

NC Joining Module NCFE

Type 2162A...

For simple, cost-sensitive joining processes

The NC joining module NCFE Type 2162A... with integrated strain gauge force sensor is available in four sizes. Size 1 is designed for nominal joining forces of 2 ... 5 kN and size 2 ... 4 covers the force range from 10 ... 80 kN. The NCFE family is extremely suitable for force-displacement monitored assembly and joining processes, typically as a replacement of hydro-pneumatic or hydraulic systems.

- Cost-effective design
- Measuring direction push
- Compact dimensions
- Uniform operating philosophy using maXYmos NC

Description

The NC joining modules NCFE Type 2162A... consist of a housing in which a strain gauge force sensor is integrated. The motion happens by means of a threaded spindle driven via belt respectively a gearbox by a motor. This motor has an absolute encoder for the exact positioning. The drive motor is an electronically commutated AC servodrive controlled by a servo amplifier. Constant revolution speed and therefore constant motion speed is ensured. Standard functions such as block pressing, position pressing and force feedback controlled pressing as well as intermediate positioning are supported.

The NC joining module NCFE can be operated with the IndraDrive Cs servo amplifier in combination with maXYmos NC Type 5847B... . The communication between IndraDrive Cs and maXYmos NC is done in real time via SERCOS III. Several fieldbus slave interfaces or digital I/O are available onboard for customer provided controlling. PROFIBUS, PROFINET, EtherNet/IP or even EtherCAT can be used with the maXYmos NC depending on customer's demands. Quality data can be transferred via the Ethernet interface with several protocols as well as a visualisation by VNC® or a data backup can be done.

Application

The NC joining module NCFE Type 2162A... is best suitable for use in automatic production systems and for manually controlled workstations with safety doors. The installation is possible vertically as well as horizontally. Fixation of the joining units at a machine frame is possible through flange mounting. Tapped holes for a tool receptacle are available at the plunger (Page 1 and 3).



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Technical data

Dimensions	mm	Page 3 and 4
Assembly options		flange assembly
Weight	kg	see table of dimensions
Max. tool weight ¹⁾	kg	see table of dimensions
Direction of measurement		compression
Nominal joining force	kN	2, 5, 10, 20, 40, 80
Length of stroke		
Nominal joining force 2 ... 5 kN	mm	200
Nominal joining force 10 ... 80 kN	mm	350
Practical repeatability	mm	0.01 ⁴⁾
Non-rotating tool holder		Fig. 1
Max. tool weight 2/5 kN		
without holding brake ¹⁾	kg	5
with holding brake ¹⁾	kg	20
Max. tool weight 10/20 kN		
without holding brake ¹⁾	kg	10
with holding brake ¹⁾	kg	50
Max. tool weight 40/80 kN		
without holding brake ¹⁾	kg	15
with holding brake ¹⁾	kg	100
Holding brake (optional)	V/A	24/0.5 to 1.0 ²⁾
Short stroke operation		
Type 2162A002/005...	mm	≤60
Type 2162A010/020...	mm	≤70
Type 2162A040/080...	mm	≤120
Max. movement speed		
NC joining module 2 ... 40 kN	mm/s	250
NC joining module 80 kN	mm/s	200

¹⁾ Possible radial forces must be considered independent of the mounting.
Permissible tool weight may have to be reduced for manual feed.

²⁾ Depending on system

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

Displacement sensor system		absolute encoder
Resolution	mm	0.003
Force sensor		Strain gauge
Temperature range	°C	10 ... 40
Protection class		IP54
Linearity in measuring range	%FSO	≤1
Accuracy class force sensor	%	0.5
Torsional backlash plunger	°	≤1
Service life of spindle (according to defined drive profile)	cycles	80% nominal joining force approx. 10 million ⁵⁾ 100% nominal joining force approx. 5 million ⁵⁾
Evaluation unit³⁾	maXYmos NC Type 5847B...	
Standard Interface	PROFIBUS, PROFINET, EtherNet/IP, EtherCAT, Digital I/O	
Power supply	VDC	24 ±5%
SERCOS III	kHz	2

