg	see table of dimensions
Max. tool weight <sup>1)</sup>	kg	see table of dimensions
Direction of measurement		compression/ tension
Nominal force	kN	5, 10, 15, 30, 60, 100, 200, 300
Stroke length		
only nominal force ≤100 kN	mm	200
nominal force 5 ... 300 kN	mm	400
Practical repeatability	mm	0,01
Anti rotate tool fitting		Fig. 1
Safety device optional	V/A	24/3 to 5 <sup>2)</sup>
Holding brake (standard)	V/A	24/0,7 to 1,5 <sup>2)</sup>
Max. speed		
NC joining module 300 kN	mm/s	100
NC joining module 200 kN	mm/s	140
NC joining module 100 kN	mm/s	200
NC joining module 5/10/15/30/60 kN	mm/s	250

<sup>1)</sup> Possible radial forces must be considered independent of the mounting.  
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.

Displacement sensor system		absolute encoder
Resolution	mm	0,001
Force sensor		strain gage
Temperature range	°C	10 ... 40
Protection class		IP54
Linearity in all ranges	%FSO	≤1
Accuracy class force sensor	%	0,5
Life cycle ball screw (per defined drive profile)	cycles	approx. 10 million

**Servo amplifier**<sup>3)</sup> Bosch-Rexroth Type 2180A...  
Standard interface SERCOS III (internal bus)

**Evaluation unit**<sup>4)</sup> maXYmos NC Type 5847...  
Standard interface PROFIBUS, PROFINET,  
EtherNet/IP, EtherCAT  
Power supply VDC 24 ±5 %

To assure sufficient lubrication in case of strokes which are considerably smaller than the nominal stroke one nominal stroke has to be made at regular intervals.

<sup>2)</sup> Depending on system

<sup>3)</sup> Servo amplifier see accessories data sheet 003-125 Type 2180A...

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

**Dimensions**

Type 2153A...	A	A <sup>9)</sup>	B	øJ g6	øK g6	C2	C3	G1	G2	P	O	R (4x)	F1	F2	C1	X h9	Y	øV (4x)
...005200	779	–	447	50	75	20	5	98	100	70	70	M8x16	50	50	180	12	3	9
...005400	1059	–	727	50	75	20	5	98	100	70	70	M8x16	50	50	180	12	3	9
...010200	905	1069	500	80	110	30	5	137	140	100	100	M10x20	70	70	190	20	4,5	11
...010400	1105	1269	700	80	110	30	5	137	140	100	100	M10x20	70	70	190	20	4,5	11
...015200	905	1069	500	80	110	30	5	137	140	100	100	M10x20	70	70	190	20	4,5	11
...015400	1105	1269	700	80	110	30	5	137	140	100	100	M10x20	70	70	190	20	4,5	11
...030200	1 077	1 272	528	90	120	50	5	148	150	100	100	M12x24	75	75	215	20	4,5	11
...030400	1 277	1 472	728	90	120	50	5	148	150	100	100	M12x24	75	75	215	20	4,5	11
...060200	1 185	1 380	544	110	150	50	5	177	180	130	130	M16x32	90	90	215	20	4,5	13,5
...060400	1 385	1 580	744	110	150	50	5	177	180	130	130	M16x32	90	90	215	20	4,5	13,5
...100200	1 357	1 582	640	160	195	50	5	227	230	170	170	M20x40	115	115	280	28	6	17,5
...100400	1 557	1 782	840	160	195	50	5	227	230	170	170	M20x40	115	115	280	28	6	17,5
...200400	1 733	1 958	968	160	200	50	5	247	250	190	190	M20x40	125	125	282	36	9	22
...300400	1 886	2 111	1 035	200	240	72	8	297	300	210	210	M24x48	150	150	377	36	9	26

<sup>9)</sup> Dimensions with safety device "KG"

