

## CQ4 (CQ4F /M 02 – CQ4F /M 02 H – CQ4F /M 03)

### Compact size “21.21” for high current or higher voltage

- Compact size “21.21” **2P+PE** and **3P+PE** connector inserts for **high current (40 A)**, and either standard voltage up to 400 V or **higher voltage 830 V**, ideally complemented by the expanding range of hoods and housings size “21.21” with **M25** threaded cable entry, either insulating or metallic (**MK, MKA, MGK**), which are particularly suitable for use with high cross-sectional area conductors (large cable diameter).
- Series **CQ4** encompasses the following size “21.21” connector inserts:

› **CQ4F /M 03** with 3P+PE with up to 40 A current-carrying capacity and standard rated voltage up to 400 V (e.g. for 3-phase motor connections);

› **CQ4F /M 02** with 2P+PE with up to 40 A current-carrying capacity and standard rated voltage up to 400 V (e.g. for 1-phase AC or for DC power connections), this one with better current-carrying capacity by the derating diagrams, due to a power contact less in the same space;

› **CQ4F /M 02 H** with 2P+PE with up to 40 A current-carrying capacity and higher rated voltage applications, up to **830 V** (for 1-phase AC or for DC higher power connections).

- Suitable for series **CX** crimp contacts (including the **PE pre-leading one**), covering stranded copper conductors cross sectional area range **1,5 mm<sup>2</sup> to 10 mm<sup>2</sup>** (16 AWG to 8 AWG).
- Protection against direct contact when unmated:

› **CQ4F 02**: both male and female connector inserts are **fingerproof** (IP2X) even on the mating face when uncoupled (useful e.g. when a male connector is on the motor side of a drive including capacitors, potentially charged for residual time).

› **CQ4F 03**: the female insert is **fingerproof** (IP2X) even on the mating face when uncoupled, while the male insert **CQ4M 03** in that circumstance is protected from access with the back of the hand (IP1X).

- **CQ4F /M 02** and **CQ4F /M 02 H** specific features:

› Special **polarisation key** on the connector bodies mating face of both versions, differently oriented, to avoid the mismatching of CQ4F /M 02 H **830 V** version with the lower voltage CQ4F /M 02 **400 V** version.

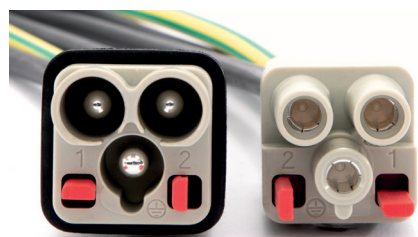
› **CQ4F /M 02 H** supplied with a **special insulating heat-shrinking tube** that provides the required additional insulation towards a metal housing.

› **CQ4F /M 02 H** specific **830 V** rated voltage duly marked on the inserts, to avoid any possible confusion with similar CQ4F /M 02 for 400 V.

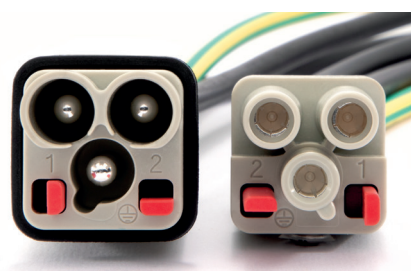
- Codings:

› **CQ4 03**: possibility of up to **4 different codings** thanks to the use of the **optional CR Q03 coding pin** (4 possible positions);

› **CQ4 02** and **CQ4 02 H**: possibility of up to **16 different codings** thanks to the use of **two optional CR Q02 coding pins** (it is possible to install two pins with 4 positions each).



**CQ4F/M 02**  
Lower voltage version



**CQ4F/M 02 H**  
Higher 830V voltage version

## CQ4 series

### TECHNICAL FEATURES

Inserts series		CQ4		
Cat. No.		CQ4F / M 02	CQ4F / M 02 H	CQ4F / M 03
No. of poles		2 + ⊕	2 + ⊕	3 + ⊕
rated current 1)		40 A		
EN 61984 pollution degree 3	rated voltage	400 V	830 V	400 V
	rated impulse voltage	6 kV		
	pollution degree	3		
contact resistance		≤ 0,3 mΩ		
insulation resistance		≥ 10 GΩ		
ambient temperature limit (°C)	min. max.	-40 °C +125 °C		
degree of protection	with enclosures (according to version)	IP44, IP65, IP66, IP67, IP68, IP69		
	without enclosures: - in mated condition	IP20 IP20 (IPXXB)		
	- termination side on male and female inserts	IP20 (IPXXB)		
	- mating side on female inserts	IP20 (IPXXB)		
	- mating side on male inserts	IP20 (IPXXB)	IP1X (IPXXA)	
conductor connections		crimp		
conductor cross-sectional area	mm²	1,5 ... 10		
	AWG	16 ... 8		
stripping lenght	mm	9 – 9,6 – 15 (according to contact size)		
mechanical endurance (mating cycles)		≥ 500		

<sup>1)</sup> See derating diagrams

**CQ4F/M 02    2 poles +     40A - 400V**

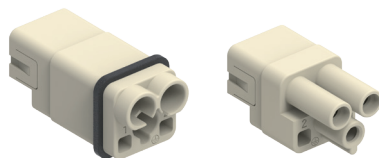
enclosures:  
size "21.21"

page:

Insulating type	339 - 348
Metallic type	349 - 363
W-TYPE for aggressive environments	512 - 518
EMC	564 - 572
IP68	628 - 631
E-Xtreme® corrosion proof	538 - 539

- cannot be used in angled enclosures (IA/IAP/VA version)

**inserts, crimp connections**



**40A crimp contacts  
silver plated**



description

part No.

part No.

without contacts (to be ordered separately), including PE  
female inserts for female contacts  
male inserts for male contacts

CQ4F 02  
CQ4M 02

40A female crimp contacts

1,5 mm <sup>2</sup>	AWG 16
2,5 mm <sup>2</sup>	AWG 14
4 mm <sup>2</sup>	AWG 12
6 mm <sup>2</sup>	AWG 10
10 mm <sup>2</sup>	AWG 8

40A male crimp contacts

1,5 mm <sup>2</sup>	AWG 16
2,5 mm <sup>2</sup>	AWG 14
4 mm <sup>2</sup>	AWG 12
6 mm <sup>2</sup>	AWG 10
10 mm <sup>2</sup>	AWG 8

CXFA 1.5  
CXFA 2.5  
CXFA 4.0  
CXFA 6.0  
CXFA 10

silver plated

CXMA 1.5  
CXMA 2.5  
CXMA 4.0  
CXMA 6.0  
CXMA 10

- characteristics according to EN 61984:

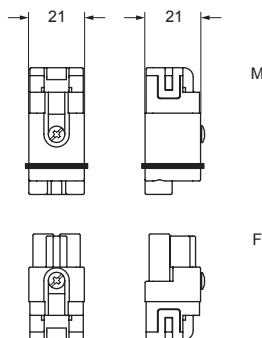
40A 400V 6kV 3



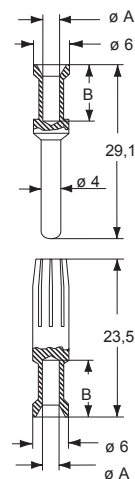
**EAC** certified

- rated voltage according to UL/CSA: 600V
- insulation resistance:  $\geq 10 \text{ G}\Omega$
- ambient temperature limit:  $-40^\circ\text{C} \dots +125^\circ\text{C}$
- made of self-extinguishing thermoplastic resin UL 94V-0
- mechanical life:  $\geq 500$  cycles
- contact resistance:  $\leq 0,3 \text{ m}\Omega$
- **it is recommended to crimp the contacts with crimping tools homologated by ILME** (please see the crimping tool section 40A contacts CXF and CXM series, on pages 708 - 741)
- for max. current load see the connector inserts derating diagram below; for more information see page 28

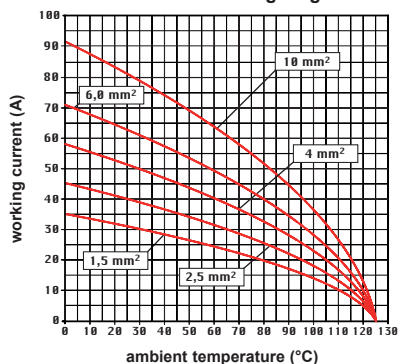
- wire diameter: up to 7,5 mm
- conductor cross-sectional area: up to 10 mm<sup>2</sup>



contacts side (front view)



**CQ4 02, 2 poles + PE connector inserts**  
**Maximum current load derating diagram**



**Coding pins**  
**CR Q02**  
**(page 691)**



### CXF and CXM contacts

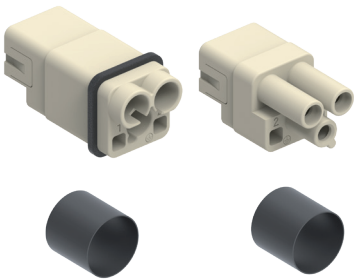
conductor cross-sectional area (mm <sup>2</sup> )	conductor slot ø A (mm)	conductor stripping length B (mm)
1,5	1,8	9
2,5	2,2	9
4	2,85	9,6
6	3,5	9,6
10	4,3	15

CQ4F/M 02 H 2 poles + ⊕ 40A - 830V

enclosures: size "21.21"	page:
Insulating type	339 - 348
Metallic type	349 - 363
W-TYPE for aggressive environments	512 - 518
EMC	564 - 572
IP68	628 - 631
E-Xtreme® corrosion proof	538 - 539

- cannot be used in angled enclosures  
(IA/IAP/VA version)

inserts, crimp connections  
heat-shrinking tube



**HIGHER VOLTAGE 830V**

40A crimp contacts  
silver plated



description	part No.	part No.
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without contacts (to be ordered separately), including PE  
female inserts for female contacts  
male inserts for male contacts

CQ4F 02 H  
CQ4M 02 H

40A female crimp contacts

1,5 mm²	AWG 16
2,5 mm²	AWG 14
4 mm²	AWG 12
6 mm²	AWG 10
10 mm²	AWG 8

40A male crimp contacts

1,5 mm²	AWG 16
2,5 mm²	AWG 14
4 mm²	AWG 12
6 mm²	AWG 10
10 mm²	AWG 8

CXFA 1.5  
CXFA 2.5  
CXFA 4.0  
CXFA 6.0  
CXFA 10

silver plated

CXMA 1.5  
CXMA 2.5  
CXMA 4.0  
CXMA 6.0  
CXMA 10

- characteristics according to EN 61984:

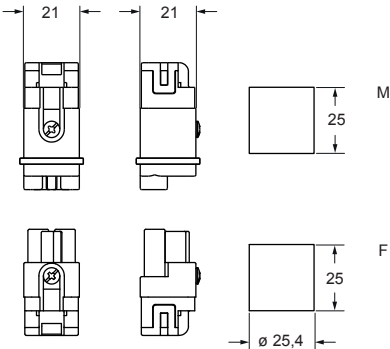
**40A 830V 6kV 3**

- (UL for USA and Canada),

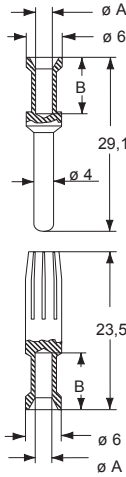
**ERC** certified

- rated voltage according to UL/CSA: 600V
- insulation resistance:  $\geq 10\text{ G}\Omega$
- ambient temperature limit:  $-40\text{ }^{\circ}\text{C} \dots +125\text{ }^{\circ}\text{C}$
- made of self-extinguishing thermoplastic resin  
UL 94V-0
- mechanical life:  $\geq 500$  cycles
- contact resistance:  $\leq 0,3\text{ m}\Omega$
- **it is recommended to crimp the contacts with crimping tools homologated by ILME** (please see the crimping tool section 40A contacts CXF and CXM series, on pages 708 - 741)
- for max. current load see the connector inserts derating diagram below; for more information see page 28

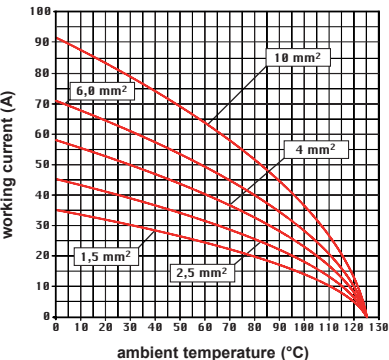
- wire diameter: up to 7,5 mm  
conductor cross-sectional area: up to 10 mm²



contacts side (front view)



CQ4 02 H, 2 poles + PE connector inserts  
Maximum current load derating diagram



Coding pins  
CR Q02  
(page 691)



CXF and CXM contacts

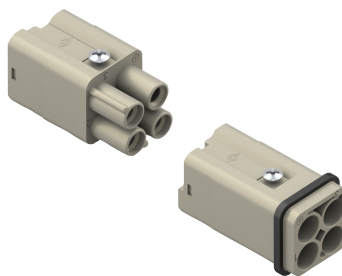
conductor cross-sectional area (mm²)	conductor slot $\varnothing A$ (mm)	conductor stripping length B (mm)
1,5	1,8	9
2,5	2,2	9
4	2,85	9,6
6	3,5	9,6
10	4,3	15

**CQ4F/M 03 3 poles + ⊕ 40A - 400V**enclosures:  
size "21.21"

page:

Insulating type	339 - 348
Metallic type	349 - 363
W-TYPE for aggressive environments	512 - 518
EMC	564 - 572
IP68	628 - 631
E-Xtreme® corrosion proof	538 - 539

inserts, crimp connections

40A crimp contacts  
silver plated- cannot be used in angled enclosures  
(IA/IAP/VA version)

description

part No.

part No.

without contacts (to be ordered separately)

female inserts for female contacts \*

male inserts for male contacts \*

**CQ4F 03**  
**CQ4M 03**

40A female crimp contacts

1,5 mm <sup>2</sup>	AWG 16
2,5 mm <sup>2</sup>	AWG 14
4 mm <sup>2</sup>	AWG 12
6 mm <sup>2</sup>	AWG 10
10 mm <sup>2</sup>	AWG 8

40A male crimp contacts

1,5 mm <sup>2</sup>	AWG 16
2,5 mm <sup>2</sup>	AWG 14
4 mm <sup>2</sup>	AWG 12
6 mm <sup>2</sup>	AWG 10
10 mm <sup>2</sup>	AWG 8

**CXFA 1.5**  
**CXFA 2.5**  
**CXFA 4.0**  
**CXFA 6.0**  
**CXFA 10****CXMA 1.5**  
**CXMA 2.5**  
**CXMA 4.0**  
**CXMA 6.0**  
**CXMA 10**

silver plated

\* wire diameter: up to 7,5 mm

- the female insert **CQ4F 03** is finger proof (IP2X or IPXXB) even if not coupled, while the male insert **CQ4M 03** in this circumstance is protected from access with the back of the hand (IP1X or IPXXA).