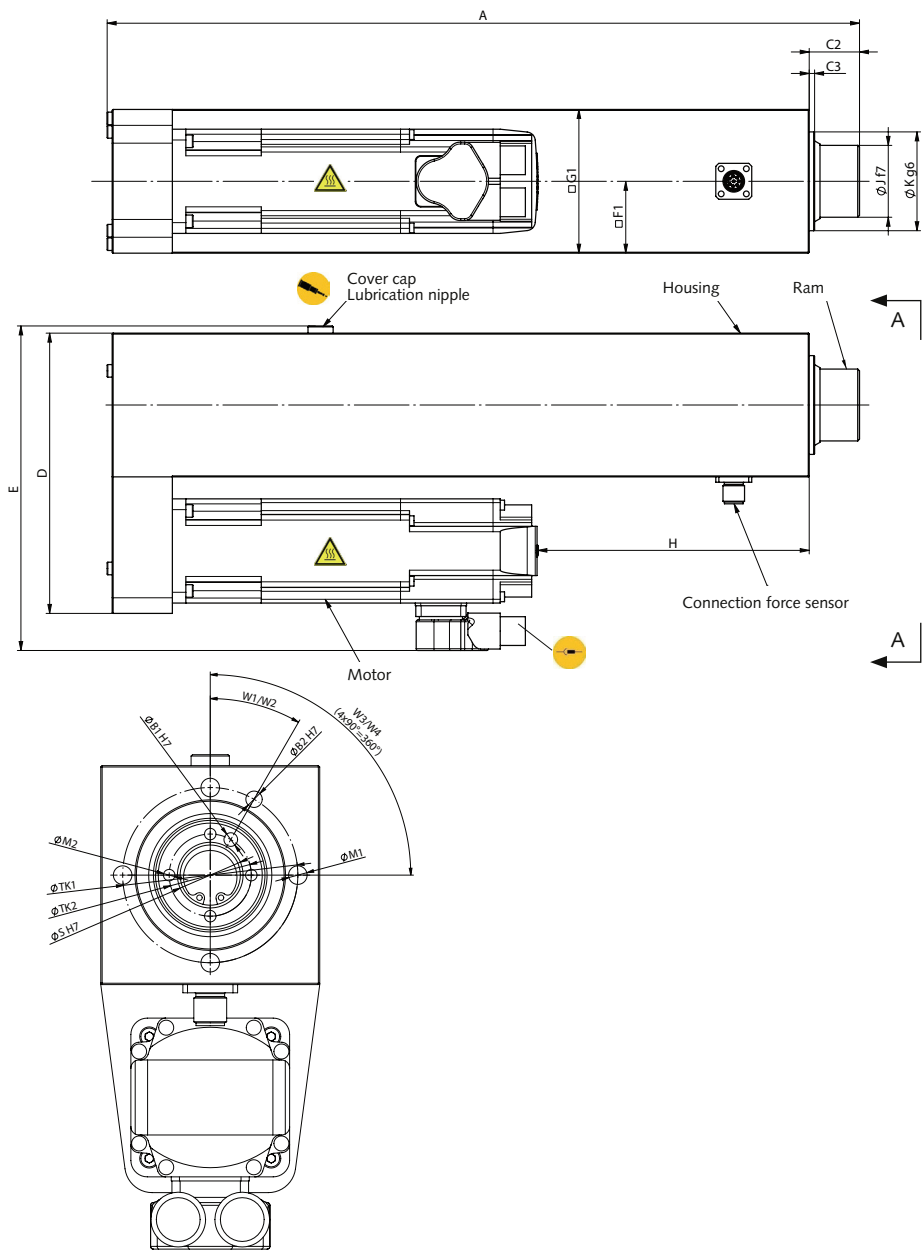
³⁾ Evaluation unit maXYmos NC Type 5847B... see data sheet 003-272

⁴⁾ At thermal steady-state

⁵⁾ The service life is application-specific and depends on the nominal joining force and other factors that can influence the service lifetime. Please do not hesitate to contact us if you have further questions

For travel profiles with a total stroke which is ≤ the short stroke, a lubrication stroke (> than the short stroke) must be performed at regular intervals.

