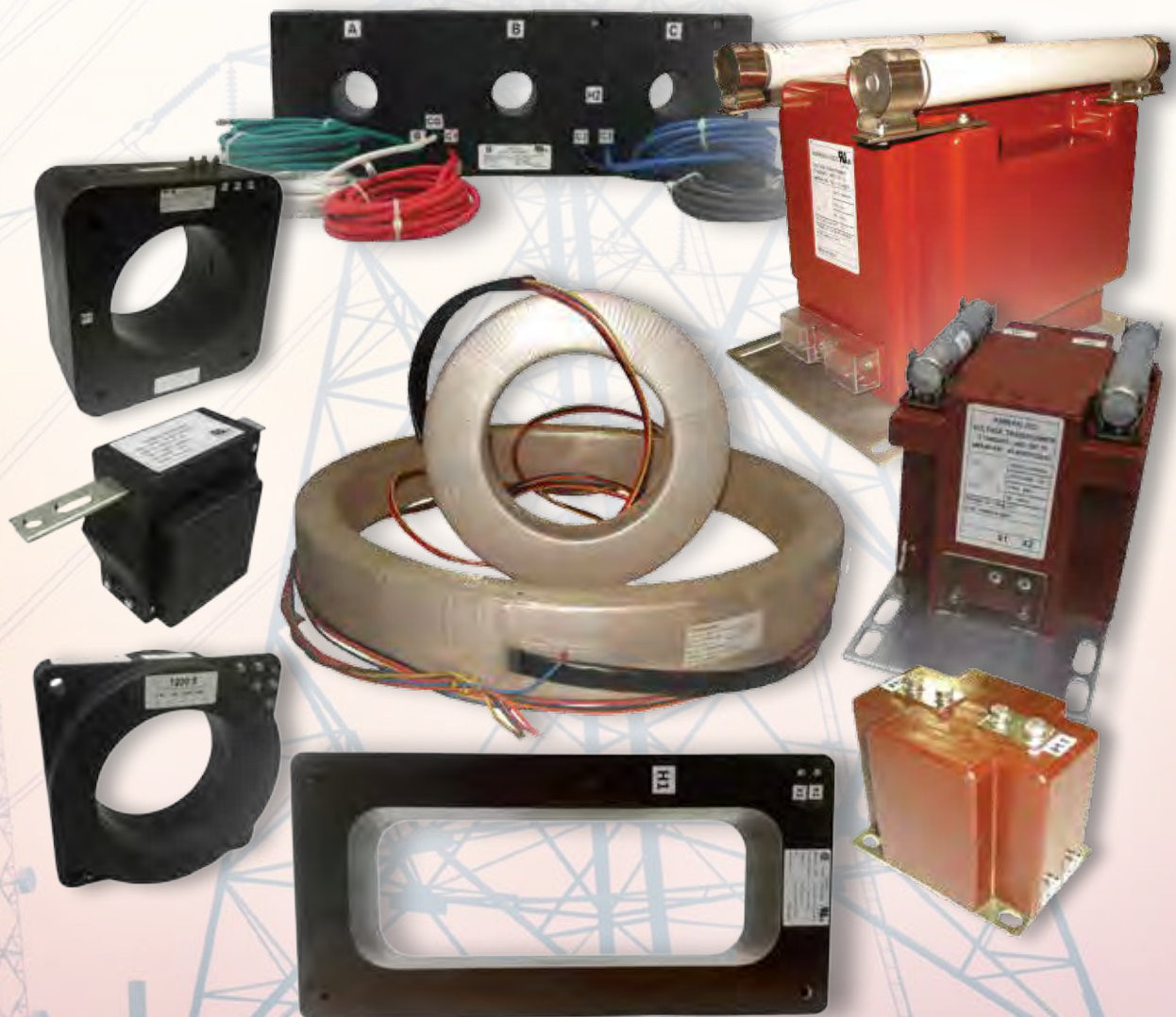


# AMRAN

INSTRUMENT TRANSFORMERS



*Engineering Excellence Through Expertise*



## VISION

Be the industry leader in instrument transformers by providing value through engineering expertise and innovation with unparalleled customer service.

***"Customers First.....no exceptions"***

## MISSION

Provide OEMs with solutions in the changing market place that creates value and partnerships with continued growth. Changes happen and we are here to provide solutions not obstructions to growth and change. Developing new products to serve our market is what we do and do well.

## GUIDING PRINCIPLES AND VALUES

Commitment to customers....Customers first, without them we do not exist and their experience is a reflection of our performance. Our golden rule is to treat our internal and external customers with respect, honesty, and integrity.