- characteristics according to EN 61984:

**40A 400V 6kV 3**

- cULus (UL for USA and Canada), certified

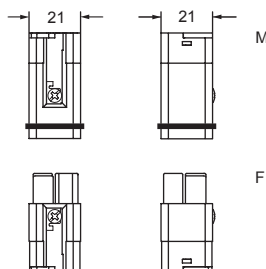
**ERC** certified- insulation resistance:  $\geq 10 \text{ G}\Omega$ - ambient temperature limit:  $-40^\circ\text{C} \dots +125^\circ\text{C}$ 

- made of self-extinguishing thermoplastic resin UL 94V-0

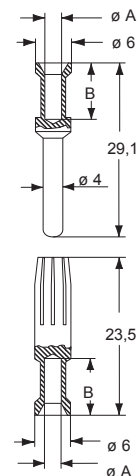
- mechanical life:  $\geq 500$  cycles- contact resistance:  $\leq 0,3 \text{ m}\Omega$ 

- it is recommended to crimp the contacts with crimping tools homologated by ILME (please see the crimping tool section 40A contacts CXF and CXM series, on pages 708 - 741)

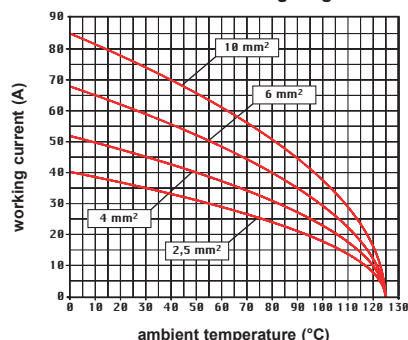
- for max. current load see the connector inserts derating diagram below; for more information see page 28



contacts side (front view)

**CXF and CXM contacts**

conductor section mm <sup>2</sup>	conductor slot ø A (mm)	conductors stripping length B (mm)
1,5	1,8	9
2,5	2,2	9
4	2,85	9,6
6	3,5	9,6
10	4,3	15

**CQ4 03, 3 poles + PE connector inserts**  
**Maximum current load derating diagram**Coding pins  
**CR Q03**  
(4 possible positions)  
(page 692)

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## CQ4 SERIES COMBINED INSERT “21.21”

### CQ4F /M 03/2

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CQ4 Series - Combined insert “21.21”

3 poles + ⊕ power: 40 A 400 V 6 kV 3

2 poles auxiliary: 10 A 250 V 4 kV 3



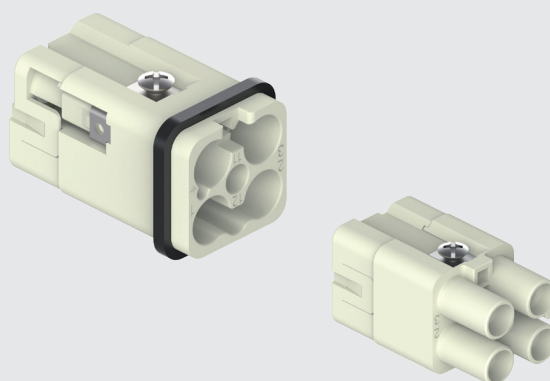
Find more  
information on  
our products at  
[www.ilme.com](http://www.ilme.com)

## TECHNICAL FEATURES

### CQ4F /M 03/2

- Proprietary design, in the same space of the currently available CQ4 03, it features two additional auxiliary contacts plus one (optional) coding pin.
- Combined insert size "21.21" (first ever) for use with 4 (3P + ⊕) removable crimp contacts series **CX** up to size **6.0** (6 mm<sup>2</sup> / 10 AWG) for power and 2 removable crimp contacts series **CD** up to size **2.5** (2,5 mm<sup>2</sup> / 14 AWG) for auxiliaries.
- Suitable to drive a 1-axis power motion control system (feeding the 3Φ AC motor of the axis) with its 2-pole braking circuit, while the encoder signals are served by a separate second connector, for ease of shielding against interferences typical of PWM variable frequency drivers.
- One optional coding pin, **CR Q03/2** (red colour), to realize 4 different codings and avoid mismating in case of installation of up to four similar connectors nearby.
- EN/IEC 61984 ratings:
  - 3P + ⊕ power: **40 A 400 V 6 kV 3**
  - 2P auxiliary: **10 A 250 V 4 kV 3**
- Lower and Upper Limiting Temperatures (LLT ... ULT):  
-40 °C ... +125 °C.
- Max diameter of wire sheathing:
  - **5,0 mm** for 3P + ⊕ 40 A power contacts,
  - **3,8 mm** for 2P 10 A auxiliary contacts.

original  
proprietary design  
for high density  
combination of  
power and brakes  
contacts





# CQ4F /M 03/2 combined "21.21" 3 poles + ⊕ (40 A - 400 V) + 2 poles (10 A - 250 V)

enclosures:  
size "21.21"

pages:

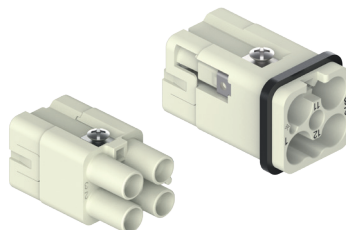
Insulating type	339 - 348
Metallic type	349 - 363
W-TYPE for aggressive environments	512 - 518
EMC	564 - 572
IP68	628 - 631
E-Xtreme® corrosion proof	538 - 539
HYGIENIC CKH-MKH	108-114*

- cannot be used in angled enclosures other than  
IA4/IAP25/AP25 and hoods other than V25/VN25/VG25

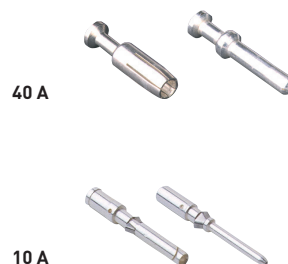
refer to CN.19 pages

\* refer to NEWS 2020 pages

inserts, crimp connections



40 A and 10 A crimp contacts  
silver plated



description

part No.

part No.

without contacts (to be ordered separately), including PE  
female inserts for female contacts  
male inserts for male contacts