Dimensional drawing for NC joining module NCFE (Size 1)



Number		
Lubrication nipple housing/bearing		
kN	Pcs. Housing	Pcs. Bearing
2, 5	1	0

Size 1
A-A view of the NCFE, 2 and 5 kN

Type 2162A...	A	without brake (kg)	with brake (kg)	ØJ ^{f7}	ØK ^{g6}	□L	C2	C3	□G1	□F1	N	R	E	D	with brake H	without brake H
...002/005...	419	9.3	9.7	40	55	–	28	3	80	40	–	–	180.6	156	122	151

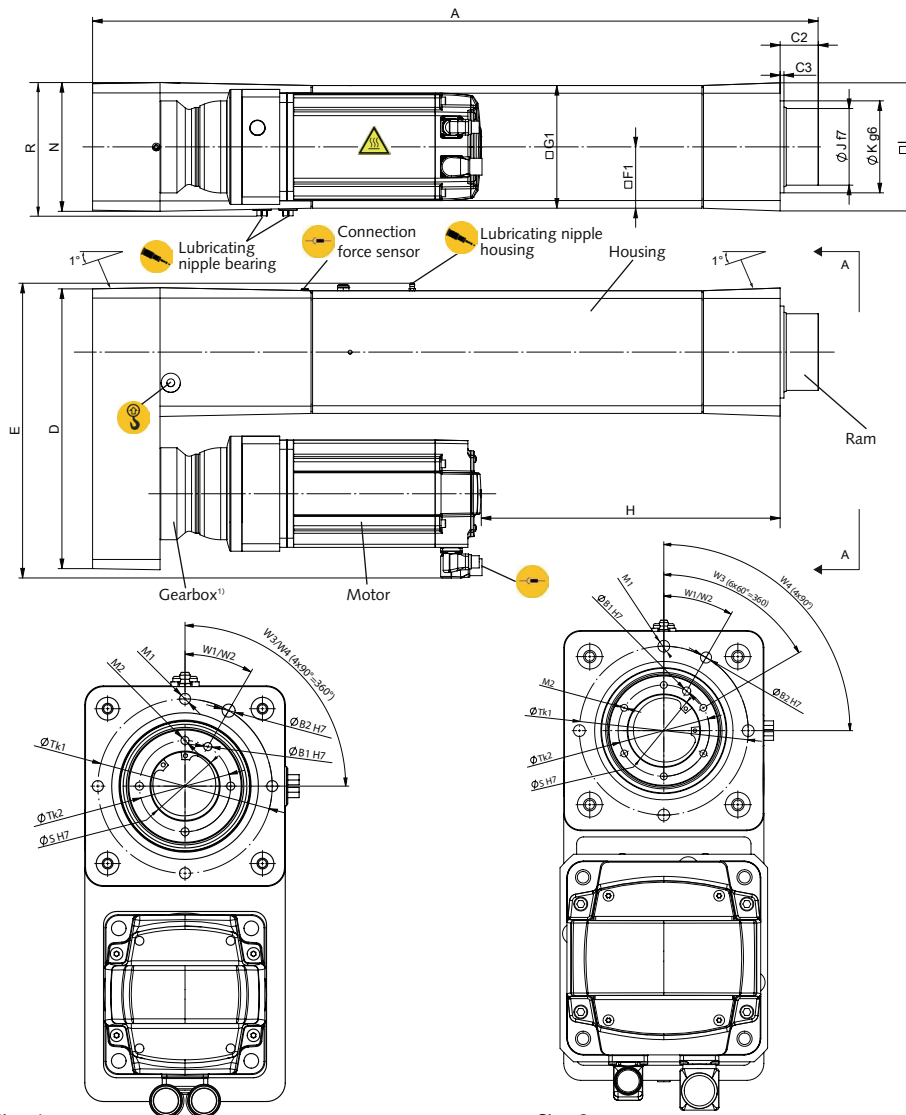
Type 2162A...	W1°	W2°	W3°	W4°	ØB1 ^{H7}	ØB2 ^{H7}	M1	M2	ØTk1	ØTk2	ØS ^{H7}
...002/005...	30°	30°	90° ^(4x)	90° ^(4x)	5 Ø10 ^(1x)	6 Ø12 ^(1x)	M8 Ø16 ^(4x)	M5 Ø10 ^(4x)	64	30	22 Ø9

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.

This information corresponds to the current state of knowledge. Kistler reserves the right to make technical changes. Liability for consequential damage resulting from the use of Kistler products is excluded.