## QUALITY POLICY

AMRAN Inc. accepts responsibility for the complete satisfaction of its customers. We are committed to meeting the customer's requirements and to continually improve the effectiveness of the qualitymanagement system. Our objective is to deliver defect free products/services on time, every time.

Our Quality Motto Is

***"If It's Worth Doing, It's Worth Doing Right"***

### COMMITMENT



- Quality
- Environment
- Customer Service

### CODE OF CONDUCT & STEWARDSHIP



- Ethics/Values
- Integrity
- Positive Work Environment

For more information, visit our website at [www.amranit.com](http://www.amranit.com)

Amran Instrument Transformers is a leading manufacturer of Low Voltage and Medium Voltage Instrument Transformers (Current and Voltage Transformers) with multiple manufacturing plants in USA and India. Amran's product portfolio includes standard products as well as numerous custom products specifically designed and developed for OEM specific equipment. Amran's Instrument Transformer products have been installed in over 50 countries around the world.

### PRODUCT RANGE

- Low Voltage CTs (600V, 720V)
- Low Voltage VTs (600V, 720V)
- Medium Voltage CTs (Upto 34.5kV)
- Medium Voltage VTs (Upto 34.5KV)
- Rogowski Coils

### PRODUCT STANDARDS / SPECIFICATIONS

- IEEE/ANSI C57.13 (North America)
- Other International Standards
  - IEC (61869-1, -2, etc.)
  - Canada (CAN/CSA)
  - Australia (AS)
  - United Kingdom (BS)
- Customer Specific standard & requirement

### PRODUCT APPROVALS / CERTIFICATIONS

- UL 
- cUL
- CSA 
- CE 
- Industry Canada (IC Approval)
- ROHs
- REACH

### CERTIFICATIONS and PROCESSES

- Minority Business Enterprise (MBE)
- ISO 9001 (Quality)
- ISO 14001 (Environment)
- OHSAS 18001 (Health & Safety)
- PPAP, FMEA, Control Plans, Flow-Chart, etc.

- Most up-to-date versions of the individual product datasheets are available on Amran's website [www.amranit.com/datasheets](http://www.amranit.com/datasheets)
- Most up-to-date version of Amran's OEM Reference Guide is available on our website [www.amranit.com/catalogs](http://www.amranit.com/catalogs)

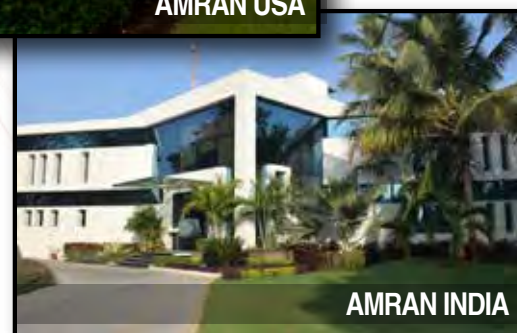


## Amran Instrument Transformers

- Multiple manufacturing locations in USA and India
- 600+ employees with strong management and engineering teams
- Design and Engineering expertise to allow custom development of products with the smallest and least expensive solutions
- Standard product range for OEM applications
- Strong teams in engineering, R&D, design and custom product development
- Minority Business Enterprise (MBE)
- ISO 9001, ISO 14001, OHSAS 18001



AMRAN USA

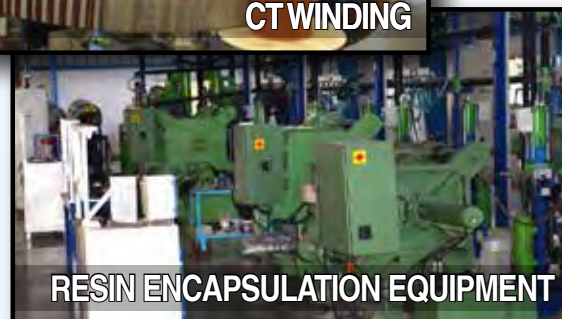


AMRAN INDIA

## LV and MV Instrument Transformer Manufacturing



CT WINDING



RESIN ENCAPSULATION EQUIPMENT

- Multiple manufacturing plants to mitigate risk and to support customers in over 50 countries around the world
- Over 85,000 sq. ft. of manufacturing space for LV and MV Instrument Transformers (Current and Voltage Transformers)
- Vertically Integrated Manufacturing-State of the art equipment for core manufacturing, CT and PT windings and encapsulation processes
  - Fully automated resin molding equipment and APG machines for epoxy/polyurethane encapsulation process for MV products



USA PRODUCTION

## Core Manufacturing

- In-house Core manufacturing facilities – multiple locations
- Electrical Steel coil slitting capabilities
- State of the art, high-speed, programmable core winding machines
- Automated annealing furnaces with controllers to monitor temperature and time cycles