CQ4F 03/2  
CQ4M 03/2

40 A female crimp contacts

1,5 mm <sup>2</sup>	AWG 16
2,5 mm <sup>2</sup>	AWG 14
4 mm <sup>2</sup>	AWG 12
6 mm <sup>2</sup>	AWG 10

40 A male crimp contacts

1,5 mm <sup>2</sup>	AWG 16
2,5 mm <sup>2</sup>	AWG 14
4 mm <sup>2</sup>	AWG 12
6 mm <sup>2</sup>	AWG 10

10 A female crimp contacts

0,14-0,37 mm <sup>2</sup>	AWG 26-22	identification No. 1
0,5 mm <sup>2</sup>	AWG 20	identification No. 2
0,75 mm <sup>2</sup>	AWG 18	identification No. ②
1 mm <sup>2</sup>	AWG 18	identification No. 3
1,5 mm <sup>2</sup>	AWG 16	identification No. 4
2,5 mm <sup>2</sup>	AWG 14	identification No. 5

10 A male crimp contacts

0,14-0,37 mm <sup>2</sup>	AWG 26-22	identification No. 1
0,5 mm <sup>2</sup>	AWG 20	identification No. 2
0,75 mm <sup>2</sup>	AWG 18	identification No. ②
1 mm <sup>2</sup>	AWG 18	identification No. 3
1,5 mm <sup>2</sup>	AWG 16	identification No. 4
2,5 mm <sup>2</sup>	AWG 14	identification No. 5

CXFA 1.5  
CXFA 2.5  
CXFA 4.0  
CXFA 6.0

CXMA 1.5  
CXMA 2.5  
CXMA 4.0  
CXMA 6.0

CDFA 0.3  
CDFA 0.5  
CDFA 0.7  
CDFA 1.0  
CDFA 1.5  
CDFA 2.5

CDMA 0.3  
CDMA 0.5  
CDMA 0.7  
CDMA 1.0  
CDMA 1.5  
CDMA 2.5

silver plated

- characteristics according to EN/IEC 61984 ratings:

40 A 400 V 6 kV 3  
10 A 250 V 4 kV 3

- cULus (ECBT2.E115072, ECBT8.E115072), (PVVA2.E506437,  
PVVA8.E506437) certified

- BV pending

- rated voltage according to UL/CSA: 600 V

- insulation resistance:  $\geq 10 \text{ G}\Omega$

- Lower and Upper Limiting Temperatures (LLT ... ULT): -40 °C ... +125 °C

- made of self-extinguishing thermoplastic resin UL 94V-0

- mechanical life:  $\geq 500$  cycles

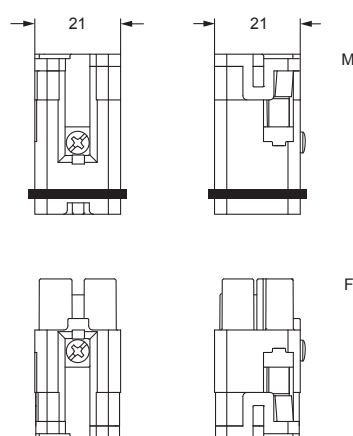
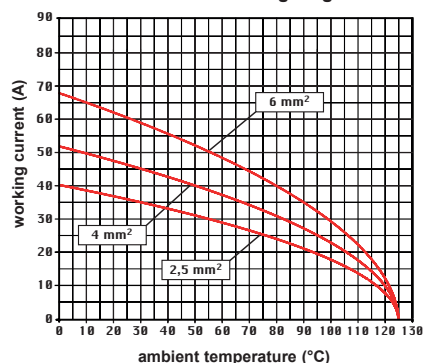
- contact resistance:  $\leq 0,3 \text{ m}\Omega$  (CD auxiliary contacts)  
 $\leq 3 \text{ m}\Omega$  (CX power contacts)

- it is recommended to crimp the contacts with crimping tools homologated by ILME (please see the crimping tool section 40A contacts CXF and CXM series and 10A contacts CDF, CDM series, on pages 708 - 741 of CN.19 catalogue). For 40 A contacts and 10 A contacts see also new pneumatic crimping tool CCPZP RN (see page 145)

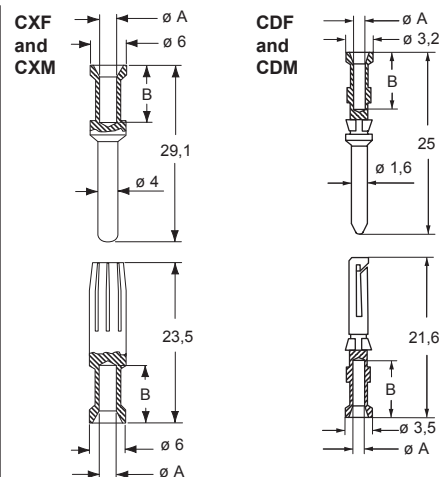
- for max. current load see the connector inserts derating diagram below.