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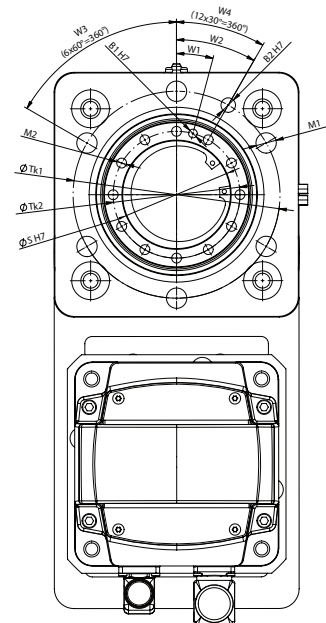
Dimensional drawing for NC joining module NCFE Type 2162A... (Size 2, 3 and 4)



Warnings and Notes:

- Lubrication points
- Electrical connection points
- Warning high temperatures
- Attachment points 2x M12x15

Number Lubrication nipple housing/bearing		
kN	Pcs. Housing	Pcs. Bearing
10, 20	1	1
40	1	2
80	1	2



Size 1

A-A view of the NCFE, 10 and 20 kN

¹⁾Remark: NCFE 10 kN and 20 kN without gearbox.

Size 2

A-A view of the NCFE, 40 kN

Size 3

A-A view of the NCFE, 80 kN

Type 2162A...	A	without brake (kg)	with brake (kg)	ØJ ¹⁷	ØK ⁶⁵	□L	C2	C3	□G1	□F1	N	R	E	D	with brake H	without brake H
...010/020...	719	34	36	70	90	122.1	50	5	120	60	123	132	273	253.2	387	417
...040...	869	67	69	80	100	143.5	50	5	140	70	145	155	354	322.3	327	381
...080...	947	110	113	100	120	167.1	50	5	160	80	168	174	385	365	336	390

Type 2162A...	W1°	W2°	W3°	W4°	ØB1 ^{H7}	ØB2 ^{H7}	M1	M2	ØTk1	ØTk2	ØS ^{H7}
...010/020...	30°	30°	90° (4x)	90° (4x)	5 Ø10 (1x)	8 Ø10 (1x)	M8 Ø24 (4x)	M6 Ø14 (4x)	107	56	42 Ø10
...040...	30°	30°	60° (6x)	90° (4x)	6 Ø10 (1x)	8 Ø10 (1x)	M10 Ø24 (4x)	M6 Ø14 (6x)	122	66	52 Ø10
...080...	15°	30°	60° (6x)	30° (12x)	6 Ø10 (1x)	10 Ø10 (1x)	M16 Ø40 (6x)	M8 Ø16 (12x)	142	87	74 Ø10

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.

Functional principle with maXYmos NC Type 5847B...

