CDSH NC-SQUICH® series

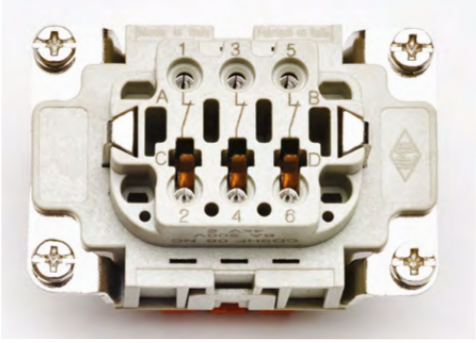
3 contact pairs with an AutoShort NC contact element

ILME developed an **innovative connector suitable for interfacing measuring current transformers (CTs)** with the dedicated electronic measurement processing equipment. Use of such systems is increasing in transformer substations with the diffusion of smart grid concepts due to the growth of self-standing power generation plants (photovoltaic, wind).

The CDSH...NC connector has the **same dimensions of a 6 poles size "44.27" CSH connector,** and it is **easy to wire** thanks to ILME proprietary SQUICH® tool-less quick connection technology.

Inside the female insert, for each of the three contact pairs 1-2, 3-4 and 5-6, a **suitable spring element is foreseen,** providing a NC (normally closed) contact between the female contact pair. The said short-circuit element automatically establishes a short-circuit between the female contact pair while the connector is being unmated, before the complete withdrawal of the corresponding male connector.

This protects the measuring current transformer's secondary windings to which this connector is deemed to be wired, against the high voltage that would arise if the ends of each winding were left open while the primary winding (the power line busbars) are still under load.

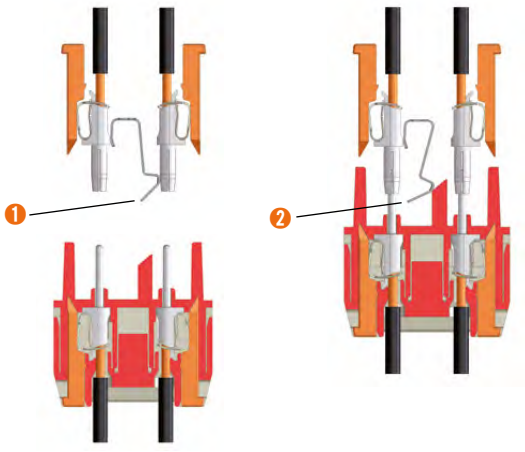


During the mating of these specially designed connector inserts, three corresponding actuator buttons realized on the mating face of the male connector, once the male contacts are already engaged with the corresponding female contacts, push aside the facing end of the AutoShort NC contact element, in order to release the short-circuit previously provided. In mated condition the proper termination of the secondary windings of the CT must be provided by the customer's downstream circuit, e.g. by suitable resistors.

AUTOSHORT NC
Operating principles

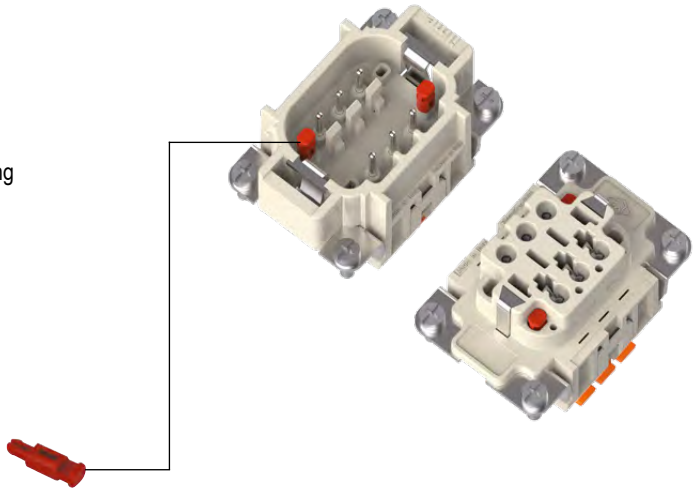
CDSH...NC connector can be used only for connecting up to three secondary (output) windings of measuring current transformers to specific measuring circuits; on the female side each contact pair is provided with said AutoShort NC contact element ❶ to keep the secondary winding ends shorted while the female connector is not engaged with the male connector, thus avoiding damages to the insulation of the current transformer and consequent hazardous condition for the personnel operating the unmating of the connector while the power busbars are energized. When the female and male connectors are being mated ❷, the short-circuit is released after proper electrical engagement of the two connector halves, thus allowing again current measurement by the dedicated electronic measurement processing equipment wired on the male connector side.

The new connector inserts can be used in size "44.27" connector enclosures, either metal (conductive) or thermoplastics (insulating), with up to IP68 degree of protection (IP66/IP68 with series CG/MG), within enclosures for aggressive environments (series "W") or with up to IP66/IP69 within series T-TYPE HYGIENIC enclosures for hygienic applications.

