

NC Joining Module NCFL

Type 2167A...

For simple, cost-sensitive joining processes

The NC joining module NCFL Type 2167A... with integrated strain gauge force sensor is available in three sizes, covering the force range from 10 ... 80 kN. The NCFL 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
- 400 mm Stroke
- Measuring direction push
- Compact dimensions
- Uniform operating philosophy using maXYmos NC

Description

The NC joining modules NCFL Type 2167A... 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 NCFL 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 NCFL Type 2167A... 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 3).



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Technical data

Dimensions	mm	Page 3
Assembly options		flange assembly
Weight	kg	see table of dimensions
Direction of measurement		compression
Nominal joining force	kN	10, 20, 40, 80
Length of stroke	mm	400
Practical repeatability	mm	0.01 ³⁾
Non-rotating tool holder		Fig. 1
Max. tool weight 10/20 kN		
with holding brake ¹⁾	kg	50
Max. tool weight 40/80 kN		
with holding brake ¹⁾	kg	100
Short stroke operation		
Type 2167A010/020	mm	≤70
Type 2167A040/080	mm	≤120
Max. movement speed		
NC joining module 10...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.

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 ⁴⁾ 100% nominal joining force approx. 5 million ⁴⁾
Evaluation unit²⁾		maXYmos NC Type 5847B...
Standard Interface		PROFIBUS, PROFINET, EtherNet/IP, EtherCAT, Digital I/O
Power supply	VDC	24 ±5%
SERCOS III	kHz	2

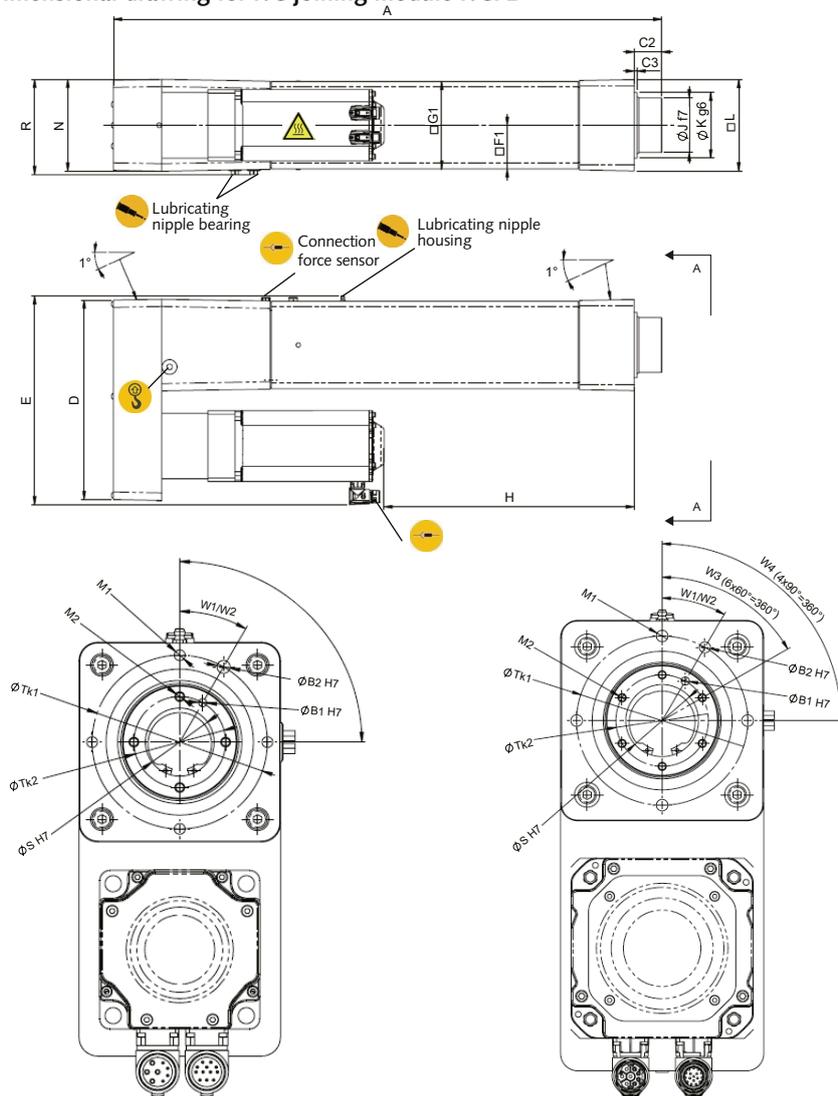
²⁾ Evaluation unit maXYmos NC Type 5847B... see data sheet 003-272

³⁾ At thermal steady-state

⁴⁾ 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 NCFL



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 NCFL, 10 and 20 kN

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

Size 2

A-A view of the NCFL, 40 kN

Size 3

A-A view of the NCFL, 80 kN

Type 2167A...	A	kg	ØJ ¹⁷	ØK ^{g6}	□L	C2	C3	□G1	□F1	N	R	E	D	H
...010/020...	769	38.5	70	90	122.1	50	5	120	60	123	132	288	253.2	443
...040...	919	70.5	80	100	143.5	50	5	140	70	145	155	352	322.3	418
...080...	997	104	100	120	167.1	50	5	160	80	168	174	382	365	455

Type 2167A...	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...