CORE MANUFACTURING



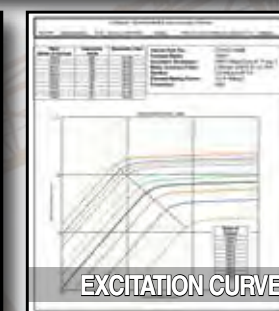
CORE MANUFACTURING



ACCURACY TESTER



BIL TEST LAB



EXCITATION CURVE

## Testing

- In-house type testing and routine testing capabilities
- Full capabilities to conduct all the routine testing per ANSI/IEEE, IEC and various other standards
- 100% final testing on each product
- 100 % Traceability of the test records with serial # on the product label
- Website interface for test record availability
- In-house labs for BIL, Partial Discharge test

## Quality

- Commitment to Quality through ISO 9001 certified facilities
- Well defined Quality Management System
- **Six sigma** approach and tools at various stages of design, production and testing for continual improvements
  - DMAIC
  - FMEA
  - PPAP
  - Control Plans
  - Flow Charts
  - Statistical analysis
  - Poka-yoke



## Warehouse and Inventory Management Services



AMRAN WAREHOUSE

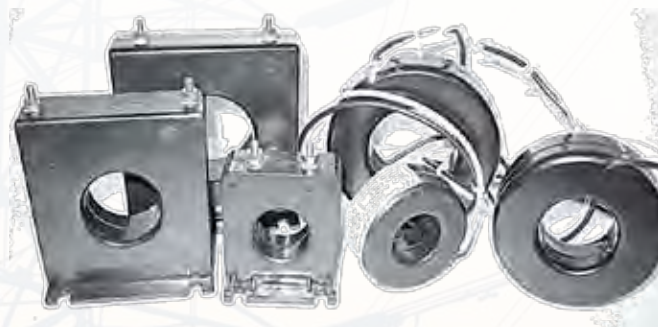
- Large warehousing available for stocking support out of Texas location
- Lead time reduction through inventory management system
- Repackaging, returnable packaging options available



### Low Voltage Switchgear and General Purpose CTs

**Applications:** Low voltage switchgear, Panel boards, Control panels, Motor control centers, Engine generators, Transfer switches, UPS etc.

- IEEE/ANSI or IEC accuracy classes available
- Low cost models are available for high volume usage
- Wide range of Ratios – 50:5 to 5000:5 (1 Amp or different Secondaries possible)
- Single or Multi Ratio options are available
- CTs can be supplied with or without secondary resistor
- Wide range of round, rectangle or composite windows available
- Available in many different sizes, with or without mounting feet.
- Various construction options are available based on application - Plastic case, Resin cast, tape insulated or resin dipped.
- Various secondary options - Terminals, pins, leads with or without connectors
- Standard product range and custom solutions
- Secondary can be leads, terminals or pins



### IEEE/ANSI CLASS CTs

**Applications:** Metering and Relaying/Protection equipments, Switchgear, MCCs, Switchboards, Metering and control Panels.

- Designed to meet the requirement of ANSI IEEE C57.13 or IEC 61869-1 or relevant standards.
- Single ratio or multi ratio models are available
- Various secondary options – Terminals, Lead wires with or without connectors
- Wide range of Ratios: 50:5 to 6000:5.
- Various sizes, shapes and window options are available
- Various outer encapsulation options are available. Plastic Cased, Resin Encapsulated, Tape Insulated etc.
- Standard product range and custom solutions



### Three Phase CTs

**Applications:** 3 phase metering, motor overload protection, MCCs, Switchgears etc.

- These CTs are used to save space inside the cabinet
- Many different sizes and shapes available
- Various Round and Rectangle window options are available
- Wide range of ratios available (50:5 to 4000:5)
- Plastic Cased or Resin Molded
- Various secondary options are available - Terminals or lead wires
- Standard product range and custom solutions



### Rectangle CTs

**Applications:** Metering and Relaying Equipment, Ground fault sensing, Switchgears, Power Distribution Modules etc.

- These CTs are used to save space inside the cabinet
- Extensive range available with many different sizes and ratios
- For use with primary bus bar or cables
- Wide range of ratios available 50:5 to 5000:5
- 1 Amp or lower secondary current levels are available
- Various secondary options are available – leads, terminals etc.
- Custom mounting options are available
- Standard product range and custom solutions



### Generator Style CTs (High Current Applications)

**Applications:** For mounting and stacking over the bushings/bus duct of large generators, metering or relaying applications