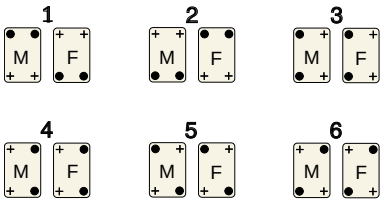


AUTOSHORT NC
Coding pins

Optionally, it is possible to add **four special coding pins CR CDS** that allow up to 6 different codings, by installing 2 coding pins on the male connector half and correspondingly 2 on the female connector half, according to the coding scheme provided in the following:



CODING SCHEME



Legend

● = coding pin installed
\+ = no coding pin

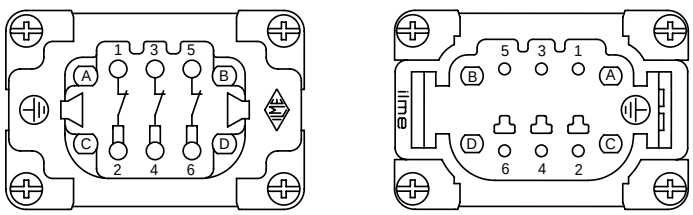
The **CR CDS coding pins can also be used in combination with other CR 20 / CRM / CRF / CR 72 metal pins** instead of insert fixing screws in order to increase the number of possible combinations.

AUTOSHORT NC
PIN Assignment

Female inserts with NC shorting contacts between contacts of pairs 1-2, 3-4, 5-6, opening upon with male inserts.
Pin assignment of contacts for the connector is the following:

Pin	Assignment
1	Winding 1 start
2	Winding 1 end
3	Winding 2 start
4	Winding 2 end
5	Winding 3 start
6	Winding 3 end
PE	⏚ Protective Earth

View from the contact side



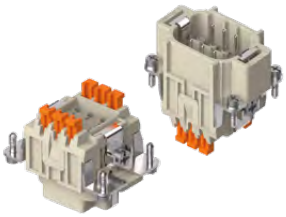
Female **Male**

CDSH NC-SQUICH® series
TECHNICAL FEATURES

Insert series	CDSH NC-SQUICH®
Electrical contacts	6 spring clamp type built-in contacts with actuator (SQUICH®) made by copper alloy, silver plated
Rated current	**6A 250V 4kV 3; 6A 500V 4kV 2** according to EN 61984 Fault condition (rated short time thermal current): 50A for 1 s
Contact resistance (connector mated)	≤ 3 mΩ
Insulation resistance	≥ 10 GΩ
Ambient temperature limit (°C)	min. -40 max. +125
Degree of protection	IP20 (IPXXB) (connector without housing, in mated condition), IP65 or IP66 (connectors in T-TYPE housings), IP66 or more (connectors in ILME metal housings)
Conductor connections	3 pairs of contacts (with autoshunt on each pair of female connector), plus protective earth, size 44.27 housings
Conductor cross-sectional area	0,14 - 2,5 mm^2 (AWG 26 - 14) for solid or unprepared stranded copperwires
	0,14 - 1,5 mm^2 (AWG 26 - 16) for stranded copper wires prepared with ferrules
Flammability	94V-0 according to UL 94
Mechanical endurance (mating cycles)	≥ 50

CDSH NC-SQUICH® 6 poles + ⏚ 6A - 250V

inserts,
spring clamp connections with actuator button, female inserts with NC shorting contacts

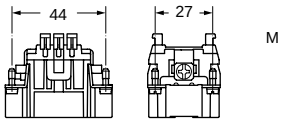


SILVER PLATED CONTACTS

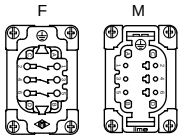
coding pins

description	part No.	part No
spring terminals with actuator button female inserts with female contacts male inserts with male contacts	**CDSHF 06 NC** **CDSHM 06 NC**	
plastic coding pins		**CR CDS**

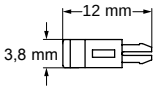
- characteristics according to EN 61984:
  6A 250V 4kV 3
  6A 500V 4kV 2
  10A with connector mated
- cULus DNV·GL BUREAU VERITAS EAC certified
- rated voltage according to UL/CSA: 600V
- insulation resistance: ≥ 10 GΩ
- ambient temperature limit: -40 °C ... +125 °C
- made of self-extinguishing thermoplastic resin 94V-0 according to UL 94
- mechanical life: ≥ 50 cycles
- contact resistance: ≤ 3 mΩ
- NC = Normally Closed
- the diagram below shows the current carrying capacity of the AutoShort female connector unmated, with the three NC contacts shorting the individual circuits wired in series. In this condition the AutoShort connector may be loaded up to 6A. At this max. current it may be wired 0,75 mm²/18 AWG to 2,5 mm²/14 AWG without significant performance difference.
  For the current-carrying capacity of the mated connector see the relevant diagram (for more information see page 28).



contacts side (front view)



- inserts for conductors section:
  0,14 - 2,5 mm² - AWG 26 - 14
- for wires with crimped ferrule, useful cross-section:
  up to 1,5 mm² (AWG 16)
- conductors stripping length: 9...11 mm

