

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).



2153A_000-669e-02.17

Technical Data

Dimensions	mm	Page 3 + 4
Assembly		Wall or flange assembly
Weight	kg	see table of dimensions
Max. tool weight ¹⁾	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 ²⁾
Holding brake (standard)	V/A	24/0,7 to 1,5 ²⁾
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

¹⁾ 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 amplifier³⁾ Bosch-Rexroth Type 2180A...
Standard interface SERCOS III (internal bus)

Evaluation unit⁴⁾ 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.

²⁾ Depending on system

³⁾ Servo amplifier see accessories data sheet 003-125 Type 2180A...

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

Dimensions

Type 2153A...	A	A ⁹⁾	B	øJ	øK	C2	C3	G1	G2	P	O	R H7	F1	F2	C1	X	Y	øV
...005200	778,3	–	447	50	75	20	5	98	100	70	70	M8x16 (4x)	49	50	180	12	3	9
...005400	1060	–	726	50	75	20	5	98	100	70	70	M8x16 (4x)	49	50	180	12	3	9
...010200	904,3	1069	500	80	110	30	5	137	140	100	100	M10x20 (4x)	70	70	190	20	4,5	11
...010400	1105	1269	700	80	110	30	5	137	140	100	100	M10x20 (4x)	70	70	190	20	4,5	11
...015200	904,3	1069	500	80	110	30	5	137	140	100	100	M10x20 (4x)	70	70	190	20	4,5	11
...015400	1105	1269	700	80	110	30	5	137	140	100	100	M10x20 (4x)	70	70	190	20	4,5	11
...030200	1 042	1 237	528	90	120	50	5	148	150	100	100	M12x24	75	75	215	20	4,5	11
...030400	1 242	1 437	728	90	120	50	5	148	150	100	100	M12x24	75	75	215	20	4,5	11
...060200	1 150	1 345	544	110	150	50	5	177	180	130	130	M16x32	90	90	215	20	4,5	13,5
...060400	1 350	1 545	744	110	150	50	5	177	180	130	130	M16x32	90	90	215	20	4,5	13,5
...100200	1 332,5	1 557,5	640	160	195	50	5	227	230	170	170	M20x40	115	115	280	28	6	17,5
...100400	1 532,5	1 757,5	840	160	195	50	5	227	230	170	170	M20x40	115	115	280	28	6	17,5
...200400	1 732,5	1 957,5	968	160	200	50	5	247	250	190	190	M20x40	115	115	282	36	9	22
...300400	1 885,5	2 110,4	1 035	200	240	72	8	297	300	210	210	M24x48	150	150	377	36	9	26

⁹⁾ Dimensions with safety device

Type 2153A...	øL	H	D	E	Z	øTK	øT H7	N	øS H7	W	U	Q	Weight [kg]	Tool weight [kg]	Thread M (2x)	U1°
...005200	15	32	136	100	80	36	ø6x12	43,5	5x10	120 °	30 °	M6x12 (6x)	21	30	M4x6	6x60°
...005400	15	32	136	100	80	36	ø6x12	43,5	5x10	120 °	30 °	M6x12 (6x)	33	30	M4x6	6x60°
...010200	18	50	100	200	116	60	ø6x16	62	6x12	120 °	30 °	M8x16 (6x)	51	50	M8x15	6x60°
...010400	18	50	100	200	116	60	ø6x12	62	6x12	120 °	30 °	M8x16 (6x)	66	50	M8x15	6x60°
...015200	18	50	100	200	116	60	ø6x12	62	6x12	120 °	30 °	M8x16 (6x)	51	50	M8x15	6x60°
...015400	18	50	100	200	116	60	ø6x12	62	6x12	120 °	30 °	M8x16 (6x)	66	50	M8x15	6x60°
...030200	18	75	150	150	125	65	8x16	68	8x16	112,5 °	8x45 °	M8x16 (8x)	75	100	M10x18	–
...030400	18	75	150	150	125	65	8x16	68	8x16	112,5 °	8x45 °	M8x16 (8x)	95	100	M10x18	–
...060200	20	90	140	150	150	80	8x16	82	10x10	112,5 °	8x45 °	M10x20 (8x)	115	100	M10x18	–
...060400	20	90	140	150	150	80	8x16	82	10x10	112,5 °	8x45 °	M10x20 (8x)	140	100	M10x18	–
...100200	26	80	204	180	200	120	10x20	106	12x24	112,5 °	8x45 °	M16x32 (8x)	225	100	M12x18	–
...100400	26	80	204	180	200	120	10x20	106	12x24	112,5 °	8x45 °	M16x32 (8x)	300	100	M12x18	–
...200400	33	100	200	200	205	120	10x20	115	12x24	112,5 °	8x45 °	M16x32 (8x)	370	100	M16x18	–
...300400	40	145	270	250	252	140	12x24	135	12x24	112,5 °	8x45 °	M16x32 (8x)	740	150	M16x16	–

