

Electrical Panel Wiring

Electrical Wiring

- Infrastructure
- Manufacturing
- Manpower

Electrical Wiring

✓ Infrastructure

- Manufacturing
- Manpower

Infrastructure

- Automated wire cutting & Stripping machine
- Automated wire crimping machine
- Hand crimp tools
- Pull tester
- Ferrule printer
- Heat shrink (Hot air gun)

Infrastructure



Automatic Wire cutting & Stripping machine

Make: Schleuniger (Switzerland)

Able to cut any length of wire

Able to cut wire diameter starting from 1 -14 sq mm

Highly accurate in cutting length (<5mm)

Able to cut shielded wire by keeping shield uncut

Minimum wastage

Infrastructure



Automatic Wire Crimping machine

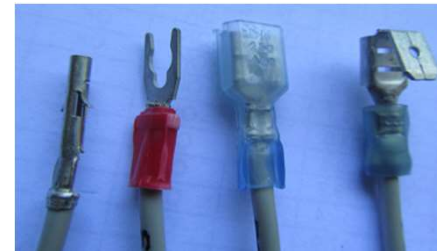
Make: GLW (Germany)

Adjustable crimp force

Hands free operation

Uniform crimping quality

Validation process in place



Infrastructure



Make: Harting / TE / Klauke

Compatible & as recommended by lug manufacturers

For manual crimping

Validation process in place

Hand Crimping Tools

Infrastructure



Crimping pull tester

Self designed

Equipped with digital force gauge

Up to 1000N force measurement

Very important for crimp quality confirmation

Infrastructure



Ferrule Printer

Make: Cannon

Able to print ferrules of type tube, labels, marking strip, heat shrink tube

Character size 1.3-6mm

Able to print ferrules with inner tube diameter of 2.5 to 6.5mm.



Infrastructure



Hot air gun

Input: 240VAC

Max output: 800 W

Max temperature – up to 400°C

Temp adjustment

Air flow adjustment

Easy to handle (hand held)

Electrical Wiring

➤ Infrastructure

✓ **Manufacturing**

➤ Manpower

Manufacturing

- Wire harness (Ready to fit in panels)
- Manual wiring
- Electrical Schematics
- SOPs
- Electrical Testing
- Operator qualification & Tool Validation for crimping processes

Manufacturing



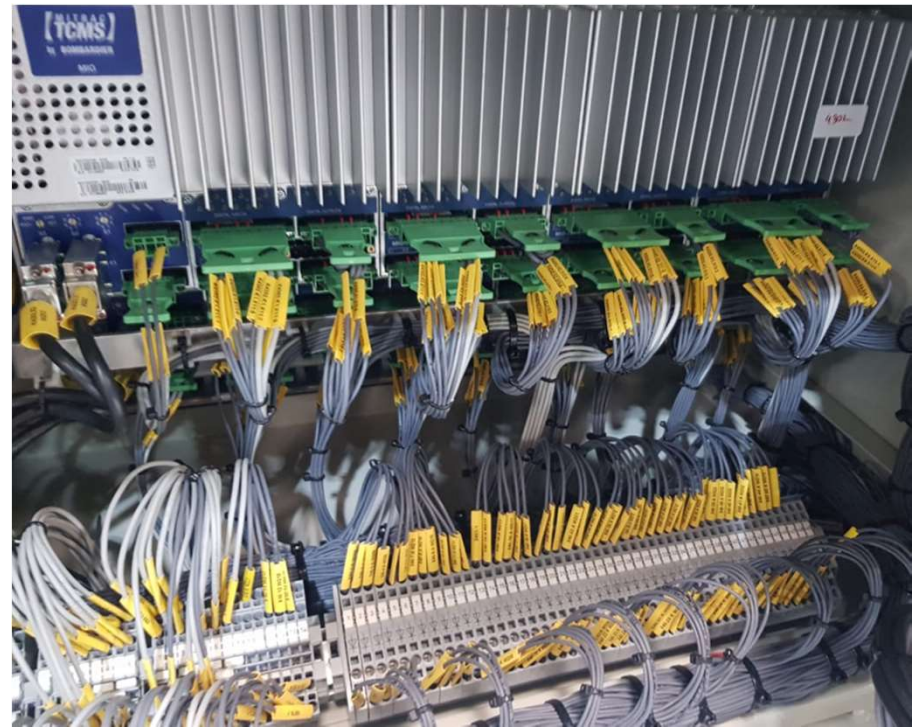
Wire harness (Ready to fit)

