

Cross currents

OCTOBER, 2012

FOR PRIVATE CIRCULATION ONLY

Wishing You A Happy Diwali And Prosperous New Year

'elmex' Spring Clamp (Screwless) Termination Technology

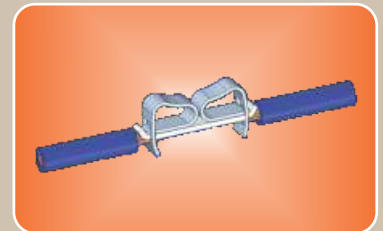
There are various methods and techniques which have been accepted by industries for termination of conductors for electrical wiring applications. These techniques have evolved in response to varying needs by different users. Termination technologies which are adopted as general wiring practices are listed below

- Screw-clamp termination
- Spring-loaded screw-clamp termination
- Screw-clamp termination for corrosive environment
- Stud & nut termination
- Spring clamp / screwless termination

elmex has range of terminal blocks providing termination solution with all the technologies mentioned above.

A terminal block typically comprises of insulation housing, current carrying part and terminal assembly. It is the terminal assembly which serves as conductor fixing device in a terminal block. A terminal assembly generally consists of two parts. In screw-clamp type terminal block, terminal assembly comprises of terminal screw and clamp within which conductor is retained by tightening the screw whereas in stud & nut type terminal blocks, conductors are first prepared using ring or fork type lugs which are then fixed in the stud and termination is secured by tightening the nut.

In spring clamp / screwless terminal block, spring clamp alone serves the purpose for terminating a conductor. Thus this type of terminal block does not require a screw or a nut for securing connection. Termination is secured with spring force action of the spring clamp.



Design and Construction of *elmex* Spring Clamp Terminal Blocks

elmex spring clamp terminal blocks are designed and constructed employing good engineering practices.

Some of the salient features of *elmex* spring clamp terminal blocks are described as under

1. Spring clamp used in *elmex* screwless terminal blocks are made using special grade Austenitic Stainless Steel material which is sourced from world renowned manufacturer. Important characteristics of this spring steel material are as under:

- ✓ It has very good spring properties.
- ✓ This material has high fatigue strength.
- ✓ Higher tensile strength.

- ✓ Further increase in strength is also obtained by a simple heat treatment process. This treatment results in a reduction of internal stress due to the mechanical deformation of material.
- ✓ Better resistance to corrosion effects.
- ✓ Higher relaxation resistance, especially at elevated temperatures.

2. Insulation housing used in these terminal blocks are made using engineering thermoplastic polyamide 6,6 (TA 6,6).

3. Current bars in these terminal blocks are made of electrolytic grade Copper and Tin plated for protection against corrosion.

4. In general, these terminal blocks are designed for mounting on standard DIN rail type TS 35 / IEC Top Hat rail TH 35. Surface mount models are also available for termination of conductor size up to 4 sq mm.

Production and Testing of Spring Clamp Terminal Blocks

elmex has well established manufacturing set up in terms of plant and machinery, as described below to produce spring clamp terminal blocks. Insulation housings are produced using closed loop, microprocessor based injection moulding machines from one of the best machine manufacturers in the world for such machines.

Spring Clamps are produced on state of the art Multi Forming Machines that produce special profile spring clamps by performing several operations, in progressive steps, on the steel strip fed in to the machine.

Copper current bars are produced on Power Presses of varying capacity depending on the operation stage.

It may be noted that Dies and Tools required for these components are designed in-house and also produced in in-house Tool Room which is equipped with latest generation CNC Wire Cut and CNC EDM's .

During manufacturing , quality of production is ensured by process control at various stages of manufacturing to ensure conformance to design and there are in process inspection checks also based on sampling plan. Our manufacturing facility is periodically audited by various product certification agencies such as UL, CSA, Demko, Semko, FIMKO and NEMKO. In addition to this our facilities are also subject to audit for quality system as per standard ISO 9001:2008 and as per ATEX standard EN 13980 (Potentially explosive atmospheres – Application of quality systems) by TUV and DNV respectively.

Special Tests For Spring Clamp Terminal Blocks

There are specific type tests for screwless terminal blocks in addition to type tests required for screw-clamp or stud and nut type terminal blocks.

Product standards such as IEC 60947-7-1, American standard UL 1059 and Canadian standard CSA 22.2 No. 158-10 call for certain tests which are specified exclusively for screwless type terminal blocks. These tests are long duration tests compared to other tests specified in the standard and evaluate terminal blocks for its rugged and reliable performance.

IEC standard specifies subjecting terminal blocks to ageing test of 192 temperature cycles; each cycle comprising conditioning of terminal blocks at 40°C (85°C for screwless earth terminal blocks) and 30°C for 10minutes each. After every 24th cycle, terminal blocks are subjected to mV drop test as per IEC standard. At the end of the test pull-out test is also conducted.