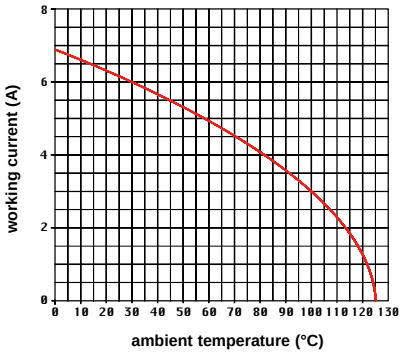


ILME CDSHF/M 06 NC (cross section: 2,5 mm²)

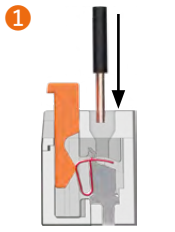
Load curve

Limit Ambient temperature (°C)	Working Current (A) 2,5 mm²
97,2	3,2
108,6	2,4
114,4	2
125	0

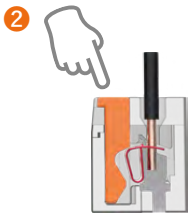
CDSH F 06 NC poles connector inserts
Maximum current load derating diagram



SQUICH®-spring connection technology
WIRING

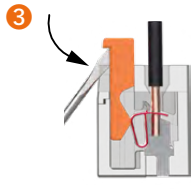


Deeply insert a stripped conductor into a round terminal.



Push the actuator button to close the terminal.

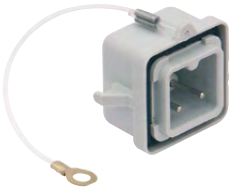
RE-OPENING



Insert a **0,5 x 3,5 mm** flat blade screwdriver in the actuator button side window and pull it up by levering down.

CKM - CQAM termination connector

termination connector for CKF/CKSF/CKSHF 03 inserts



termination connector for CQF 12 insert

description	part No.	part No.
with pegs and seal, connects pole 2 with pole 3	**CKM 03 T1**	
with pegs and seal, connects pole 1 with pole 2	**CKM 03 T3**	
with pegs and seal, connects pole 5 with pole 6 and pole 7 with pole 8		**CQAM 12 T1**

CKM 03 T1 - CKM 03 T3

- characteristics according to EN 61984:
  10A 400V 4kV 3
- c UL us (UL for USA and Canada), DNV·GL BUREAU VERITAS
  EAC certified

When the termination connector is mated with a CKF/CKSF/CKSHF 03 insert (complete with an enclosure with lever), it performs a dual function:
- connects two socket insert poles
- acts as a cover (IP65 protection rating compliant with EN 60529 standard, with lever closed).

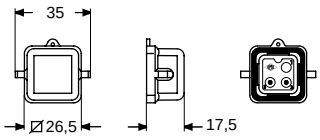
CQAM 12 T1

- characteristics according to EN 61984:
  10A 400V 6kV 3
  10A 400/690V 6kV 2
- c UL us (UL for USA and Canada), DNV·GL BUREAU VERITAS
  EAC certified

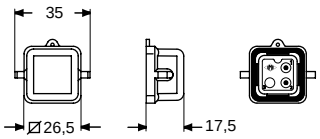
When the terminal connector is mated with a CQF 12 insert (complete with an enclosure with lever), it performs a dual function:
- connects two socket insert poles
- acts as a cover (IP65 protection rating compliant with EN 60529 standard, with lever closed).

CR Q03 code pins can be used with CQAM 12 T1, in this case the CQF 12 inserts must be provided by CR Q12.

CKM 03 T1

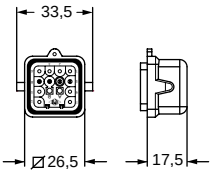


CKM 03 T3



- interconnected male contacts

CQAM 12 T1



- interconnected male contacts

ACCESSORIES

CR bridges for delta connection

inserts

CQF *	12 poles + ⏚
CDDF	24, 42, 72 (144), 108 (216) poles + ⏚
CX 17 DF (MIXO)	1 module

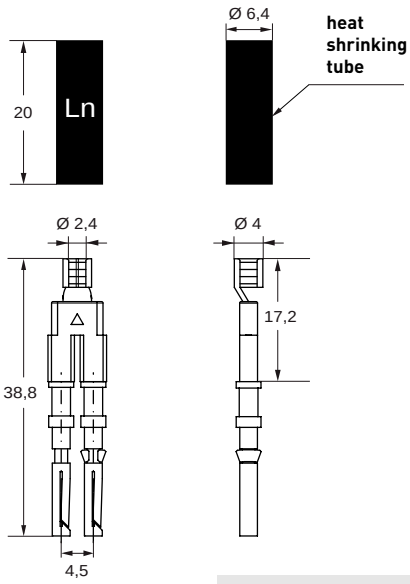
* for enclosures C-TYPE series (CKA/MKA ..I/VS) only

bridges for delta connection

description	part No.
bridge with 2 female 10A contacts, silver plated and open type crimp barrel	**CR BDE**