Manufacturing



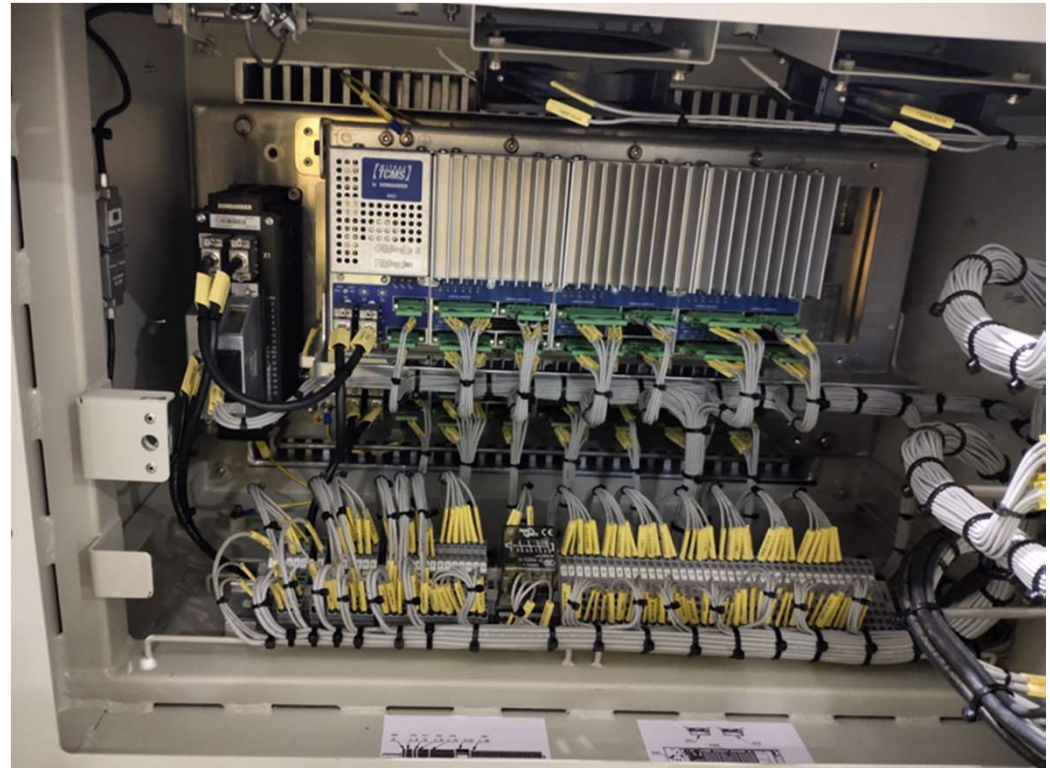
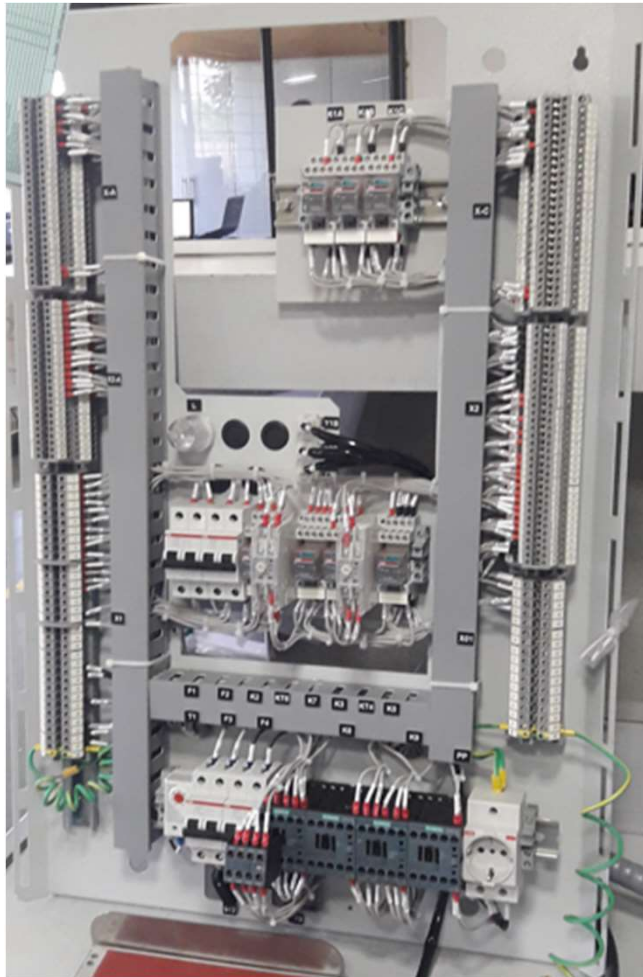
**Wire harness
(Ready to fit)**