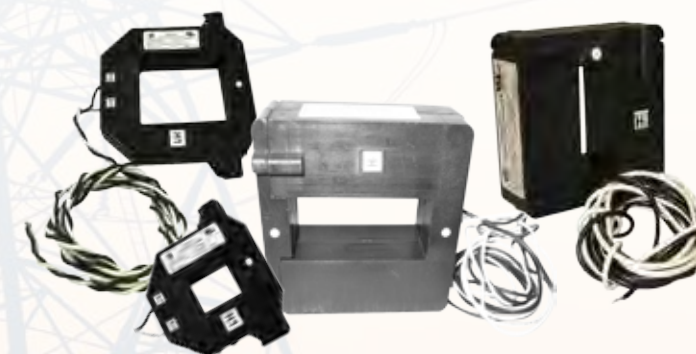
- Designed specifically for high current application inside large generators, bus ducts
- Specific mounting to fit around large primary cables, round or rectangle bus bars
- Current rating of 5000 to 30000 Amps.
- Tape Insulated or Resin Cast construction depending on application/use
- Specific mounting is provided - Special mounting boards, mounting bracket options are available
- Various secondary options – leads, terminals, terminal boxes etc.
- Shielded winding design available
- Standard product range and custom solutions



### Split Core CTs

**Applications:** Metering applications, Energy management applications, Sub-metering etc.

- Easy installation on long primary conductors
- Small to Large sizes with different windows
- Many different ratios 50:5 Amp to 5000:5 Amp
- Voltage Output possible with built in resistor
- Various construction options are available – tape insulated, plastic cased.
- Standard product range and custom solutions



### Ground Fault CTs

**Applications:** To detect ground fault currents in switchgears, metering/control panels, and other applications.

- Large Window sizes up-to 30 x 12 inches are available
- Rectangle and Round window options are available
- Various Ratios starting from 50:5A and up
- Special ratios and physical sizes built to customer specifications
- Different encapsulation options – plastic cased, resin encapsulated, tape insulated
- Different mounting options are available
- Standard product range and custom solutions
- Most commonly used models are CT428, CT355, CTQ2340



### Medium Voltage Switchgear CTs

**Applications:** Designed specifically to mount in medium voltage switchgears (Usually 5, 15, 27 and 38kV Switchgears)

- CTs are normally mounted over primary bushings in MV Switchgears
- Integrated corner mounting holes for easy installation
- Single and Multi ratio options are available.
- As per IEEE/ANSI C57.13 or IEC 61819-1 accuracy classes for metering and/or relaying
- Wide range of windows and sizes
- Wide range of ratios from 50:5 to 6000:5.
- 1 Amp secondary available
- Supplied with leads or terminals.
- Custom secondary termination possible
- Standard product range and custom solutions





### Low Voltage (600V) Potential Transformers

**Applications:** Voltage measurement in AC Power systems, metering and control panels, LV switchgears.

- Wide range of Ratios with secondary voltages 100/110/120V (Different Secondary voltage possible)
- Single Phase or three phase designs are available
- Plastic Cased and Resin Cast Molded construction
- Line to line or Line to ground designs
- 50 Hz designs are available
- Available in many different sizes, with or without mounting bracket.
- Single and multi secondary options are available
- Designed to meet IEEE ANSI or IEC standards
- Standard product range and custom solutions



### Miniature CTs

**Applications:** Current measurement, power and energy monitoring devices, energy meters, relays, etc.

- Low cost CTs for instrumentation and current measurement purpose.
- Highly accurate and linear CTs using special Nickel-Iron (Ni-Fe) and Nano-crystalline core constructions.
- CTs can be supplied with or without secondary resistor
- Wide range of Constructions options are available – Plastic cased, Resin Casted, Resin dipped, Tape Insulated etc.
- Available in many different sizes with various secondary options –leads, PCB mountable pins, terminals, with or without connectors & housings.
- Standard product range and custom solutions



### Auxiliary/Summation CTs

**Applications:** For the use in the secondary of main current Transformers

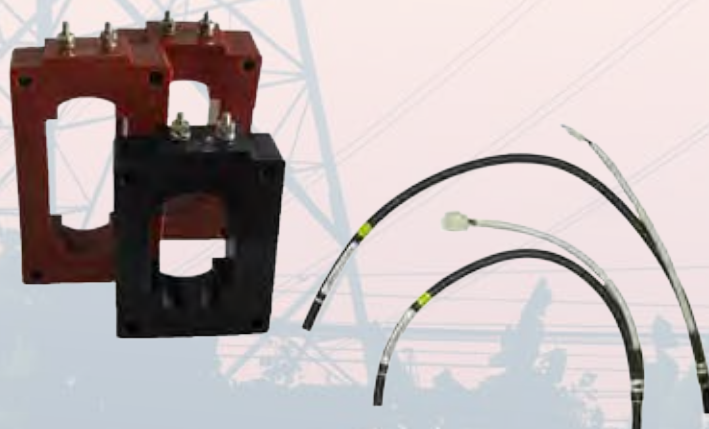
- Wound primary upto 50 Amp
- Various accuracy classes for metering or relaying
- Summation CTs can have many different secondaries
- Various sizes and ratios available.
- Standard product range and custom solutions



### Rogowski Coils & Sensors

**Applications:** Circuit breakers, welding equipment, instrumentation, measurement and protection devices, Switchgears, Control panels etc.