UL/CSA standards specify two tests specifically for screwless type terminal blocks. These tests are as under:

- Temperature test – This is a “30 days” test and calls for monitoring temperature rise at rated current at approximately every 24 hours.
- Heat cycling test – This is a “14 days” test. This test specifies subjecting terminal blocks to 84 ON periods of 3-1/2 hours, each followed by ½ hour OFF period. During ON period a current of 150% of rated current is passed through the terminal blocks.

elmex terminal blocks have successfully undergone the tests described above.

It may be noted that *elmex* test laboratory has been approved by UL as well as CSA under their 'Witness Test Data Programme' for carrying out all the type tests in our laboratory.

Salient Features of Spring Clamp Terminal Blocks

- These terminals offer increase in wiring efficiency and speed. In screw-clamp type terminal blocks, it is required to open up screws and tighten them up after conductor insertion. In spring clamp terminal blocks, conductor is inserted after opening the clamp with a screw driver which is to be withdrawn after inserting the conductor and the termination is secured with spring action force of spring clamp. These spring clamps are made using special grade spring steel material which is heat treated for stress relief.
- Torque application for termination is not required: Since the termination is by spring force action and without a screw or a stud and nut mechanism, there is no question of setting and applying the specified torque as is required to be done for the other types of terminal blocks.
- Ease of using unprepared conductors: These terminal blocks are so designed that they do not require conductor preparation i.e. one just needs to strip the conductor for the specified stripping length and insert it into the clamp, i.e. no need to prepare conductor with a ring or fork type lug by additional operation of crimping. Of course, these terminals can securely clamp conductors crimped with pin type lugs also. Crimping needs to be done carefully to ensure a reliable termination.
- These terminal blocks are available with multiple options for conductor entry, i.e. side entry, top entry and angular entry to choose from depending on termination requirement.
- These terminals can be interconnected by using just 2 way push in type shorting links, in required numbers. Current bars in these terminal blocks have provision to accept two shorting links which can be inserted from the top or side depending upon construction of the terminal block. Thus we can short two terminals with one shorting link, three terminals with two shorting links, and four terminals with three shorting links and so on.

elmex Range of Spring Clamp Terminal Blocks

elmex introduced basic series of feed through spring clamp terminal blocks in domestic market in the year 2006 and has since then developed range of spring clamp terminal blocks for various applications such as 'one input two output', 'test disconnect' , fuse terminal blocks and earth terminal blocks. These terminal blocks are developed catering to the requirements of Control & Instrumentation industry and major customers include industry leaders such as ABB, GE India, Rockwell Automation, L&T, Powerica and others. These terminal blocks are used in certain prestigious projects also. *elmex* spring clamp terminal blocks are used by public sector enterprises like NTPC and BHEL also for which projects are executed either directly by these organizations or by other private sector organizations.

8 LEVEL TERMINAL BLOCKS

DS8L P16



16 Spring Clamp Connections

IEC 60947-7-1 : 250V/10A/1.5 sq mm

DS8L P32



32 Spring Clamp Connections

IEC 60947-7-1 : 250V/10A/1.5 sq mm

DS8L: DIN Rail Mounted Screwless Terminal Block having 8 Levels of feed-through connections. Used for marshaling applications where number of wires are very large. The construction of the terminal reduces the space requirement considerably in the panel. Available in two versions with the same terminal pitch for 8 inputs / 8 outputs and 16 inputs / 16 outputs.

FEED THROUGH TERMINAL BLOCKS: TOP ENTRY

DST 2.5



IEC 60947-7-1 : 800 V/24 A/2.5 sq mm
 @ : 600 V/15 A/14-20 AWG

DST 4



IEC 60947-7-1 : 800 V/32 A/4 sq mm
 @ : 600 V/20 A/12-20 AWG

DST 6



IEC 60947-7-1 : 800 V/41 A/6 sq mm
 @ : 600 V/25 A/10-20 AWG

DST 10



IEC 60947-7-1 : 800 V/57 A/10 sq mm
 @ : 600 V/50 A/8-16 AWG

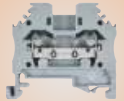
DST 16



IEC 60947-7-1 : 800 V/76 A/16 sq mm
 @ : 600 V/65 A/6-16 AWG

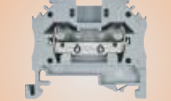
FEED THROUGH TERMINAL BLOCKS: SIDE ENTRY

SCT 2.5



IEC 60947-7-1 : 800 V/24 A/2.5 sq mm
 RU RU : 600 V/15 A/14-22 AWG

SCT 4



IEC 60947-7-1 : 800 V/32 A/4 sq mm
 @ : 600 V/20 A/12-20 AWG

DCT 2.5-1x2



IEC 60947-7-1 : 800 V/24 A/2.5 sq mm
 RU RU : 600 V/15 A/14-22 AWG

DCT 2.5-2x2



IEC 60947-7-1 : 800 V/24 A/2.5 sq mm
 RU RU : 600 V/15 A/14-22 AWG

DST 2.5-1x2



IEC 60947-7-1 : 800 V/24 A/2.5 sq mm

MULTIPLE OUTPUT TERMINAL BLOCKS

DSDD 2.5 (DOUBLE-DECK)