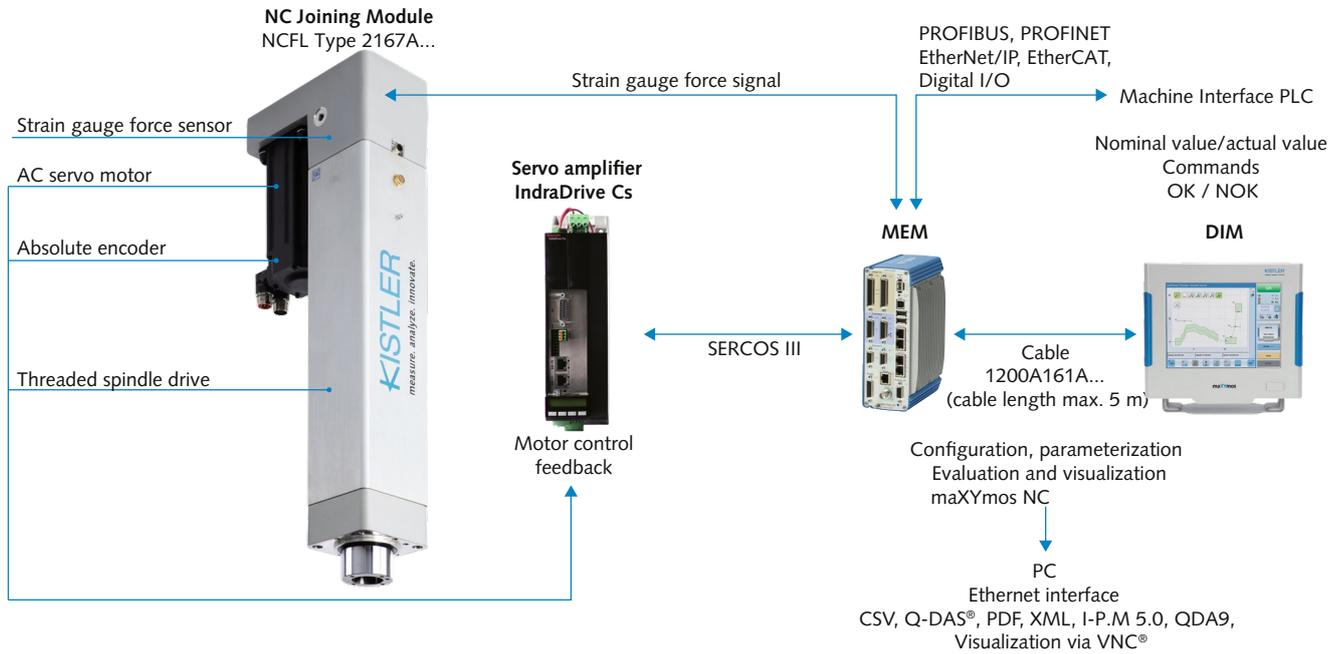


Fig. 2: Functional principle of NC joining system with NC joining module NCFL Type 2167A... and maXYmos NC Type 5847B...

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

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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 NCFL 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
- Diagnosis via Ethernet

Description

A suitable servo amplifier package is available for the NC joining module NCFL. 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 NCFL 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		
ACS01.1E-W0018-A-03	kg	1.7
ACS01.1E-W0028-A-03	kg	1.7
ACS01.1E-W0036-A-03	kg	1.7
ACS01.1E-W0054-A-03	kg	4.22
Protection class		IP20
Cooling method		Forced ventilation