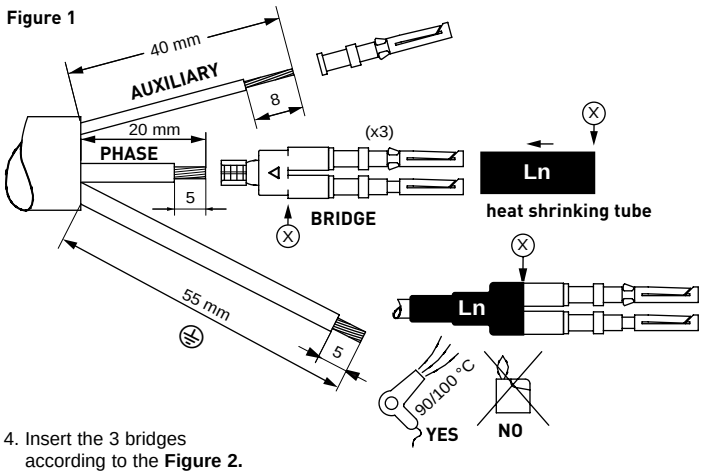
NOTE:
The typical use of the product requires three bridges each with its shrinking tube with L1 / L2 / L3 marking to identify the phases in the wiring.

1. Cut and strip the wires as shown in **Figure 1.**
2. Crimp the contacts on the auxiliary wires and the bridge end to the phase wires (3 units) using CRPZ pliers and CRD matrix (position 2,5).
3. Insert the insulating heat shrinking tubes on the bridges, their end must be aligned with the position Ⓧ. Then heat them at 90/100 °C till they shrink over the wires.



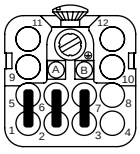
For wires with cross-section ranging from 1,5 to 2,5 mm² (16-14 AWG), crimp connection with **CRPZ** pliers (model CEMBRE IDT) and **CRD** matrix.

Figure 1



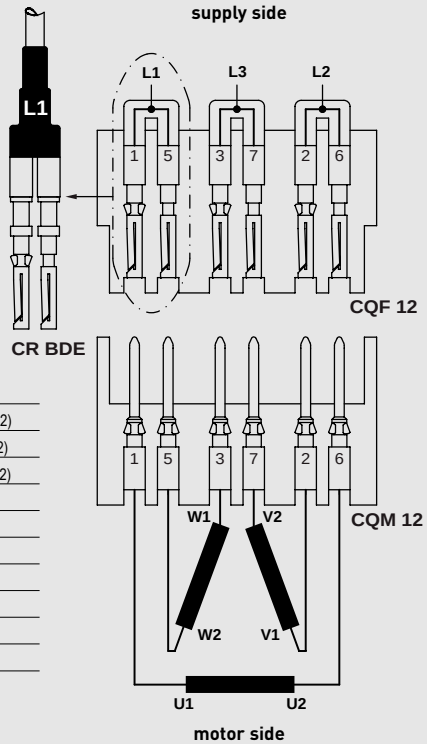
4. Insert the 3 bridges according to the **Figure 2.**

Figure 2



CQF 12
termination side

Example of DELTA connection using inserts CQ 12



1-5	BRIDGE L1 (winding U1/W2)
2-6	BRIDGE L2 (winding V1/U2)
3-7	BRIDGE L3 (winding W1/V2)
4	auxiliary circuit
8	auxiliary circuit
9	auxiliary circuit
10	auxiliary circuit
11	auxiliary circuit
12	auxiliary circuit
⏚	protective earth

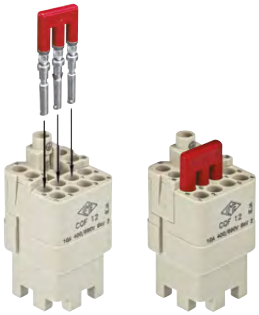
CR bridges for star connection

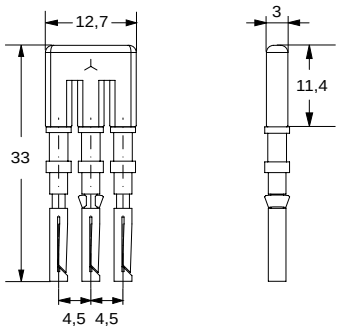
inserts

CQF	12 poles + ⏚
CDDF	24, 42, 72 (144), 108 (216) poles + ⏚
CX 17 DF (MIXO)	1 module