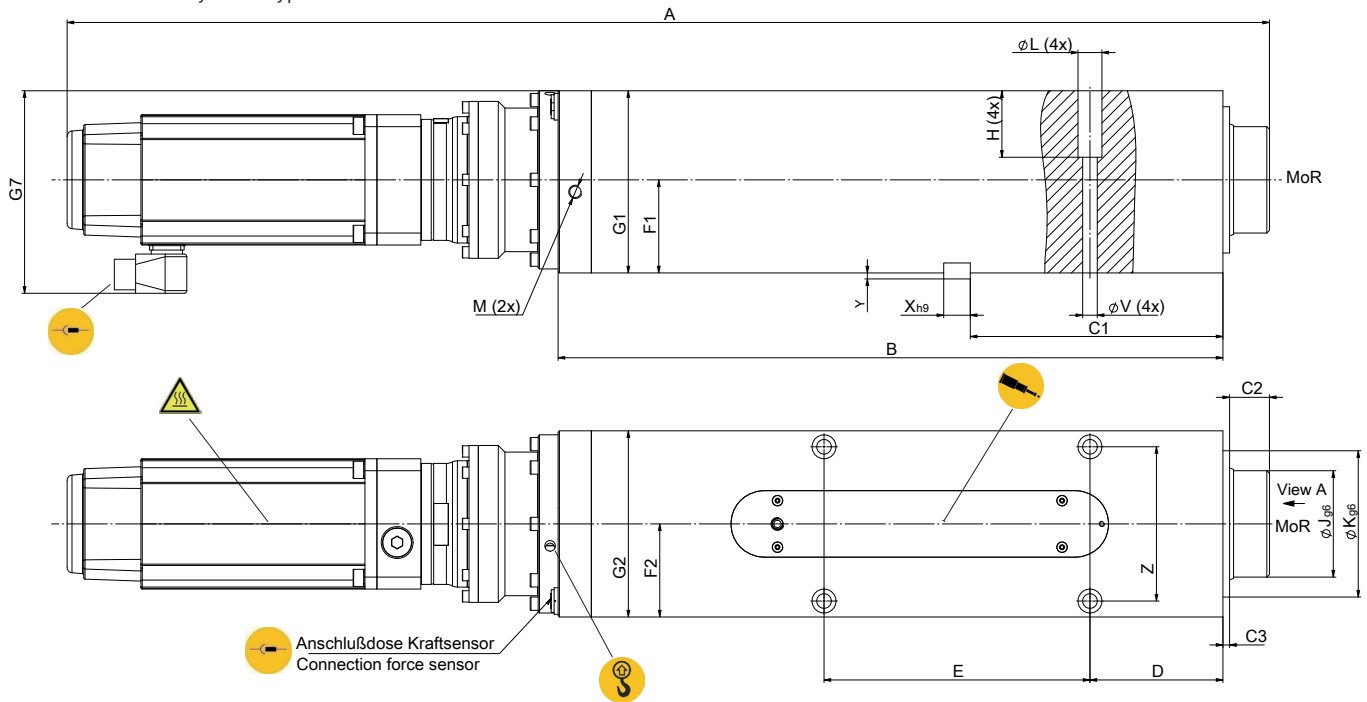
Type 2153A...	øL (4x)	H (4x)	D	E	Z	øTK	øT H7	N	øS H7	W °	U °	U1 °	Q	Weight [kg]	Tool weight [kg]	Thread M (2x)
...005200	15	32	136	100	80	36	6x16	43,5	5x10	120 °	30 °	6x60°	M6x12 (6x)	21	30	M8x12
...005400	15	32	136	100	80	36	6x16	43,5	5x10	120 °	30 °	6x60°	M6x12 (6x)	33	30	M8x12
...010200	18	50	100	200	116	60	6x16	62	6x12	120 °	30 °	6x60°	M8x16 (6x)	51	50	M10x18
...010400	18	50	100	200	116	60	6x16	62	6x12	120 °	30 °	6x60°	M8x16 (6x)	66	50	M10x18
...015200	18	50	100	200	116	60	6x16	62	6x12	120 °	30 °	6x60°	M8x16 (6x)	51	50	M10x18
...015400	18	50	100	200	116	60	6x16	62	6x12	120 °	30 °	6x60°	M8x16 (6x)	66	50	M10x18
...030200	18	75	150	150	125	65	8x16	68	8x16	112,5 °	22,5 °	8x45 °	M8x16 (8x)	75	100	M10x18
...030400	18	75	150	150	125	65	8x16	68	8x16	112,5 °	22,5 °	8x45 °	M8x16 (8x)	95	100	M10x18
...060200	20	90	140	150	150	80	8x16	82	10x20	112,5 °	22,5 °	8x45 °	M10x20 (8x)	115	100	M10x18
...060400	20	90	140	150	150	80	8x16	82	10x20	112,5 °	22,5 °	8x45 °	M10x20 (8x)	140	100	M10x18
...100200	26	80	204	180	200	120	10x20	106	12x24	112,5 °	22,5 °	8x45 °	M16x32 (8x)	225	100	M10x18
...100400	26	80	204	180	200	120	10x20	106	12x24	112,5 °	22,5 °	8x45 °	M16x32 (8x)	300	100	M10x18
...200400	33	100	200	200	205	120	10x20	115	12x24	112,5 °	22,5 °	8x45 °	M16x32 (8x)	370	100	M10x18
...300400	40	145	270	250	252	140	12x20	135	12x24	112,5 °	22,5 °	8x45 °	M16x32 (8x)	740	150	M16x24