Manufacturing



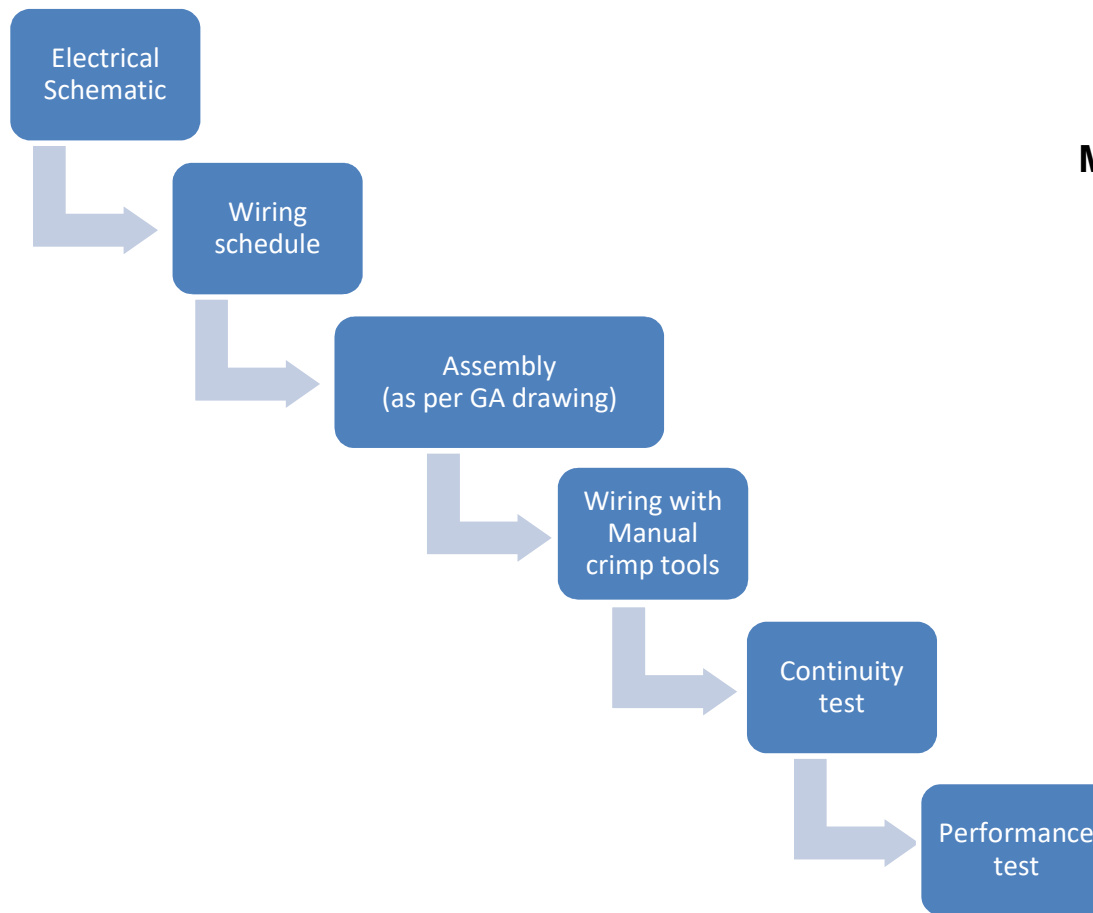
Assembly of ready to fit harness in panel