- Wide current range is available
- Various outer encapsulation options are available – taped, plastic cased, encapsulated etc.
- Excellent linearity without saturation within small to high current range
- Very high bandwidth to measure switching transient
- High short circuit current withstanding capacity
- Light weight and easy installation
- Rogowski sensor and magnetic core sensor combination unit option is available



### Medium Voltage, Single Phase Voltage Transformers

**Applications:** Metering panels, Relay/Control panels, Generators, Switchgears, Circuit breakers, Motor Starters etc.

SINGLE PHASE - (SINGLE BUSHING OR TWO BUSHING DESIGNS)

- Up to 34.5kV Class, 170kV BIL
- IEEE / ANSI or IEC class VTs are available
- Wide range of Ratios with various secondary voltages 100/110/120V (Different Secondary voltage possible)
- APG method for resin encapsulated construction (polyurethane/epoxy cast)
- VTs can be supplied with or without fuses and related hardware (fuse clips)
- Available in many different sizes, with or without mounting bracket.
- Easy installation with various mounting options
- Type test data available for BIL, Partial Discharge etc.
- Multiple secondary options are available in a single PT
- Standard product range and custom solutions



### Medium Voltage, Three Phase Voltage Transformers

**Applications:** Metering panels, Relay/Control panels, Generators, Switchgears, Circuit breakers, Motor Starters etc.

THREE PHASE (WYE-WYE CONSTRUCTION)

- Unique 3 phase designs are available where space is a constraint.
- Up to 15.5 kV Class, 110KV BIL
- IEEE / ANSI or IEC class VTs are available
- Wide range of Ratios with various secondary voltages 100/110/120V (Different Secondary voltage possible)
- APG method for resin encapsulated construction (polyurethane/epoxy cast)
- VTs can be supplied with or without fuses and related hardware (fuse clips)
- Available in many different sizes, with or without mounting bracket.
- Easy installation with various mounting options
- Type test data available for BIL, Partial Discharge etc.
- Standard product range and custom solutions



### Medium Voltage CTs (Window Type / Bar Type / Wound Primary Type)

**Applications:** Metering panels, Relay/Control panels, Generators, Switchgears, Circuit breakers, Motor Starters, Power systems etc.

- Current transformers with various primary options
  - Window Type (various size and shape of windows)
  - Bar Type (various size and shape of bars)
  - Wound Primary Type (Terminals to attach customer bar or cable)
- Wide range of Ratios – 50:5 to 25000:5 (1 Amp Secondary possible)
- Up to 34.5 kV Class, 170kV BIL
- APG method for resin encapsulated construction (polyurethane/epoxy cast)
- Various ratio options, mounting options, and single and multi-ratio options are available.
- IEEE / ANSI or IEC class CTs are available
- Type test data available for BIL, Short time thermal current, Partial discharge etc.
- Multi-ratio options are available
- Standard product range and custom solutions







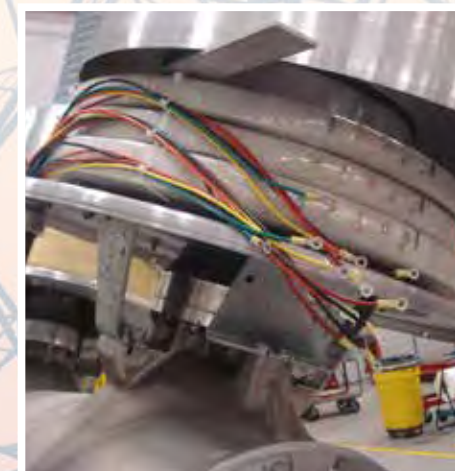
#### Bushing CTs

**Applications:** Medium and High voltage circuit breakers, Large Power Transformers

- For Gas insulated or Oil-immersed Applications
- Various construction options available – Tape insulated CTs with polyester film / Cotton tape / fiber glass tape etc.
- Wide range of ratios - single or Multi Ratios available
- Various secondary options – leads, terminals etc.
- High accuracies possible for metering application using nanocrystalline cores
- Single core or multi core designs possible
- Collapsible, returnable plastic container shipping options are available
- Custom solutions to suite end application