Type 2153A...	G7	G8	øS1 H7
...005x00	132	–	5x10
...010x00	153	170	6x12
...015x00	153	170	6x12
...030x00	205	189	8x16
...060x00	219	204	10x20
...100x00	278	249	12x24
...200x00	288	291	12x24
...300x00	313	284	12x24

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**Dimensional Drawing**

View without safety brake Type 2153A - xxx - xxx - x - H - G



View with safety brake Type 2153A - xxx - xxx - x - K - G

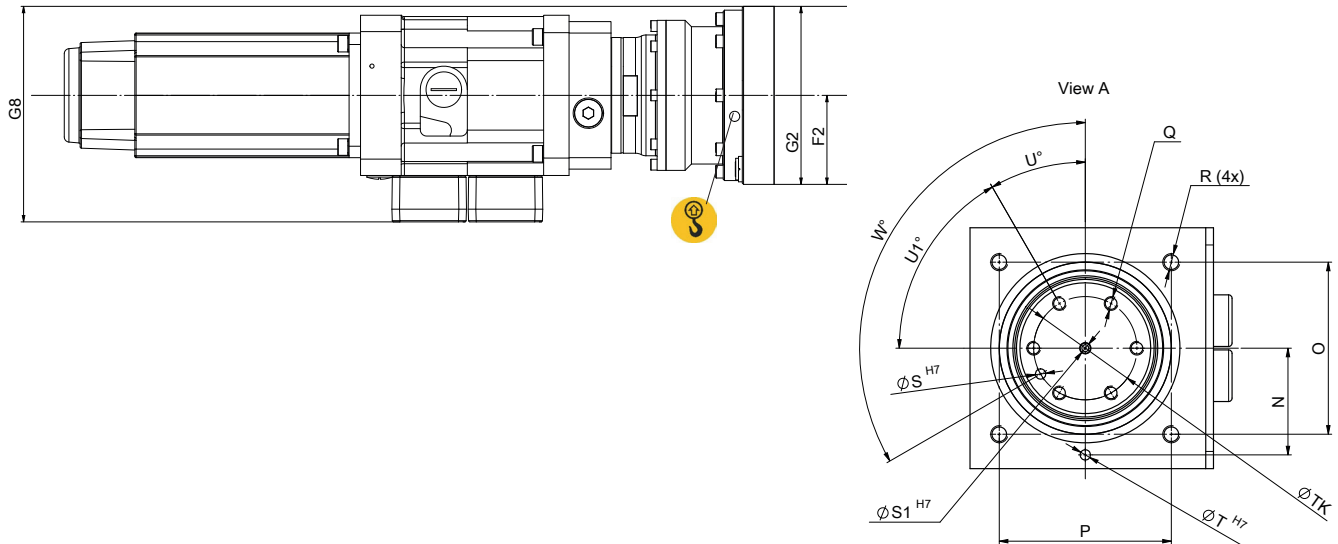


Fig. 1: Dimensions NC joining module NCFN Type 2153A...  
The NC joining module with nominal force  $\geq 30$  kN have  
8 tooling mount holes (Q).  