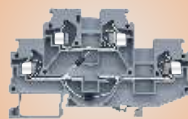
IEC 60947-7-1 : 800 V/24 A/2.5 sq mm

DSDD 2.5 CA1



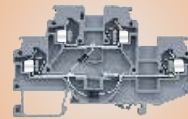
IEC 60947-7-1 : 300V/24A/2.5 sq mm
 Diode : IN 4007, 1000V/1A

DSDD 2.5 CA2



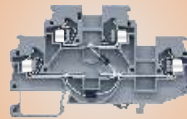
IEC 60947-7-1 : 300V/24A/2.5 sq mm
 Diode : IN 4007, 1000V/1A

DSDD 2.5 CC1



IEC 60947-7-1 : 300V/24A/2.5 sq mm
 Diode : IN 4007, 1000V/1A

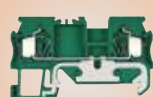
DSDD 2.5 CC2



IEC 60947-7-1 : 300V/24A/2.5 sq mm
 Diode : IN 4007, 1000V/1A

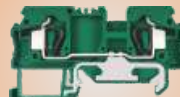
EARTH TERMINAL BLOCKS

DSET 4



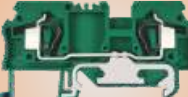
IEC 60947-7-2 : 4 sq mm
 @ : 10-20 AWG

DSET 6



IEC 60947-7-2 : 6 sq mm

DSET 10



IEC 60947-7-2 : 10 sq mm

DET 2.5-1X2



IEC 60947-7-2 : 2.5 sq mm

DET 2.5-2X2



IEC 60947-7-2 : 2.5 sq mm

FUSE TERMINAL BLOCKS

DCF 4

CE



IEC 60947-7-1 : 800 V/24 A/4 sq mm
 : 600 V/10 A/10-20 AWG

DCF 4D/A

CE



IEC 60947-7-1 : 800 V/24 A/4 sq mm
 : 600 V/10 A/10-20 AWG

DCDT 4

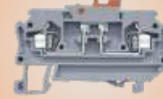
CE



IEC 60947-7-1 : 800 V/20 A/4 sq mm
 : 600 V/10 A/10-20 AWG

DSDT 2.5

CE



IEC 60947-7-1 : 1000V/17.5A/2.5 sq mm

DSDT 2.5-2X2

CE



IEC 60947-7-1 : 1000V/17.5A/2.5 sq mm

PANEL MOUNTED TERMINAL BLOCKS/MICRO TERMINAL BLOCK

MCT 1.5

CE



FRONT VIEW SIDE VIEW

IEC 60947-7-1 : 500V/17.5A/1.5 sq mm

MCT 2.5

CE RU RU Ex



FRONT VIEW SIDE VIEW

IEC 60947-7-1 : 500 V/24 A/2.5 sq mm
 : 300 V/15 A/14-22 AWG

MCT 2.5P4

CE RU RU Ex



FRONT VIEW SIDE VIEW

IEC 60947-7-1 : 500 V/24 A/2.5 sq mm
 : 300 V/15 A/14-22 AWG

MCT 4

CE RU Ex



FRONT VIEW SIDE VIEW

IEC 60947-7-1 : 500 V/32 A/4 sq mm
 : 300 V/20 A/12-20 AWG

MCT 2.5MC

CE



IEC 60947-7-1 : 500V/24A/2.5 sq mm

Participation in National and International Exhibitions

elmex participated in various national and international exhibitions held in India and abroad from May, 2012 to September, 2012. In these exhibitions many new products were displayed in addition to existing range of elmex products and the response was overwhelming.



YAUTOMATION 2012
 7-10th SEPTEMBER 2012, NSE MUMBAI

Date: 7th to 10th September, 2012.
 Stall No.:- L36
 Place: NSE Complex, Goregaon, Mumbai.

Elektro 2012, 13th June to 16th June 2012
 Moscow, Russia

ENIE-2012, 14th to 16th August, 2012
 Sau Paulo, Brazil

The 4th International Exhibition on
 Electrical Industry
 19th to 21st September 2012
 HoChiMinh City, Vietnam

For regular updates on technical advances on termination technology and activities at elmex, please follow us at



Elmex Controls Pvt. Ltd.



ElmexControls



Elmex Controls Pvt. Ltd.



Elmex Controls Pvt. Ltd.
Elmex Electric Pvt. Ltd.

12, GIDC Estate, Makarpura Road, Vadodara 390 010, India.
 Telephones: +91-265-2642021, 2642023 ♦ Facsimile: +91-265-2638646
 e-mail: marketing@elmex.net ♦ URL: www.elmex.net