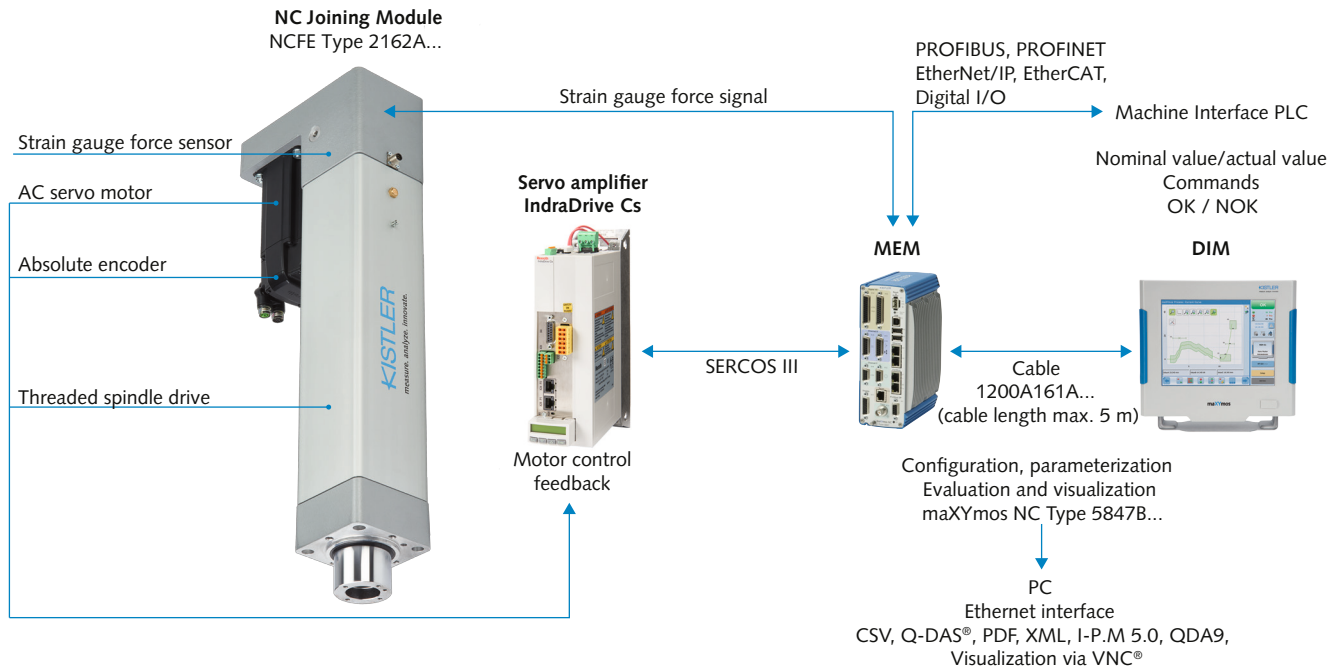


Fig. 2: Functional principle of NC joining system with NC joining module NCFE Type 2162A... and maXYmos NC Type 5847B...

Included accessories

- None

Optional accessories

Optional accessories	Type/Art. No.
• Mounting 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
• DIM Cable Extender between maXYmos MEM and Display DIM	1200A163

IndraDrive Cs servo amplifier and accessories

The maXYmos NC controls, monitors, evaluates and documents XY progressions for joining and press-fitting processes in combination with NC joining module NCFE and the associated servo amplifier IndraDrive Cs.

- Complete ready to use package with all components
- CSB02 control unit: NC joining module specifically parameterized
- SERCOS III connection to maXYmos NC
- Safe motion on board (STO/SBC)
- Applications up to Performance Level e (PL e) possible
- Diagnosis via Ethernet

Description

A suitable servo amplifier package is available for the NC joining module NCFE. It consists of the following components: a power section, a control unit with the necessary firmware as well as a parameter set, and the required cables. This ensures optimum system performance and at the same time reduces the project planning time required by the application planner for the drive technology to a minimum.

Application

The motor of the NC joining module NCFE is controlled by the servo amplifier IndraDrive Cs. This has a direct influence on the travel distance, travel speed and the maximum force of the NC joining module. The settings of this control are transferred directly via SERCOS III bus in accordance with the sequence parameterized in the maXYmos NC. This enables flexible implementation of a very wide variety of applications in the range of joining and press-fitting.

Technical data

IndraDrive Cs servo amplifier

Interface		SERCOS III
Control voltage	VDC/W24	(19.2 ... 28.8) /24
Output voltage	V	3x AC 0 ... 500
Power connection	V	400 (400 ... 500) ±10%
	Hz	50 ... 60 ±2%
	phases	3
Weight of power section		
HCS01.1E-W0008-A-03	kg	0.7
HCS01.1E-W0018-A-03	kg	1.7
HCS01.1E-W0028-A-03	kg	1.7
HCS01.1E-W0054-A-03	kg	4.2
Protection class		IP20
Cooling method		Forced ventilation