5 to 15 kN have 6 tooling mount holes (Q).

The radial forces (for example due to the weight of the tool)  
must be considered for the installation. An external guide may  
have to be provided for the plunger.

**Warnings and Notes:**

MoR = Middle of Ram

- Lubrication points
- Electrical connection points
- Warning high temperatures
- Attachment points

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**Functional Principle with maXYmos NC Type 5847...**

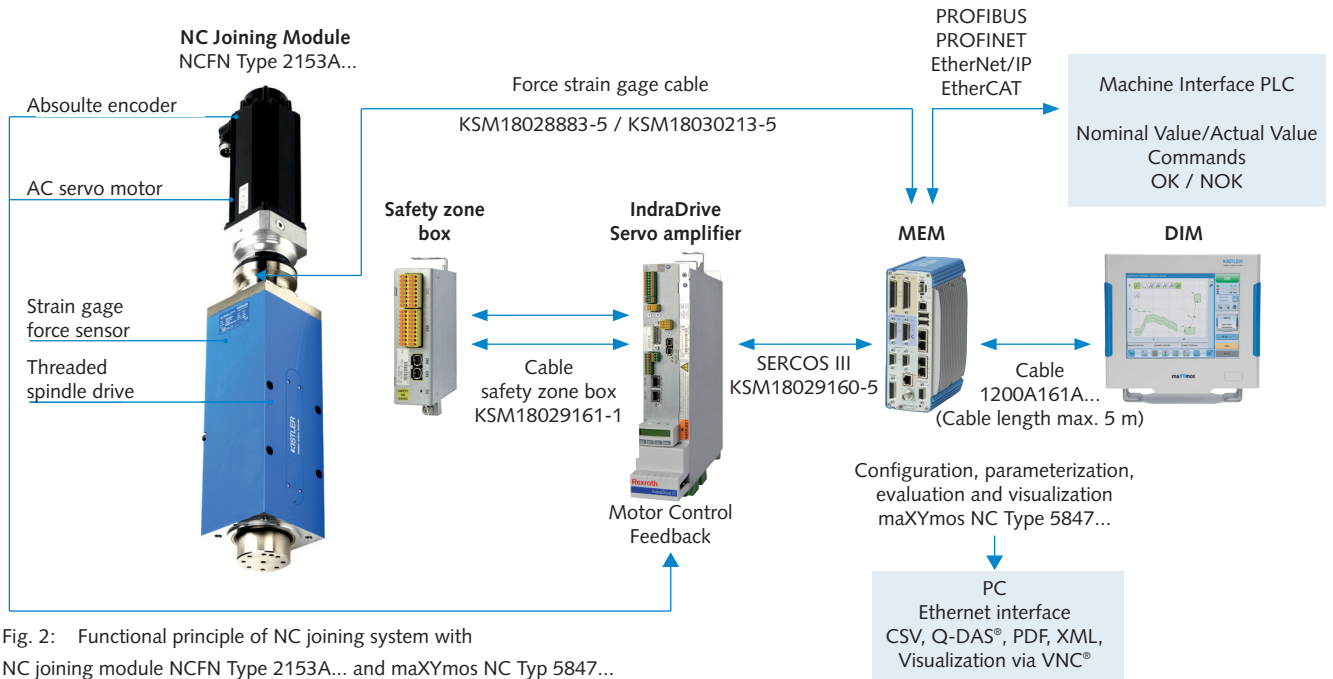


Fig. 2: Functional principle of NC joining system with NC joining module NCFN Type 2153A... and maXYmos NC Typ 5847...