CQ4F /M 03/2 combined connector inserts

Maximum current load derating diagram



contacts side (front view)



CXF and CXM contacts

conductor cross-sectional (mm <sup>2</sup> )	conductor slot ø A (mm)	conductor stripping length B (mm)
1,5	1,8	9
2,5	2,2	9
4	2,85	9,6
6	3,5	9,6

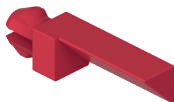
CDF and CDM contacts

conductor cross-sectional (mm <sup>2</sup> )	conductor slot ø A (mm)	conductor stripping length B (mm)
0,14-0,37	0,9	8
0,5	1,1	8
0,75	1,3	8
1,0	1,45	8
1,5	1,8	8
2,5	2,2	6





coding pin for crimp inserts

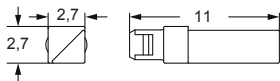


description

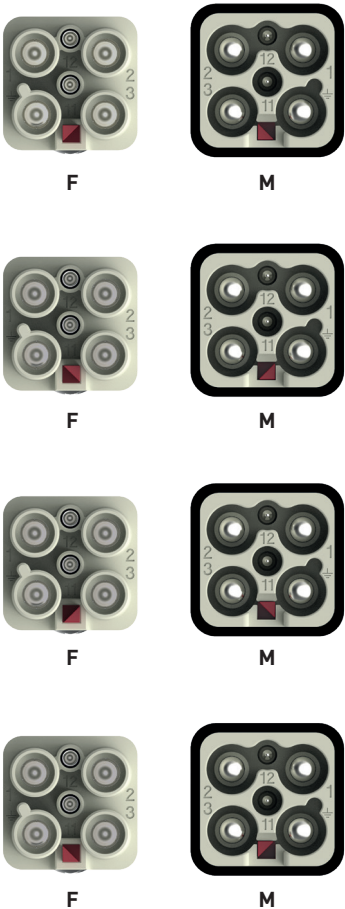
part No.

coding pin (optional) for CQ4 03/2 inserts

CR Q03/2



CR Q03/2 CODING OPTIONS



☑ Thanks to the use of the **optional CR Q03/2 coding pin** it is possible to achieve up to **4 different codings**.

## RECOMMENDED TIGHTENING TORQUE

- insert terminal screws, including PE terminal and fixing screws
- axial screw insert, MIXO series CX 02 4A / CX 02 4B
- enclosures assembly screws

### Insert terminal screws, including PE terminal and fixing screws

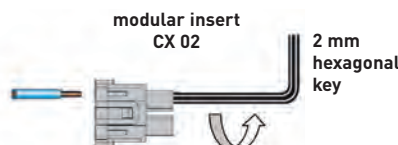
Increasing the tightening torque of terminal screws does not considerably improve the contact resistance. The screw torques are selected according to standard EN 60999-1, to provide excellent mechanical, thermal and electric behaviour. The conductor or terminal may be damaged if the recommended values are significantly exceeded.

Screw size	Connector type	Recommended tightening torque		Recommended size of screwdriver
		(Nm)	(lb.in)	
	LINE TERMINALS			
M2,5	CT 40, 64	0,4	3,5	0,5 x 3
M2,6	CT 06..24	0,4	3,5	0,5 x 3
M3	CK	0,5	4,4	0,5 x 3
M3	CDA	0,5	4,4	Ph0 or 0,6 x 3,5
M3	CNE, CME	0,5	4,4	Ph0 or 0,8 x 4
M3	CX 4/2, CX 4/8 (16A)	0,5	4,4	0,6 x 3,5
M3	CX 4/8 Q (16A)	0,5	4,4	Ph0
M4	CP	1,2	10,6	Ph1 or 0,8 x 4
M6	CX 4/.. (80A)	2,5	22,1	1,0 x 5,5
	PE TERMINAL			
M3	CK, CQ 05, CQ 07, CQ 12	0,5	4,4	0,5x3
M4	all series except CD 15, CD 25, CDA, CDC, CSAH, MIXO	1,2	10,6	Ph2 or 1,0 x 5,5
M3,5	series CD 15, CD 25, CDA, CDC, CSAH	0,8	7,1	Ph1 or 0,8 x 5,5
M3	small PE terminal, MIXO frames series	0,5	4,4	Ph1 or 1,0 x 4,5
M4	large PE terminal, MIXO frames series	1,2	10,6	Ph1 or 1,0 x 5,5
M4	PE terminal, MIXO ONE enclosures	1,2	10,6	Ph1 or 1,0 x 5,5
	FASTENING SCREWS			
M3	CK, CKS, CKSH, CD 07, CD 08, CQ 05, CQ 07, CQ 12, CQ 21, CQ4 02 /02 H, CQ4 03, CX 1/2 BD	0,5	4,4	Ph1 or 0,8 x 5,5
M3	screw for fastening inserts to enclosures of all series except T-TYPE, CQ-MQ 08 and MIXO ONE	0,8	7,1	Ph1 or 0,8 x 4
Ø 2,9	screws for fastening "32.13" inserts CQ 04/2, CQ 08, CQ 17 to CQ-MQ 08 enclosures	0,7	6,2	Ph1
M3	screw for fastening inserts to T-TYPE enclosures	0,5	4,4	Ph1 or 0,8 x 4
Ø 2,9	series MIXO ONE enclosures, assembly of top and bottom parts	0,8	7,1	Ph1
M4	CYR 16.3, CYR 24.4 cable pass-through hoods, assembly of two halves	1,2	10,6	Ph2 or 1,0 x 5,5
M4	CYG 16 in-line joint, assembly of two halves and mounting of two bulkhead mounting housings size "77.27"	1,2	10,6	Ph2 or 1,0 x 5,5
M5	series BIG enclosures, assembly of top and bottom parts	1,0	8,8	Ph2

### Axial screw insert, MIXO series CX 02 4A / CX 02 4B

The connections of the conductors to the female and male inserts are made via axial screw. Fully insert the stripped wire in the back of the contact (axial screw terminals are supplied fully opened); while holding the wire down, insert a 2 mm hexagonal key in the front of the contact and tighten to recommended torque. After assembling the complete connector periodically check that the contact is screwed tight by re-applying the proper tightening torque.