Fig. 3: IndraDrive Cs
HCS01.1E-W0018-A-03

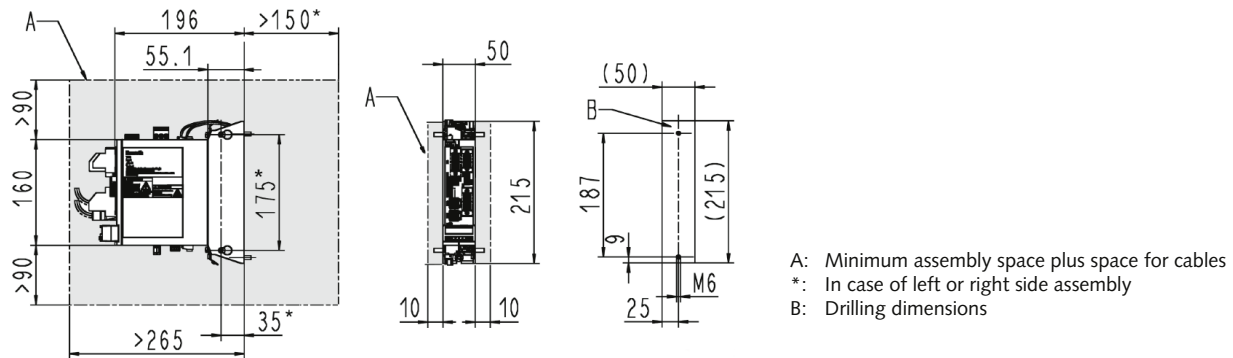


Fig. 4: IndraDrive Cs
HCS01.1E-W0054-A-03

Device depths, heights and widths

Device	NCFE kN	Device width W [mm]	Device depth D [mm]	Device height H [mm]
HCS01.1E-W0008-A-03	2, 5, 10	50	246*	215
HCS01.1E-W0018-A-03	20	70		268
HCS01.1E-W0028-A-03	40	70		268
HCS01.1E-W0054-A-03	80	130		268

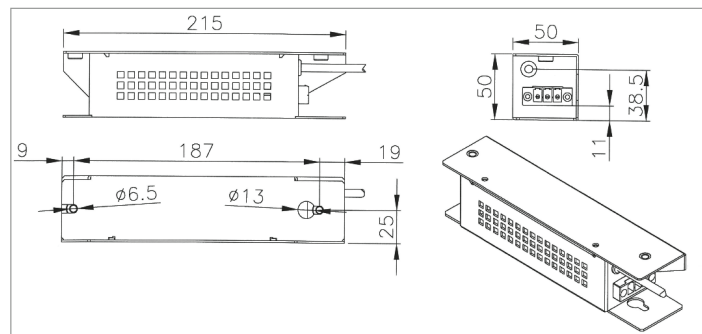
* including base line filter

Dimensions of Power Section/Converter HCS01.1E-W0008-A-03 for NCFE Type 2162A002/005/010...

Dimensions EMI line filter HFD 141 for NCFE Type 2162A002/005/010...

Power section	Line filter	
HCS01.1E-W0008	HFD 141 / B 1612043	

Dimensions line filter HFD 141 / B 1612043		
H	T	B
215	50	50

Max. dissipation loss including brake resistance		
HCS01.1E-W0008	Watt (max.)	46



Details of the diagram in the assembly drawing are not binding. General tolerances DIN2768-c

Technical data line filter
Line filter for HCS01.1E-W0008-A-03

Phases		3
Rated voltage	V	480
Rated frequency	Hz	50-60
Rated current	A	5
Operating current ¹⁾	mA	40
Operating current ²⁾	mA	4
Proof voltage	V-	2150/2700
Protection class ³⁾		IP20
Ambient temperature	°C	50
Climate range		25/85/21
Cooling type		AN
Operating mode		DB

¹⁾ Calculated at max. input voltage and loss of 2 phases (type.@50Hz)

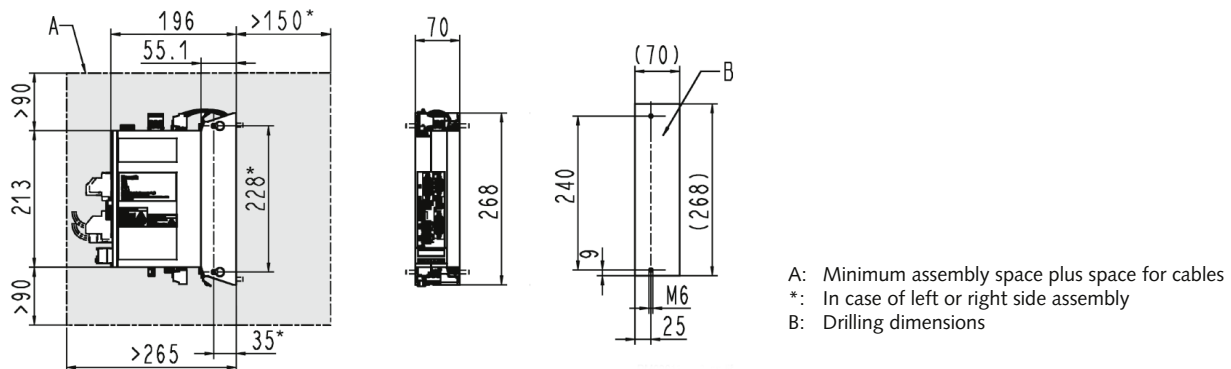
²⁾ Rated on the maximum allowed input voltage swing according to IEC 38 ±10%