Manufacturing



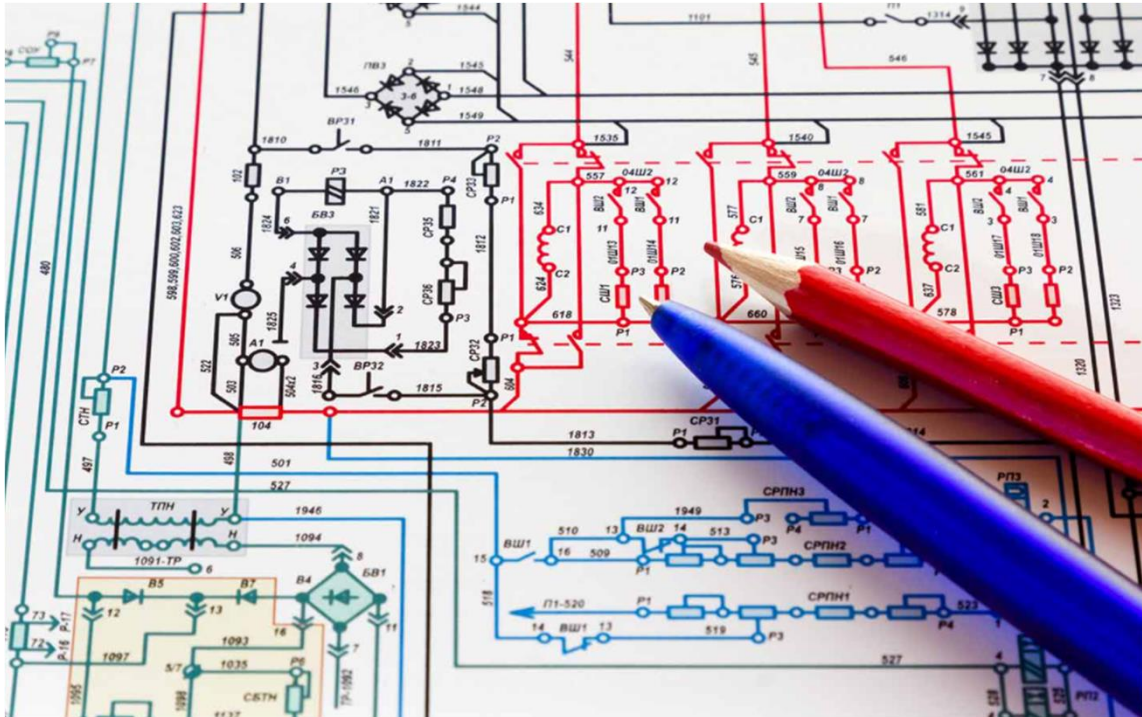
Manual wiring

Manufacturing



Manual wiring process

Manufacturing



Electrical Schematic

Engineering team & Technicians capable to understand schematic drawings

Converting schematics in to Wiring schedules for ease of manufacturing

Testing & Troubleshooting as per schematic

Manufacturing



SOPs

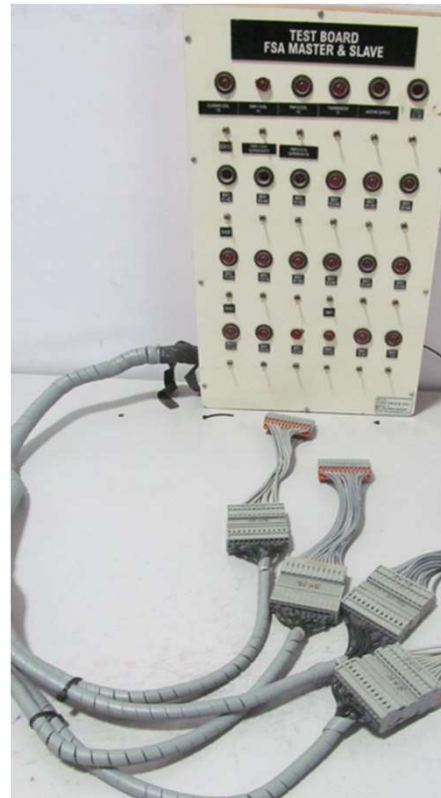
- Assembly
- Torqueing
- Crimping
- Testing
- Visual inspection