Type 2153A...	G3	G4	G5	G6	øS1 H7
...005x00	80	40	78	38	5x10
...010x00	110	55	107	52	5x10
...015x00	110	55	107	52	6x12
...030x00	120	60	118	58	8x16
...060x00	140	70	130	65	10x20
...100x00	190	95	187	92	12x24
...200x00	210	105	207	102	12x24
...300x00	260	130	257	127	12x24

2153A_000-669e-02.17

Dimensional Drawing

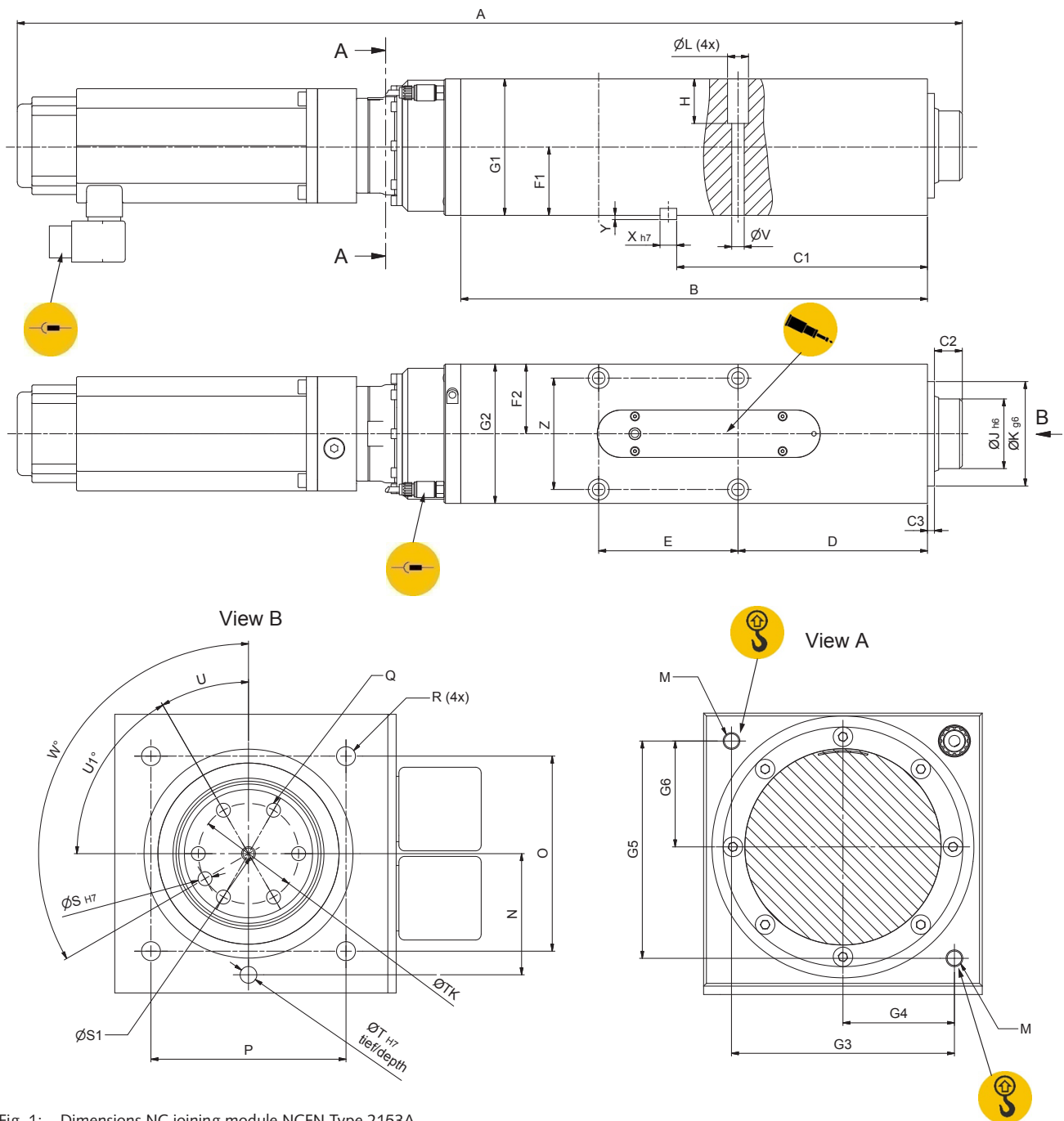






Fig. 1: Dimensions NC joining module NCFN Type 2153A...
The NC joining module with nominal force ≥ 30 kN have 8 tooling mount holes (Q).
5 to 15 kN have 6 tooling mount holes (Q).