³⁾ Protection class when connected

Mechanical data line filter
Line filter for HCS01.1E-W0008-A-03

Input	AWG	16
	N·m	max. 0.6
Output	AWG	16
Output cable length L1`/L2`/L3`	mm	250 ±5
Cables PE	mm	250 ±5
Fastening bolts		M6
Weight (net)	kg	~0.8
Assembly frequency converter		M6

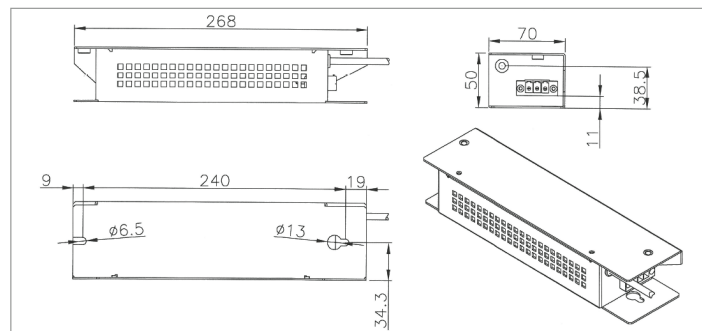
The specified technical data are typical.
 According to material and manufacturing deviations can occur.

Dimensions of Power Section/Converter HCS01.1E-W0018/28-A-03 for NCFE Type 2162A020... and 2162A040...

Dimensions EMI line filter HFD 141 for NCFE Type 2162A020... and 2162A040...

Power section	Line filter	
HCS01.1E-W0018/28	HFD 141 / B 1612044	

Dimensions line filter HFD 141 / B 1612044		
H	T	B
268	70	50

Max. dissipation loss including brake resistance		
HCS01.1E-W0018	Watt (max.)	80
HCS01.1E-W0028	Watt (max.)	120



Details of the diagram in the assembly drawing are not binding. General tolerances DIN2768-c

Technical data line filter
Line filter for HCS01.1E-W0018/28-A-03

Phases		3
Rated voltage	V	480
Rated frequency	Hz	50-60
Rated current	A	5
Operating current ¹⁾	mA	40
Operating current ²⁾	mA	4
Proof voltage	V-	2150/2700
Protection class ³⁾		IP20
Ambient temperature	°C	50
Climate range		25/85/21
Cooling type		AN
Operating mode		DB

¹⁾ Calculated at max. input voltage and loss of 2 phases (type.@50Hz)

²⁾ Rated on the maximum allowed input voltage swing according to IEC 38 ±10%

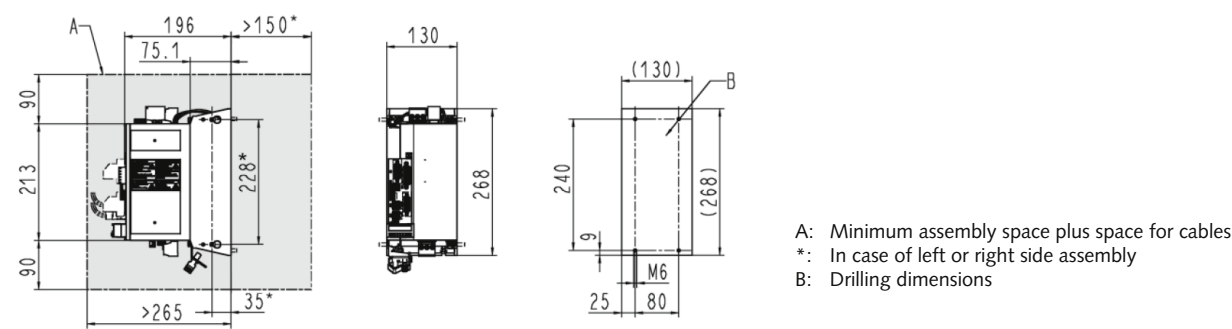
³⁾ Protection class when connected

Mechanical data line filter
Line filter for HCS01.1E-W0018/28-A-03

Input	AWG	16
	N·m	max. 0.6
Output	AWG	16
Output cable length L1`/L2`/L3`	mm	250 ±5
Cables PE	mm	250 ±5
Fastening bolts		M6
Weight (net)	kg	~1.2
Assembly frequency converter		M6

The specified technical data are typical.
 According to material and manufacturing deviations can occur.