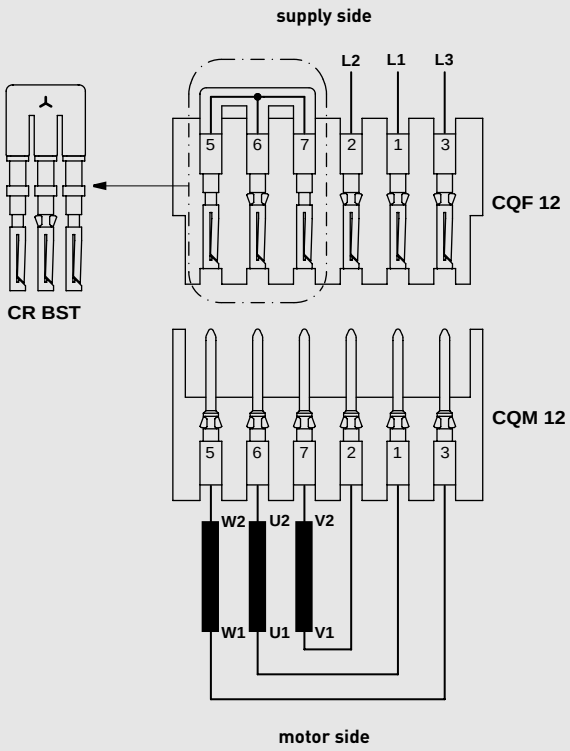
bridges for star connection

description	part No.
bridge with 3 female 10A contacts, silver plated	**CR BST**

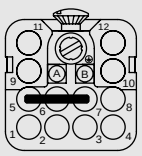




Example of STAR connection using inserts CQ 12

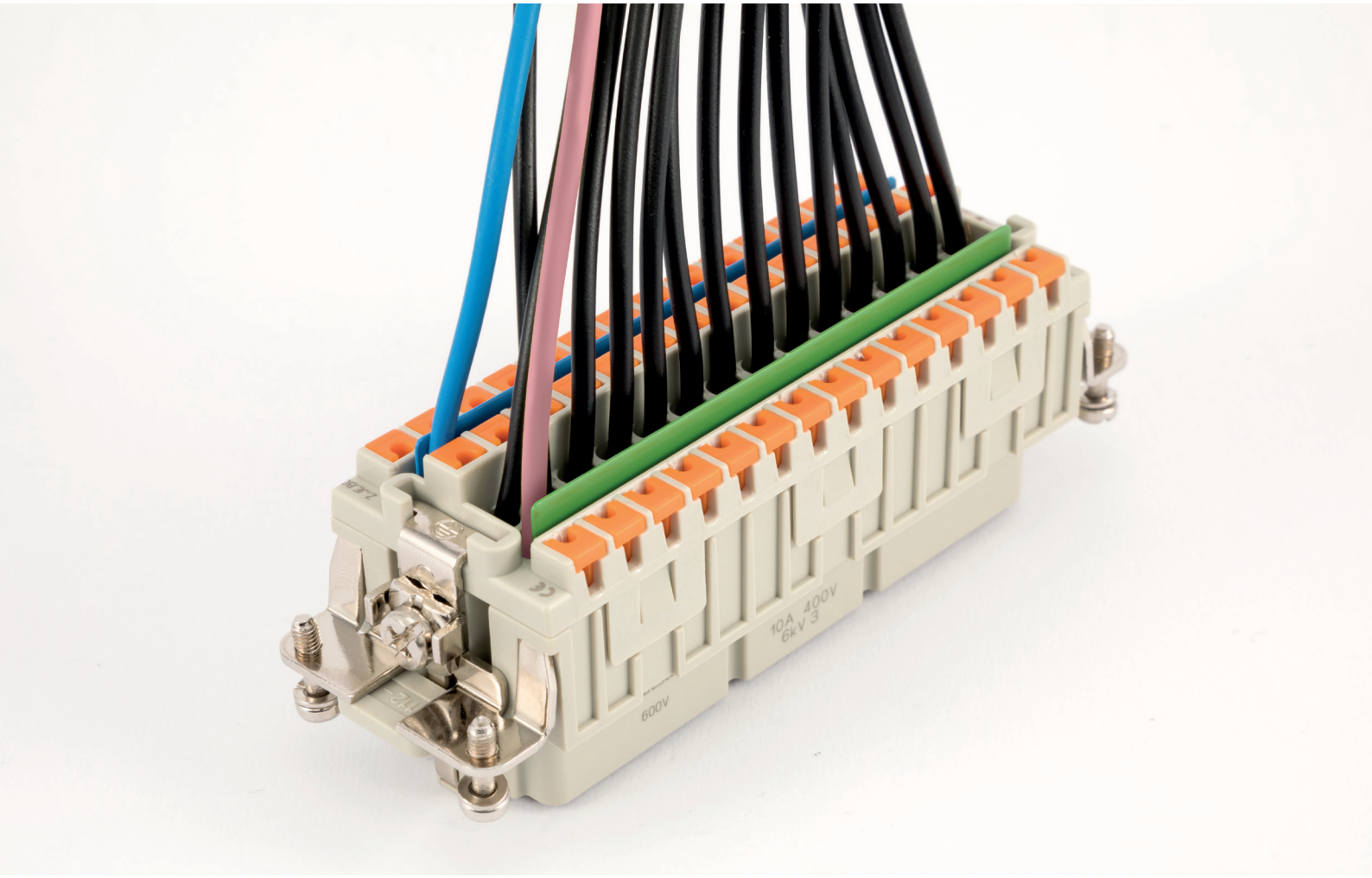


5-6-7	BRIDGE W2-U2-V2
1	L1
2	L2
3	L3
4	auxiliary circuit
8	auxiliary circuit
9	auxiliary circuit
10	auxiliary circuit
11	auxiliary circuit
12	auxiliary circuit
⏚	protective earth