Manufacturing

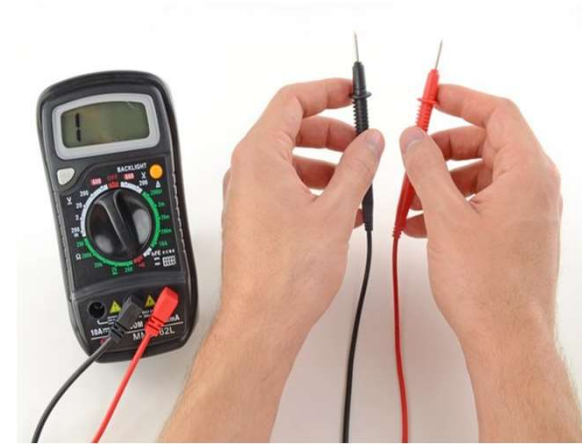
Electrical testing



Up to 2 KV for 1 min



Continuity test - Automatic with test board



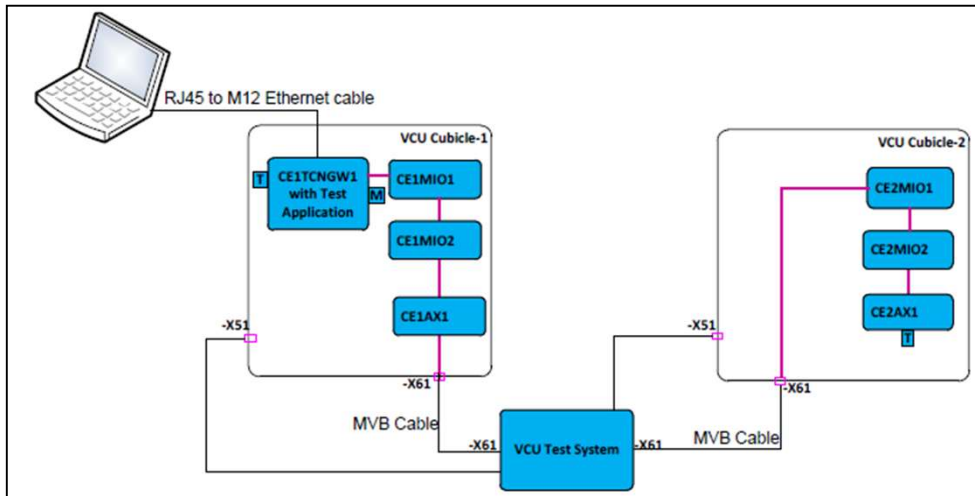
Continuity test - Manual with multimeter

Testing



Electrical testing

- Performance testing
- Automated test bench (software based)



Manufacturing

Operator qualification & Tool Validation for crimping processes

INTEGRA ENGINEERING		Operator Qualification and Tool Validation Report							
Report No					Date of Report				
Date of Validation					Name of Master used for Testing:				
Due Date of Validation					Calibration due date of Master				
Tested By					Calibration certificate No of master				
Approved By					Test Specification used				
SI No	Operators Name	Sample Discription	Wire Size (Sq mm)	Machine /Tool No	Acceptance value as per customer	Obtained Value in (N)			Remarks
						Sample 1	Sample 2	Sample 3	

- Validation of crimping tool – Every 6 months
- Operator qualification (3rd party sample testing/Training)
- Operator performance re-evaluation – after 6 months of qualification
- Special process audit – Every 6 months

Electrical Wiring

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✓ **Manpower**

Manpower

- Team of qualified engineers
- Long serviced technicians with wiring skills
- Training process in place for new technician before on job working
- Operator qualification for special processes (eg. Crimping, Soldering, Torqueing)