**Included Accessories**

- None

**Optional Accessories**

	Type/Art. No.
• Evaluation unit maXYmos NC <sup>4)</sup> (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 <sup>2)</sup>	2180A...

<sup>2)</sup> Servo amplifier see accessories data sheet 003-125 Type 2180A...

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

**Cable**

	Type/Art. No.
• NCFN 5/10/15 motor cable, length 5 m RKL4302	KSM341600-5
• NCFN 30 motor cable, length 5 m RKL4309	KSM303490-5
• NCFN 60 motor cable, length 5 m RKL4314	KSM305640-5
• NCFN 100 motor cable, length 5 m RKL4323	KSM307530-5
• NCFN 200/300 motor cable, length 5 m RKL4329	KSM316330-5

- NCFN MSK Feedback cable,  
length 5 m RKG4200 KSM303500-5
- maXYmos force strain gage cable,  
length 5 m, ≤5 kN KSM18030213-5
- maXYmos force strain gage cable,  
length 5 m, ≥10 kN KSM18028883-5
- 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.

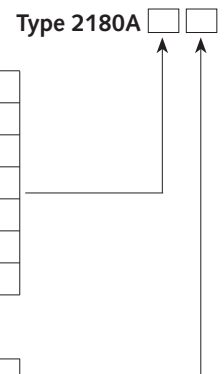
**Ordering Key Servo Amplifier for NCFN**

**Power section for NC joining module**

NCFN	2153A 005...	<b>NCFN0005</b>
NCFN	2153A 010/015...	<b>NCFN1015</b>
NCFN	2153A 030...	<b>NCFN0030</b>
NCFN	2153A 060...	<b>NCFN0060</b>
NCFN	2153A 100...	<b>NCFN0100</b>
NCFN	2153A 200...	<b>NCFN0200</b>
NCFN	2153A 300...	<b>NCFN0300</b>

**Safety technology**

with safety zone box	<b>SB</b>
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**Ordering Key**

Type 2153A

**Nominal Force [kN]**

5	005
10	010
15	015
30	030
60	060
100	100
200	200
300	300

**Stroke [mm]**

200 only ≤100 kN	200
400	400

**Speed [mm/s]**

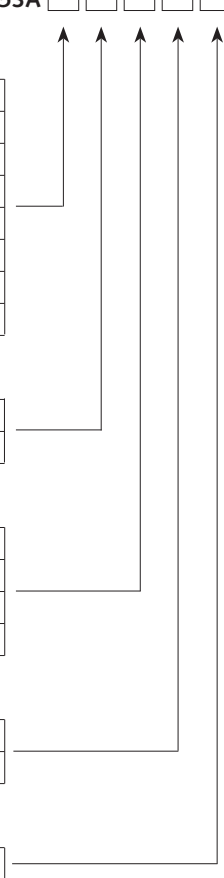
100 mm/s only 300 kN	0
140 mm/s only 200 kN	1
200 mm/s only 100 kN	2
250 mm/s only 5/10/15/30/60 kN	3

**Brake**

Holding brake (standard)	H
Safety brake <sup>6)</sup>	K

**Configuration**

Straight	G
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<sup>6)</sup> Safety brake is optional possible by 10/15/30/60/100/200 and 300 kN

**Ordering Example:** Type 2153A0602003HG

NC joining module NCFN **Type 2153A...**, nominal force **60 kN**,  
stroke **200 mm**, speed **250 mm/s**, holding brake **H**, holding brake **G**

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