CQF 12
termination side

PARALLEL BRIDGES CR BDSH
FOR CDSH-SQUICH® CONNECTOR INSERTS



Parallel bridges

for CDSH SQUICH® 3-, 6-, 9-, 14- pin

2 colours available: light blue and green

EN/IEC 61984 ratings: 10 A 50 V 0,8 kV 3

Find more information on our products at www.ilme.com

TECHNICAL FEATURES
CR BDSH

CR BDSH parallel bridges are made available in order to quickly and economically put electrically in parallel multiple circuits on the same connector.

This quick connection solution reduces the number of connections inside a control panel to feed multiple sensors/ actuators.

Suitable for series **CDSH-SQUICH®** connector inserts, that due to their **original and proprietary design** with a 3-row pattern configuration, allow to assign each "slice" of connector to an actuator/sensor that typically requires a 3-lead wiring.

Use of parallel bridges for the "common" references (e.g.: the neutral return and the +24 V feed or the common earth (ground) reference) dramatically cuts the need for individual wiring of each sensor/actuator: only one wire is needed for these common functions, all the others are shunted together by **CR BDSH** parallel bridges.

2 colours available: **light blue** and **green**.

Series **CDSH** (SQUICH® 10 A) representing the compact evolution of the SQUICH® technology comes particularly at hand for field wiring of multiple sensors. These elements require usually a 3-lead wiring and CDSH connectors are the only connectors on the market able to offer 3 SQUICH® fast wiring terminals in-line: CDSH 09 covers the wiring of 3 sensors, CDSH 18 allows 6 sensors to be wired, CDSH 27 allows 9 sensors to be wired and CDSH 42 allows up to 14 sensors to be wired.

A full wiring would require 3 wires per each sensor, but all sensors have two circuits that share the potential. If it would be possible to put in parallel on the connector such circuits, a lot of wiring time and a lot of wire could be spared.

By employing the new **CR BDSH** parallel bridges, available in 4 sizes (3-pin, 6-pin, 9-pin and 14-pin) and in two colours – **light blue** and **green**, identified in their part nos. respectively by suffix **A** (azure, i.e. light blue) or **G** (green) – it is now possible to feed just one circuit in a line of 3, 6, 9, or 14 (depending on the connector chosen) and all the other circuits i.e. sensors will be simultaneously provided with the same potential.

Usually the required potential for such sensors are a 0 V reference (earth/ground potential) and a feeding voltage e.g. 24 V. The third wire is deemed to carry the feedback signal from the field. Use of a **CDSH** connector in synergy with a couple of **CR BDSH** parallel bridges, one for the FE circuit, the other for the common return for potential (neutral) allows sparing a lot of wiring time and a large quantity of wire.

Due to the inherently low voltage of these applications (both neutral and FE are at 0 V potential) there is no need to provide such **CR BDSH** bridges with additional costly insulation: they are provided with an insulating enamel coating, which is able to provide a **10 A 50 V 0,8 kV 3 rating**.

Connector insert series CDSH (1)	Parallel bridge – **light blue** colour	Parallel bridge – **green** colour
CDSH 09, CDSH 18, CDSH 27, CDSH 42	CR BDSH3A	CR BDSH3G
	CR BDSH6A	CR BDSH6G
	CR BDSH9A	CR BDSH9G
	CR BDSH14A	CR BDSH14G

(1) Parallel bridges fit only on inserts of series CDSH of larger or equal number of "columns": 3-pin bridges fit on all inserts, 6-pin bridges fit on all but CDSH 09, 9-pin bridges fit on CDSH 27 and CDSH 42, 14-pin bridges fit only on CDSH 42.

CAUTION – **CR BDSH** parallel bridges shall be used only with unprepared conductors up to 1,5 mm² / 16 AWG. The rated current applies to the conductor used to feed the **CR BDSH** parallel bridge, it applies to the above indicated maximum wire size and is distributed to all pins in parallel in a manner inversely proportional to the impedance of the served branch circuit. When all branches are with identical impedance, the current is equally divided by the number of served branches in parallel.

EN/IEC 61984 ratings: **10 A 50 V 0,8 kV 3**

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

NOTE – These CR BDSH parallel bridges are accessories for the CDSH connector inserts only and are not electrical components able to provide a definite electrical function by themselves, for this reason even if they would have a voltage rating within the scope of the Low Voltage Directive 2014/35/EU (which they do not) they would not bear the CE marking, nor be subject to the similar EAC TR CU 004/2011 regulation. Moreover, their voltage rating is in the extra-low voltage range, i.e. inherently safe provided they are used within such ratings and out of scope of the above regulations. So, for two reasons neither the CE marking nor the EAC mark are applicable.