## BUSHING CURRENT TRANSFORMERS







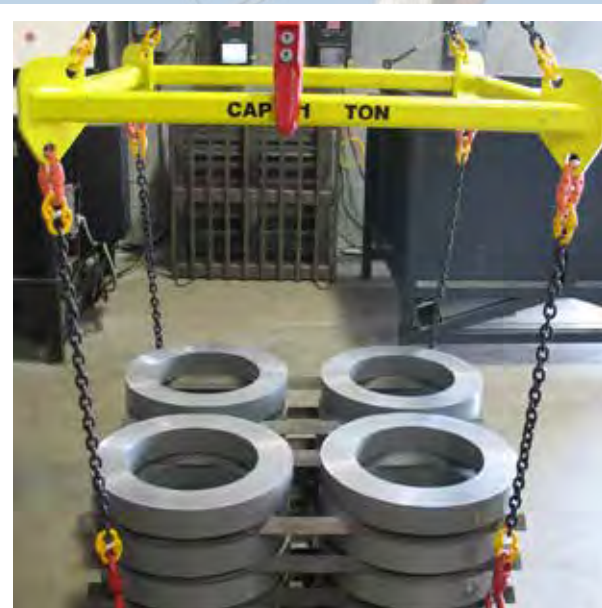
## Amran Bushing Current Transformer

Amran specializes in manufacturing broad range of Bushing Current Transformers for medium to high voltage circuit breakers, large power generators and power transformers applications. Amran Bushing Current Transformers are produced with the highest quality standards and they are designed in-house to meet exact customer specifications & requirements.

Amran core manufacturing facilities and equipment are designed to be flexible to incorporate rapid changes in core sizes and shapes.

### Electrical Steel/Core Manufacturing/Annealing

- Finest quality of cold rolled grain oriented electrical steel material is used to build cores for the Bushing CTs.
- Cores are manufactured and wound on high speed, programmable core winding machines.
- Core dimensions and weight are checked to ensure that the tight tolerances are met.
- State of the art annealing process is used to remove stresses from the electrical steel.
- Cores are annealed in a highly controlled environment where temperature and time cycles are monitored and recorded digitally using various controllers.
- High quality grain oriented steel and flaw-less core manufacturing and annealing processes help Amran meet stringent accuracy standards with minimum excitation losses.



### Core Insulation

- Cores are insulated with electrical grade press-pan and/or polyester film to ensure that the winding is separated from the core.
- Epoxy varnish is applied on the core to prevent moisture ingress.

### Secondary Winding

- Production facility includes various toroidal winding machines, fully programmable to achieve maximum winding efficiencies for various turn configurations.
- Magnet wire is fully distributed around the insulated core for all multi ratio units to ensure lowest possible leakage on each tap.



Call Amran to discuss your custom requirements!







### Terminal / Lead wire installation

- Winding wire is terminated with either leads or terminals depending on customer specifications.
- Various types and sizes of lead wires are crimped and soldered with the winding wire to ensure solid connections.
- Lead wires are color coded and marked for easier connections as per customer requirements.

**Amran also offers terminal type connections. The terminals are attached with the magnetic wires using hydraulic crimping machines.**



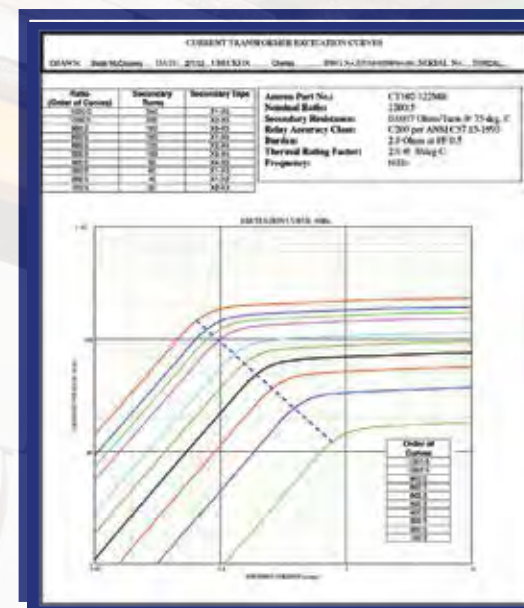
### Outer Insulation

- Secondary winding is insulated with non-porous polyester film or cotton tape depending on end application and use of the current transformers.
- Amran also offers insulation options of electrical grades of press-pan material on the exterior winding of the CTs to ensure that the outer insulation withstands the most demanding and harsh field conditions.



### Testing and Packaging

- All Bushing Current Transformer are tested as per IEEE/ANSI C57.13 or relevant test standards.
- Accuracy, Polarity, Double Induced, Di-electric, Turns-ratio, and excitation tests are standard for every current transformer.
- Each Bushing CT has a unique serial number which allows Amran to trace back the test records of the CTs.
- Test Certificates are provided with the Current Transformer shipments.
- Test data is available on-line to customers for easy access
- Amran uses collapsible, returnable packaging for Bushing Current transformers to reduce packaging costs and ensure maximum protection during transportation.
- Other packaging options are available upon request.