Fig. 3: IndraDrive Cs
ACS01.1E-W0018/28/36-A-03



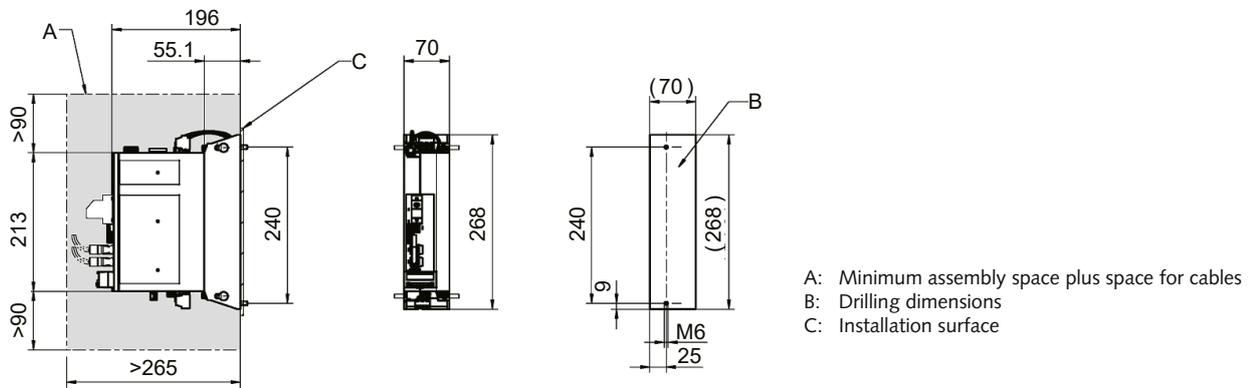
Fig. 4: IndraDrive Cs
ACS01.1E-W0054-A-03

Device depths, heights and widths

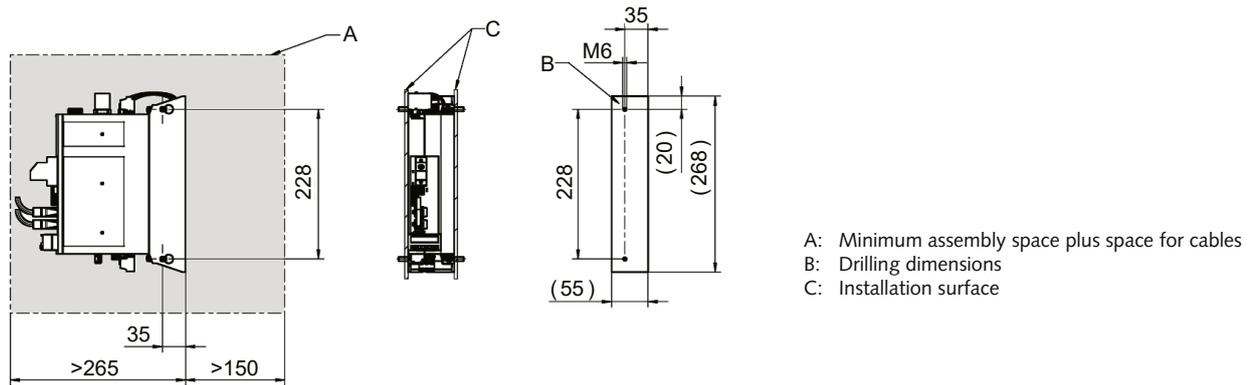
Device	NCFL kN	Device width W [mm]	Device depth D [mm]	Device height H [mm]
ACS01.1E-W0018-A-03	10	70	246*	268
ACS01.1E-W0028-A-03	20	70		268
ACS01.1E-W0036-A-03	40	70		268
ACS01.1E-W0054-A-03	80	130		268

* including base line filter

Dimensions of Power Section/Converter ACS01.1E-W0018/28/36-A-03 for NCFL Type 2167A010/020/040...



ACS1-W018/28/36 standard installation



ACS1-W018/28/36 left or right side installation

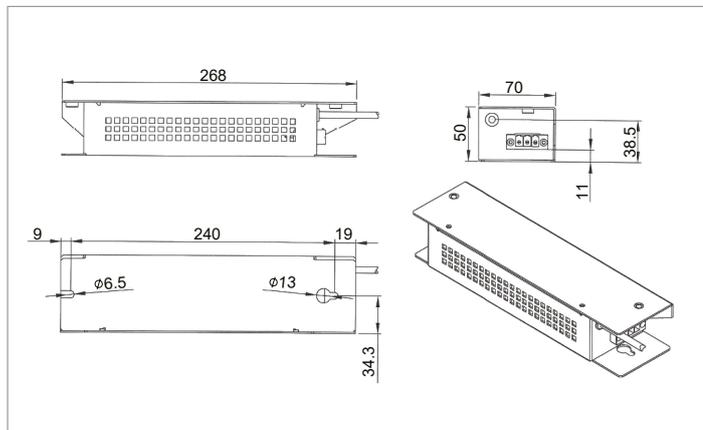
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Dimensions EMI line filter HFD 141 for NCFL Type 2167A010/020/040...

Power section	Line filter
ACS01.1E-W0018/28/36	HFD 141 / B 1612044

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

Max. dissipation loss including brake resistance		
ACS01.1E-W0018	Watt (max.)	80
ACS01.1E-W0028	Watt (max.)	120
ACS01.1E-W0036	Watt (max.)	120



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

Technical data line filter for NCFL Type 2167A010/020/040...