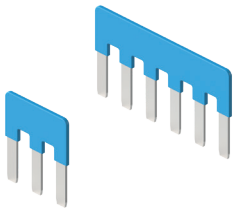
CR BDSH A parallel bridges for CDSH-SQUICH® 10 A 50 V

inserts **page:**

CDSH-SQUICH®	9 poles + ⏚	**86**
CDSH-SQUICH®	18 poles + ⏚	**87**
CDSH-SQUICH®	27 poles + ⏚	**88**
CDSH-SQUICH®	42 poles + ⏚	**89**

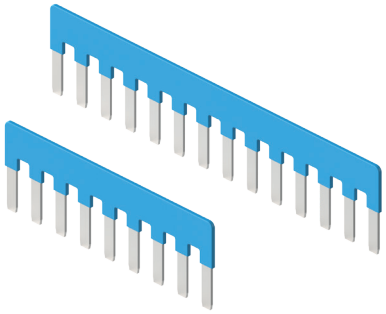
refer to CN.19 pages

parallel bridges



FROM APRIL 2020

parallel bridges



FROM APRIL 2020

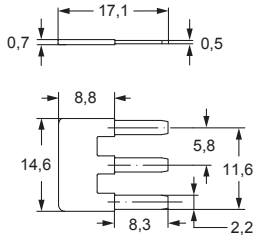
description	part No.	part No.
parallel bridge, 3-pin light blue colour	**CR BDSH3A**	
parallel bridge, 6-pin light blue colour	**CR BDSH6A**	
parallel bridge, 9-pin light blue colour		**CR BDSH9A**
parallel bridge, 14-pin light blue colour		**CR BDSH14A**

- characteristics according to EN/IEC 61984 ratings:
  10 A 50 V 0,8 kV 3
- Lower and Upper Limiting Temperatures (LLT, ULT):
  -40 °C ... +125 °C

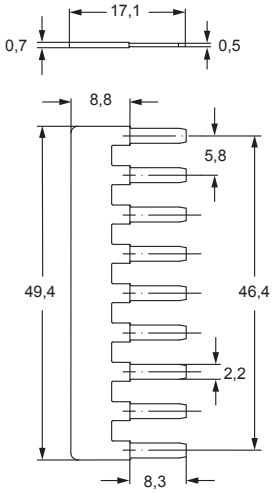
CAUTION – CR BDSH parallel bridges shall be used only with unprepared conductors up to 1,5 mm² / 16 AWG.

The rated current applies to the conductor used to feed the **CR BDSH** parallel bridge, it applies to the above indicated maximum wire size and is distributed to all pins in parallel in a manner inversely proportional to the impedance of the served branch circuit. When all branches are with identical impedance, the current is equally divided by the number of served branches in parallel.

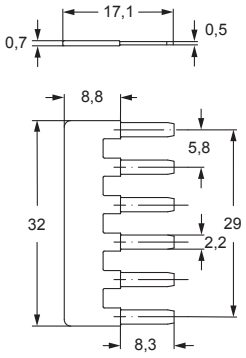
CR BDSH3A



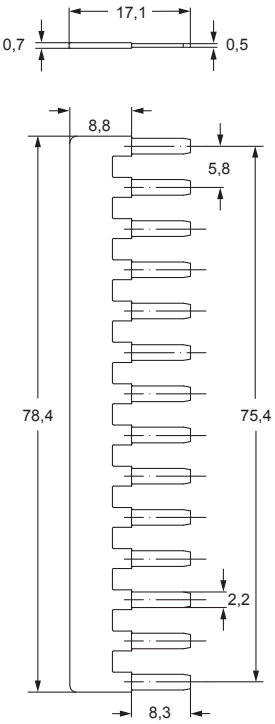
CR BDSH9A



CR BDSH6A



CR BDSH14A



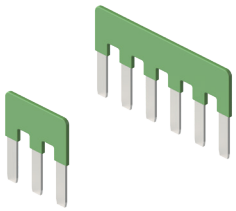
dimensions shown in mm are not binding and may be changed without notice

CR BDSH G parallel bridges for CDSH-SQUICH® 10 A 50 V

inserts		page:
CDSH-SQUICH®	9 poles + ⏚	86
CDSH-SQUICH®	18 poles + ⏚	87
CDSH-SQUICH®	27 poles + ⏚	88
CDSH-SQUICH®	42 poles + ⏚	89