- Usable conductor cross-sections (EN 60228 Class 5):
  - from 2,5 to 8 mm<sup>2</sup> (14 AWG to 10 AWG) (CX 02 4AF/M)
  - from 6 to 10 mm<sup>2</sup> (10 AWG to 8 AWG) (CX 02 4BF/M)
  - (extra-flexible EN 60228 class 6: 2,5... 6 mm<sup>2</sup> (14 AWG to 10 AWG))
- Use only stranded flexible copper conductors
- Do not twist the strands!
- Tightening torque with 2 mm hexagonal Allen key:
  - 1,5 Nm (13,3 lb.in) max for conductors with section 2,5 ... 4 mm<sup>2</sup> (14 AWG to 12 AWG)
  - 2 Nm (17,7 lb.in) max for conductors with section 6 ... 10 mm<sup>2</sup> (10 AWG to 8 AWG)
- Stripping length: 8+1 mm



## Enclosures assembly screws

In the table below, the recommended minimum and maximum tightening torque to apply to the fixing screws of ILME bulkhead mounting housings are shown, assuming the use of steel screws with 8.8 resistance class and a good fixing panel surface according to the requirements mentioned therein.

Series	Number of screws	Screw size	Recommended torque		Flange sealing element
			(Nm)	(lb.in)	
CK/MK, CKX, CKA/MKA, CQ	2	M3	0,8 – 1,0	7,1 – 8,9	Gasket
MIXO ONE	4	M3	0,5 – 0,9	4,4 – 8,0	Gasket
CZI 15 /25	4	M3	0,8 – 1,0	7,1 – 8,9	Gasket
CHI 50	4	M4	1,2 – 1,8	10,6 – 15,9	Gasket
CHI 06 /10 /16 /24	4	M4	0,8 – 1,2	7,1 – 10,6	Gasket
CHI 32	4	M4	1,2 – 1,8	10,6 – 15,9	Gasket
CHI 48	4	M6	3,0 – 3,6	26,6 – 31,9	Gasket
CGK/MGK (IP68)	2	M4	0,8 – 1,2	7,1 – 10,6	O-ring
CGI/ MGI 06/ 10/ 16/ 24 (IP68)	2	M6	3,0 – 3,6	26,6 – 31,9	O-ring
T-TYPE, T-TYPE/H, T-TYPE/C, T-TYPE/ W	4	M4	0,8 – 1,2	7,1 – 10,6	Gasket

To guarantee the declared IP degree of protection of the housings reported in this catalogue, according to EN IEC 60529 or to the relevant Type rating per ANSI/UL 50 and 50E (for those products bearing approval to those ratings), the surface of the mounting panel must meet the following requirements (definitions are provided in ISO 4287 standard):

- Waviness  $W_t \leq 0,2$  mm over a distance of 200 mm (measured on the panel without load)
- Roughness  $R_a \leq 16$   $\mu$ m

NOTE: The values of tightening torque indicated in the above table are just recommended values, that must be related – by the designer of the final application – to the resistance class of the screws (not included in the delivery), with the assumption that the mounting panel is sufficiently rigid (stiff). If the deflection of the panel, under the effect of tightening the screws, is greater than 0,7 mm over a distance of 100 mm, it is necessary to use the counter-flanges mentioned in our catalogue or the special flange gaskets available upon request (please contact our Sales Department). For the CGI/MGI IP68 enclosures the specific counter-flanges mentioned in our catalogue are always recommended.

## Enclosures locking screws

Series	Number of screws	Screw size	Recommended tightening torque		Recommended size of screwdriver
			(Nm)	(lb.in)	
CGK/MGK	2	M4	1,2	10,6	1,0 x 5,5 or 7 mm hexagonal key
CG/ MG	2	M6	2,5	22,1	1,6 x 10 or 10 mm hexagonal key