Dimensions of Power Section/Converter HCS01.1E-W0054-A-03 for NCFE Type 2162A080...

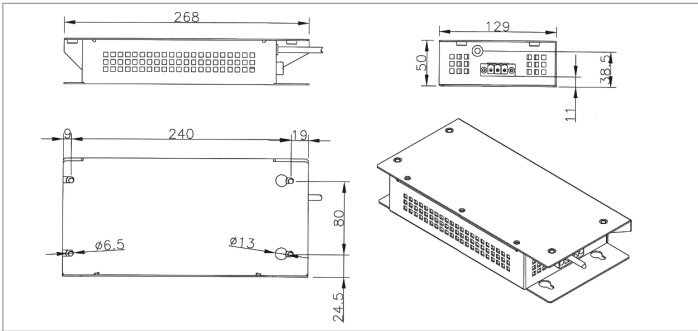


Dimensions EMI line filter HFD 141 for NCFE Type 2162A080...

Power section		Line filter	
HCS01.1E-W0054		HFD 141 / B 1612045	

Dimensions line filter HFD 141 / B 1612045		
H	T	B
268	129	50

Max. dissipation loss including brake resistance		
HCS01.1E-W0054	Watt (max.)	400



Details of the diagram in the assembly drawing are not binding. General tolerances DIN2768-c

Technical data line filter

Line filter for HCS01.1E-W0054-A-03		
Phases		3
Rated voltage	V	480
Rated frequency	Hz	50-60
Rated current	A	5
Operating current ¹⁾	mA	40
Operating current ²⁾	mA	4
Proof voltage	V-	2150/2700
Protection class ³⁾		IP20
Ambient temperature	°C	50
Climate range		25/85/21
Cooling type		AN
Operating mode		DB

¹⁾ Calculated at max. input voltage and loss of 2 phases (type.@50Hz)
²⁾ Rated on the maximum allowed input voltage swing according to IEC 38 ±10%
³⁾ Protection class when connected

Mechanical data line filter

Line filter for HCS01.1E-W0054-A-03		
Input	AWG	16
	N·m	max. 0.6
Output	AWG	16
Output cable length L1`/L2`/L3`	mm	250 ±5
Cables PE	mm	250 ±5
Fastening bolts		M6
Weight (net)	kg	~1.6
Assembly frequency converter		M6

The specified technical data are typical.
According to material and manufacturing deviations can occur.

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Configurator

2162A

NC Joining module	M
No NC Joining module	N

IndraDrive	I
No IndraDrive	N

Line filter	L
No line filter	N

maXYmos NC	Y
No maXYmos NC	N

Motor cable ¹⁾	P
No motor cable	N

Motor feedback cable ¹⁾	E
No motor feedback cable	N

Force strain gauge cable	F
No force strain gauge cable	N

SERCOS III cable	S
No SERCOS III cable	N

Type 2162A..., NCFE 2	C
Type 2162A..., NCFE 5	E
Type 2162A..., NCFE 10	1
Type 2162A..., NCFE 20	2
Type 2162A..., NCFE 40	4
Type 2162A..., NCFE 80	8

Length SERCOS III Cable	
00	No cable
01	Length 1 m
05	Length 5 m
10	Length 10 m
20	Length 20 m
30	Length 30 m

Length strain gauge cable	
00	No cable
05	Length 5 m
10	Length 10 m
20	Length 20 m
30	Length 30 m

Length Motor/Feedback cable	
00	No cable
05	Length 5 m
10	Length 10 m
15	Length 15 m
20	Length 20 m
30	Length 30 m
D	German
E	English
H	With holding brake
N	Without holding brake

Ordering example configurator
Type 2162A M I L Y P E N S 1 X X X H X X X X D 10 00 01

Type 2162A, NC joining module: **M**, with IndraDrive: **I**, with line filter: **L**, with maXYmos NC: **Y**, with motor cable: **P**, with motor Feedback cable: **E**, no strain gauge force cable: **N**, SERCOS III cable 1 m: **S**, NC joining module Type 2162A... 10 kN: **1**, with holding brake: **H**, German: **D**, length motor cable 10 m: **10**, no stain gauge force cable: **00**, length SERCOS III cable 5 m: **01**.

¹⁾ Motor cable/motor feedback cables must have the same cable length

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- MFU / MSA
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