### The Advantages of Working with Amran

- BCTs are designed and engineered to meet customer specifications.
- Fast turn-around time for custom quotations. Low manufacturing lead time.
- Flexible production set up to manufacture various size and shape of Cores and Bushing Current Transformers.
- Various construction options are available to meet the customers need.
- USA and Over-seas manufacturing capabilities to provide maximum benefits on price and lead time. (Stocking options available).
- Cost saving opportunities presented through design/engineering and low over-head manufacturing operations.





# AMRAN

INSTRUMENT TRANSFORMERS

## SWITCHGEAR STYLE CURRENT TRANSFORMERS





### Amran Switchgear Style Current Transformer

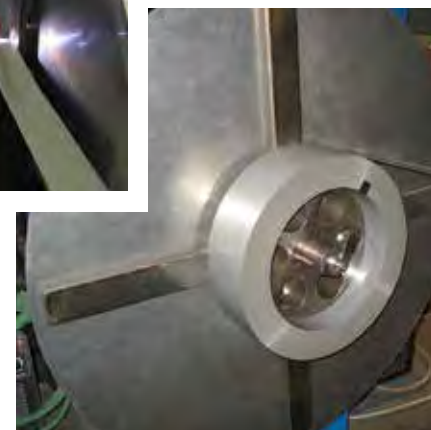
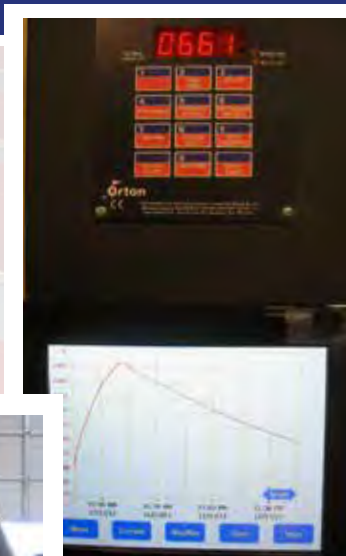


Amran specializes in manufacturing a broad range of Current Transformers specifically for Low and Medium Voltage Switchgear. Single and Multi Ratio CTs are specifically designed to mount inside switchgear panels through the corner mounting holes. Switchgear style CTs are produced with the highest quality standards and they are designed in-house to meet exact customer specifications and requirements.

Amran core manufacturing facilities and equipment are designed to be flexible to incorporate rapid changes in core sizes and shapes.

#### Product Features

- UL Recognized
- cUL Recognized
- IEC 61869-1, IEC 61869-2, IEC 60044
- CE Marking
- CSA Certified
- IEEE ANSI C57.13 standard



### Electrical Steel/Core Manufacturing/Annealing

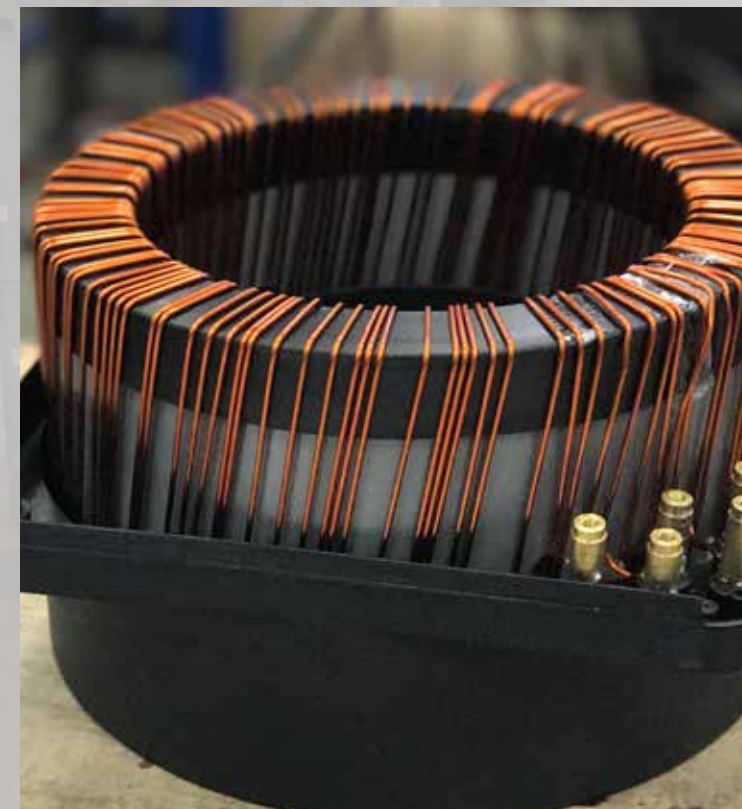
- The finest quality of grain oriented electrical steel material is used to build cores for the switchgear style CTs.
- Cores are manufactured and wound on high speed, programmable core winding machines.
- Core dimensions and weight are checked to ensure that the tight tolerances are met.
- State of the art annealing process is used to remove stresses from the electrical steel.
- Cores are annealed in a highly controlled environment where temperature and time cycles are monitored and recorded digitally using various controllers.
- High quality grain oriented steel and flawless core manufacturing and annealing process help Amran meet stringent accuracy standards with minimim excitation losses.