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:

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

2153A_000-669e-02.17

Functional Principle with maXYmos NC Type 5847...

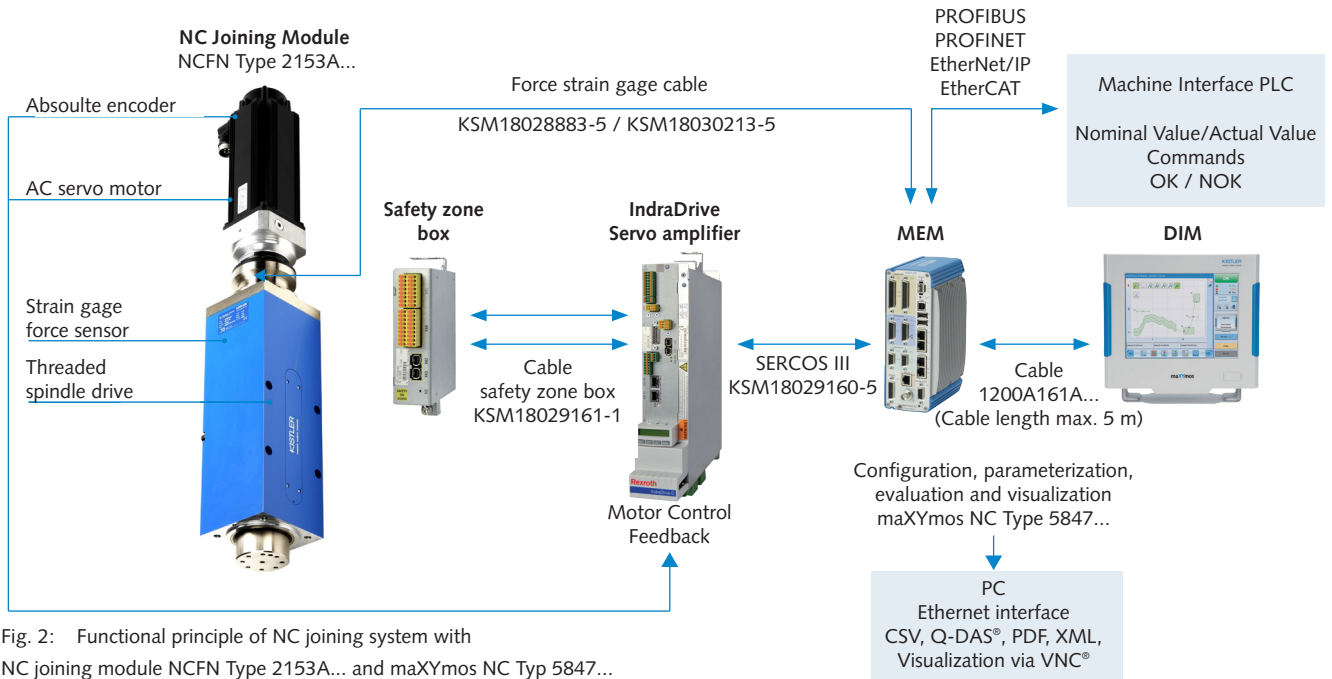


Fig. 2: Functional principle of NC joining system with NC joining module NCFN Type 2153A... and maXYmos NC Typ 5847...

Included Accessories

- None

Optional Accessories

	Type/Art. No.
• Evaluation unit maXYmos NC 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⁾	2180A...

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

⁴⁾ 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...	NCFN0005
NCFN	2153A 010/015...	NCFN1015
NCFN	2153A 030...	NCFN0030
NCFN	2153A 060...	NCFN0060
NCFN	2153A 100...	NCFN0100
NCFN	2153A 200...	NCFN0200
NCFN	2153A 300...	NCFN0300

Safety technology

with safety zone box	SB
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Type 2180A

2153A_000-669e-02.17

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]

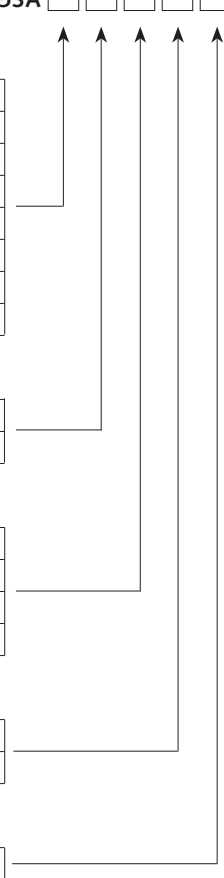
100 mm/s only 300 kN	0
140 mm/s only 200 kN	1
200 mm/s only 100 kN	2
250 mm/s only 5/10/15/30/60 kN	3

Brake

Holding brake (standard)	H
Safety brake ⁶⁾	K

Configuration

Straight	G
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⁶⁾ 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**

2153A_000-669e-02.17