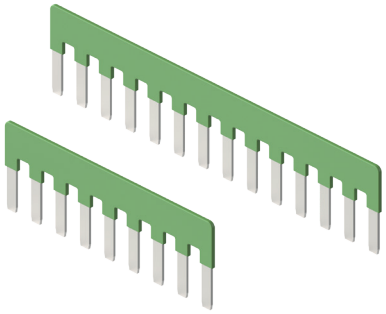
refer to CN.19 pages

parallel bridges



FROM APRIL 2020

parallel bridges



FROM APRIL 2020

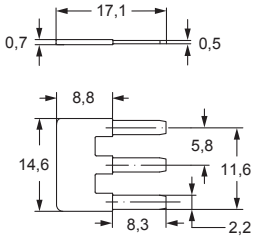
description	part No.	part No.
parallel bridge, 3-pin green colour	**CR BDSH3G**	
parallel bridge, 6-pin green colour	**CR BDSH6G**	
parallel bridge, 9-pin green colour		**CR BDSH9G**
parallel bridge, 14-pin green colour		**CR BDSH14G**

- characteristics according to EN/IEC 61984 ratings:
  10 A 50 V 0,8 kV 3
- Lower and Upper Limiting Temperatures (LLT, ULT):
  -40 °C ... +125 °C

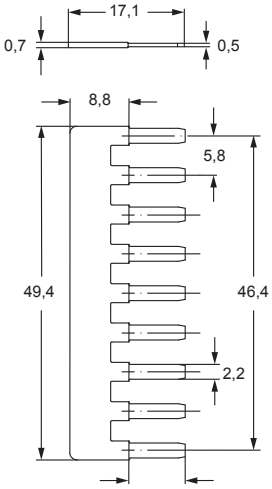
CAUTION – CR BDSH parallel bridges shall be used only with unprepared conductors up to 1,5 mm² / 16 AWG.

The rated current applies to the conductor used to feed the **CR BDSH** parallel bridge, it applies to the above indicated maximum wire size and is distributed to all pins in parallel in a manner inversely proportional to the impedance of the served branch circuit. When all branches are with identical impedance, the current is equally divided by the number of served branches in parallel.

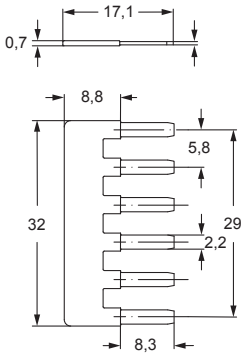
CR BDSH3G



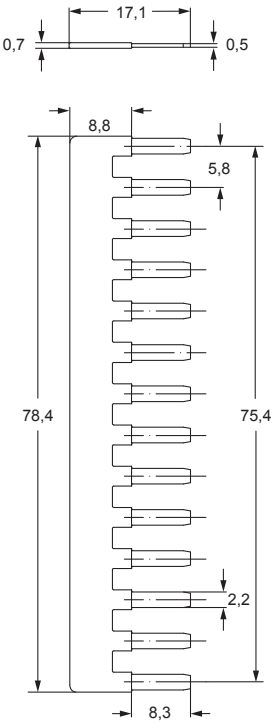
CR BDSH9G



CR BDSH6G



CR BDSH14G



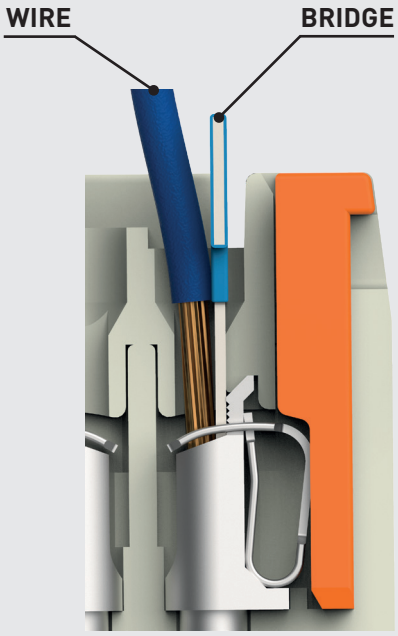
CR BDSH parallel bridges for CDSH-SQUICH® 10 A 50 V

WIRING INSTRUCTIONS

Watch our online tutorial

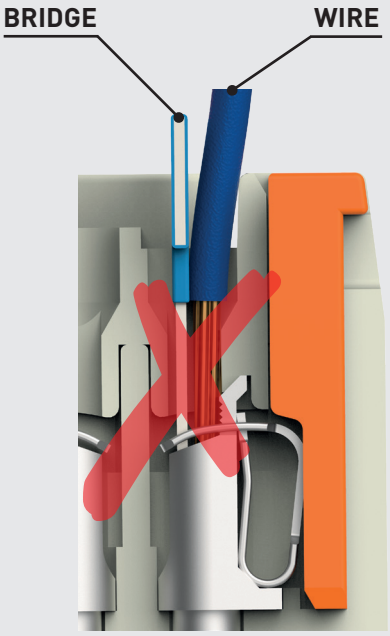
PARALLEL BRIDGES CR BDSH FOR CDSH CONNECTOR INSERTS

A



CORRECT WIRING

B



WRONG WIRING

CR BDSH PARALLEL BRIDGES FOR CDSH CONNECTOR INSERTS