### Core Insulation & Secondary Winding

- Cores are insulated with specially designed core caps to fit various sizes and shapes of the cores.
- For the most demanding relaying applications, cores are insulated with mylar or equivalent tape to ensure smaller builds and larger area.
- The winding on the CT is fully distributed around the insulated core to ensure lowest possible leakage on each tap.
- Production facility includes various toroidal winding machines, fully programmable to achieve maximum winding efficiencies for various turn configurations.



Call Amran to discuss your custom requirements!



### Terminal Soldering & Case Assembly

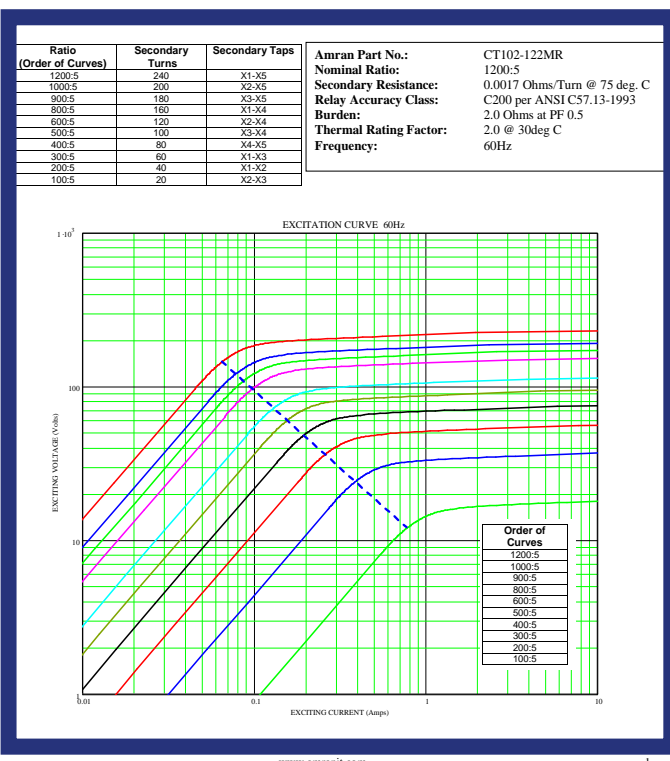
- The magnet wire of the coil is soldered to the brass terminals specifically designed to prevent rotation during installation.
- Coil and Terminal assembly is carefully secured inside the plastic housing to prevent movement.
- Amran ensures superior terminal connection and coil fitment into the plastic housing to ensure long term use in most stringent field conditions.





### Testing

- Each Current Transformer is tested for all the routine test parameters as per IEEE/ANSI C57.13 or relevant test standards.
- Accuracy, Polarity, Di-electric and Turns-ratio tests are standard for every current transformer.
- Excitation curves are published for each design having a relay rating. Amran ensures optimal performance of the CTs by monitoring and testing for compliance to the excitation curves
- Each CT has a unique serial number which traces back to the factory test report. Test reports are available upon request.



Amran offers switchgear style CTs for ANSI and IEC markets. 50 Hz Current Transformers are designed to meet IEC standards.



### The Advantages of Working with Amran

- Switchgear style CTs are specifically designed to fit most common Low and Medium Voltage Switchgears and Breaker panels used in today's market place.
- Standard product range and Custom design options are available
- Highly technical engineering team is fully capable of custom designing CTs to improve performance and/or reduce spacings in Switchgear and Panels. For example – narrow design of CTs, Rectangle CT, etc.
- USA and Over-seas manufacturing capabilities to have maximum benefits on price and lead time. Stocking options available
- Manufacturing facilities are ISO 9001, ISO 14001 and OHSAS 18001 certified.
- Fast turn-around time due to stocking options and domestic manufacturing.
- Cost saving opportunities presented through design/engineering and low over-head manufacturing operations.





**AMRAN**  
INSTRUMENT TRANSFORMERS

■ Manufacturing Plants  
■ Customer Base





## SOUTH AMERICA

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**Chile**

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