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%

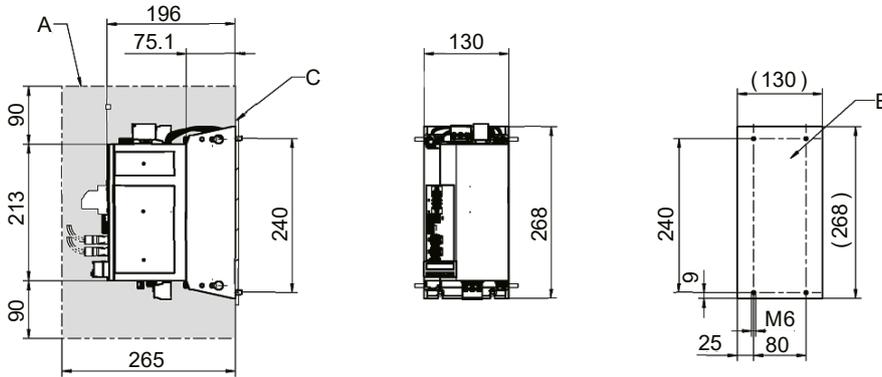
³⁾ Protection class when connected

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

Mechanical data line filter for NCFL Type 2167A010/020/040...

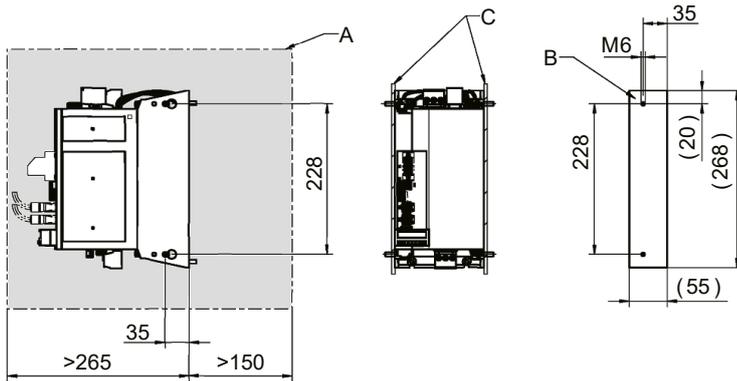
Input	mm ²	4.0 (3x)
	N·m	max. 0.6
Output	AWG	16
Output cable length L1`/L2`/L3`	mm	250 ±5
Cables PE	mm	250 ±5
Fastening bolts		M6
Weight (net)	kg	~1.2
Assembly frequency converter		M6

Dimensions of Power Section/Converter ACS01.1E-W0054-A-03 for NCFL Type 2167A080...



- A: Minimum assembly space plus space for cables
- B: Drilling dimensions
- C: Installation surface

ACS1-W054 standard installation



- A: Minimum assembly space plus space for cables
- B: Drilling dimensions
- C: Installation surface

ACS1-W054 left or right side installation

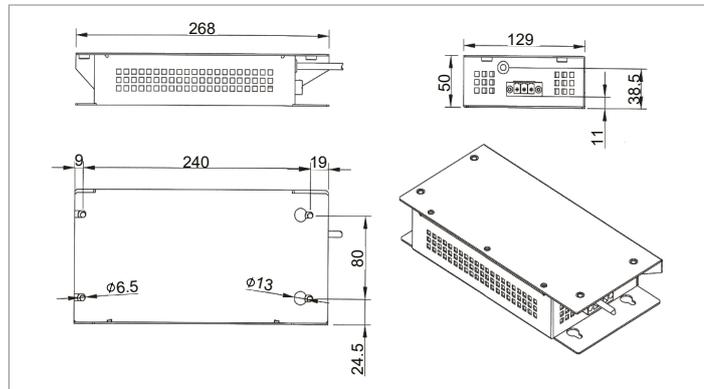
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Dimensions EMI line filter HFD 141 for NCFL Type 2167A080...

Power section	Line filter
ACS01.1E-W0054	HFD 141 / B 2502041

Dimensions line filter HFD 141 / B 2502041		
H	T	B
268	129	50

Max. dissipation loss including brake resistance		
ACS01.1E-W0054	Watt (max.)	400



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

Technical data line filter for NCFL Type 2167A080...

Phases		3
Rated voltage	V	480
Rated frequency	Hz	50-60
Rated current	A	10
Operating current ¹⁾	mA	40
Operating current ²⁾	mA	4
Proof voltage	V-	2250/2800
Protection class ³⁾		IP20
Ambient temperature	°C	45
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

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

Mechanical data line filter for NCFL Type 2167A080...

Input	mm ²	4.0 (3x)
	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