# RANGE OF CONDUCTOR CROSS-SECTIONAL AREA AND STRIPPING LENGTH

Connector inserts connection technique	Range of conductor cross-sectional area		Stripping length
Screw	(mm <sup>2</sup> )	AWG	(mm)
CK	0,75 – 2,5	18 – 14	6
CX 4/2, CX 4/8 (poles 16A) <sup>1)</sup>	0,75 – 4	18 – 12	7
	0,75 – 2,5	18 – 14	7
CNE <sup>1)</sup>	0,5 – 4	20 – 12	7
CNE..X	0,25 – 2,5	24 – 14	7
CDA <sup>1)</sup>	0,5 – 4	20 – 12	7
CDA..X	0,25 – 2,5	24 – 14	7
CT 06..24	0,75 – 2,5	18 – 14	12
CT 40 and 64	0,75 – 2,5	18 – 14	12
CME <sup>1)</sup>	0,5 – 4	20 – 12	7
CME..X	0,5 – 2,5	20 – 14	7
CP <sup>1)</sup>	0,75 – 6	18 – 10	10,5
CX 4/.. (80A poles)	4 – 16	12 – 5	14
<b>Crimp</b>			
MIXO (5A), CX 25 IB	0,08 – 0,75	28 – 18	4
CQ 21	0,08 – 0,5	28 – 20	4
CDD, CD, MIXO (10A), CQ 12, CQ 07	0,14 – [2,5]*	26 – 14	8 – * [6 for 2,5 mm <sup>2</sup> ]
CCE, CDC, CMCE, CQ, CQE, CQEE, MIXO (16A)	0,14 – 4	26 – 12	7,5
CX, MIXO (40A), CQ4 03	1,5 – 2,5	16 – 14	9
	4 – 6	12 – 10	9,6
MIXO (70A)	10 – 25	7 – 4	15
MIXO (100A), CX 6/6	10 – 35	7 – 2	15
MIXO (200A)	16 – 70	6 – 2/0	15
<b>Spring</b>			
CSE, CSH, CTSE 06..24, CMSH, MIXO [CX 05 S <sup>2)</sup> , CX 05 SH], CSS	0,14 – 2,5	26 – 14	9 - 11
CTS 40/64	0,14 – 2,5 unprepared	26 – 14 unprepared	9 - 11
	0,14 – 1 prepared	26 – 18 prepared	
CKS, CKSH, CDS, CDSH, CSAH	0,14 – 2,5 unprepared	26 – 14 unprepared	9 - 11
	0,14 – 1,5 prepared	26 – 16 prepared	

<sup>1)</sup> For CNE, CDA, CP, CME, "CX 4/8 – pole 16A" series connectors with screw terminal and conductor protection plate, the use of ferrules is not necessary (= unprepared conductor).

The use of ferrules (= prepared conductor) causes a reduction in maximum useful cross-section to the lower size (e.g. 4 mm<sup>2</sup> unprepared - 2,5 mm<sup>2</sup> prepared).

<sup>2)</sup> Available upon request.

## LOAD CURVES

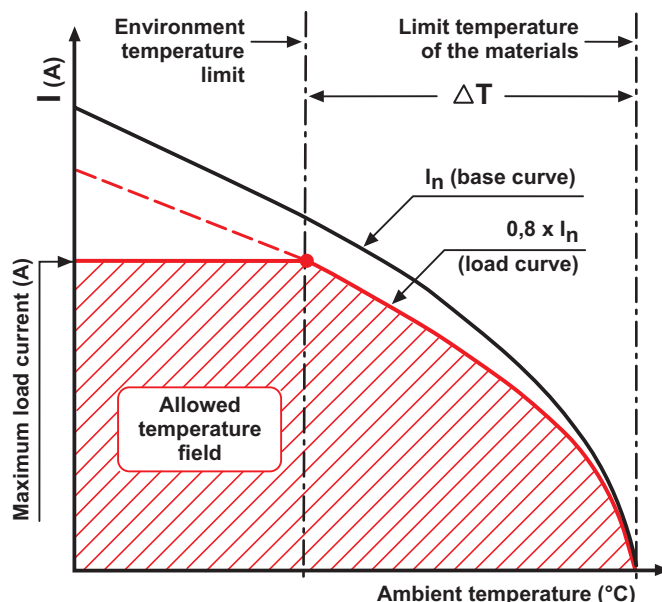
The permitted current carrying capacity for connectors is variable: it becomes lower with the increase of the number of poles and of the ambient temperature in which the connector is installed and it depends upon the thermal properties of the material used for the contacts and the insulating parts including those of the type of conductor used. The current carrying capacity is obtained from the load curves which are constructed according to standard IEC 60512-5-2 for currents circulating simultaneously in all poles.

The limit current curves express current values that determine the achievement of the upper limit temperature of the materials. The choice of the permanent load applicable on the contacts **must be made within the field of operation possible delimited by the above mentioned curves.**

Since use of connectors at the limit values of their characteristics is not recommended, the **base curve** is de-rated. The reduction of the load currents to 80% defines the correction curve where both the maximum permissible contact resistances and the inaccuracy of the temperature measurements are sufficiently taken into consideration.

The correction curve represents the final **limit current curve (load curve)** as defined by standard IEC 60512-5-2. It therefore bears in consideration the differences between the various connector inserts, as well as errors in the temperature measurements.

All the load curves presented in this catalogue include the correction. See figure below.



### Legend

#### Maximum load current (A)

Value for which the connector reaches the upper limit temperature of the material at the corresponding ambient temperature intersected on the load curve.

#### Limit temperature of the materials

Value determined by the characteristics of the material used. The sum of the environmental temperature and the increase of the  $\Delta T$  (temperature rise) caused by the current flow must not exceed the limit temperature of the materials.

#### Environment temperature limit

The environmental conditions must not exceed this value. It may be known and determines the maximum load current, or it may be directly obtained from the load curve.

#### Base curve

Set of current and temperature values obtained from laboratory tests and influenced by the connector's characteristics (number of poles, construction shape, thermal conductivity of the materials, etc.) and the cross-section of the conductor used.

#### Load curve (limit current curve)

Obtained from the base curve via the safety coefficient.

#### $\Delta T$ (temperature rise)

Temperature rise produced by a permanent current circulating through all the poles of a connector coupling; difference between the upper limit temperature of the material and the ambient temperature obtained on the limit current curve.