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Glossary

GE Structured Services, LP

DC Motors Nomenclatures

Explanation

Main Coils	*Provide Field Strength Or Flux Strength.*
• Series	*All coils in series with the armature circuit. High torque, always use load (HI AMP – LO TURNS)*
• Shunt	*Voltage for the field is in parallel to the armature, or separately excited. (LO AMP – HI TURNS)*
• Compound/Stab Shunt	*Combination of the above two. This gives increased the with torque load.*
Armature Coils	*Coils Sold in Sets of Coils Only.*
• Lap Wound or Wave Wound	*Describes the pattern.*
Bearings	*These include Sleeve, Ball, and Roller*
Current Collection Parts	*These include Brushes, Brushholders, Clocksprings, Constant Pressure, Brushholder Studs, Yokes, and Standoff Insulators.*
Add–On Kits or Parts	*These include Blower Kits, Filters, Tachometer Kits (AC, DC, Pulse) Overspeed Devices, Trec Coils for main and commutating coils, and Insulation Kits.*

MAKE SURE THAT YOU ARE BOTH SPEAKING OF THE SAME END

Commutator end–also called:
- Opposite Drive End
- Brush End
- Front End
- Yoke End
- Opposite Pinion End
- Connection End
- Front End

Drive end–also called:
- Opposite Comm End
- Sheave End
- Pulley End
- Opposite Connection End
- Shaft End
- Pinion End
- Fan End
- Belt End
- Gear End

Main Coils–also described in many ways:
- Shunt
- Stab–Shunt Series
- Compound
- Exciting Coils

Commutating Coils –also called:
- Innerpoles
- Interpoles
- Comm Coils
- Comm Poles

Yokes–also called:
- Rockers
- Rocker Rings
- Brushrings

Bearing Brackets–also called:
- Endbells
- Endshields
- Bearing Supports
- End Bracket

Bearing Caps can be retainers. These are different than cartridges.
Covers come in various types – Solid, Louver, Splashproof, Waterproof

Glossary

DC Motors Nomenclatures

Domestic Terminology

As in almost every field of activity, a vocabulary of terms is developed. New words and abbreviations are coined as well as new definitions of existing words. For example, a “strike” has a different meaning to a bowler than to a labor mediator.

In working with dc machinery, it then becomes helpful to form an understanding of the vocabulary of terms commonly used, thus avoiding misunderstandings as to the meaning assigned to particular words. Listed below are some of the more commonly used abbreviations and definitions which you are likely to encounter in discussions of machinery.

Abbreviations Commonly Used

A. F. F. L.	Amperes in field at full load
A. F. N. L.	Amperes in field at no load
A. F. A.	Auxiliary field amperes
AMB.	Ambient
AUX.	Auxiliary
B. D.	Brush Drop
BKR.	Breaker
C. E. M. F.	Counter Electro–motive Force
C. F. S. A.	Commutating field shunted amperes
CKT.	Circuit
COMM.	Commutating or Commutation
COMP.	Compensating
COND.	Conductor
CONN.	Connection
CONT.	Control
CUM.	Cumulative
DIFF.	Differential
D. L.	Drawing List
ECF	Direct Current Exciter with commutating winding
ECR	Direct Current Exciter with rolled frame and compensating poles
EF	Direct Current Exciter with laminated pole construction
E. N.	Electrical Neutral or Engineering notice
E. P.	End play
EXC.	Exciter
F. L.	Full Load
FLD.	Field
F. W.	Friction and windage
GEN.	Generator
GND. DET.	Ground detector
L. E. S.	Leading edge sparking
L.S.	Loss supply
MCF	Direct current motors and generators with pole face windings and commutating poles
MOT.	Motor
MP	Multipole direct current motors and generators
MPC	Direct current motors and generators with commutating poles
MPF	Direct current motors and generators smith pole face windings
NO.	Number
N. L.	No load
O. C. C. L.	Open circuit core loss
O. C. R.	Overcurrent relay
O. L.	Overload
O. S. S.	Overspeed switch
REQ.	Requisition
RES.	Resistance
REV.	Reversing
RHEO.	Rheostat
R. L.	Running light
ROT.	Rotation
R. T. D.	Resistance temperature detector
AT.	Saturation
S.C.C.L.	Short circuit core loss
SER.	Series or serial
S. H.	Shunt or shorting
S. O.	Shop order
STAB.	Stabilizing
SW.	Switch
TC	Thermocouple
TH.	Thermometer
U. F.	Acyclic Generator
U. V. D.	Undervoltage device
U. V. R.	Undervoltage relay

DC Motors Nomenclatures

Domestic Terminology Glossary

Air Duct.	The small holes running from the inside of the rotor through the laminations to the outside of the rotor on a D. C. machine for the purpose of furnishing, cooling air to the armature windings and core.
Air Gap.	The distance from a pole tip to the armature. The space between the rotor and the stator.
Ambient.	The basis for a measurement. Ambient temperature is the room temperature. Ambient noise is the room noise before a test is started.
Back End.	The end of the D. C. machine which is opposite from the commutator end (other end, pulley end).
Base.	The metal section on which the stator, bearings, etc., are assembled.
Bearing Cap.	The cover placed over the upper half of the bearing and bolted to the bearing pedestal to hold the bearing in place.
Bearing Pedestal.	The base which supports the lower half of the bearing and journal and forms the oil reservoir beneath the bearing. The pedestal is fastened to the base which supports the machine.
Binding Band.	Heavy wire or glass which is wrapped around either end of the outer periphery of the rotor to form a tight holding device for the armature coils on a D. C. machine.
Bracket Arm.	The arm which is suspended from the brush yoke. The arm is for the support of the brush boxes and usually can be adjusted to align the brushes in the proper position.
Breaker.	The device used to interrupt currents rapidly by some mechanical or electrical device.
Brush Alignment.	The positioning of the brush stud so that the edge of the brush will ride parallel to the slots of the commutator within one half the width of a commutator slot.
Brush Angle.	The angle between the center line of a brush and the tangent to the commutator where the brush rests on it.
Brush Box.	The box open at both ends, which is placed so as to form a guide for the brushes to place them at the correct position on the commutator.
Brush Clearance.	The distance from the edge of the brush box to commutator.
Brush Rigging.	A general term used to designate the apparatus on the machine for applying the brushes to the commutator. This also includes the shifting device on D. C. machines.
Brush Spacing.	The distance from one stud to the next. This distance must be equal for all studs on the same machine. The distance is obtained by marking a piece of paper tape with the actual circumference of the commutator and dividing it into as many equal parts as there are poles on the machine. The lines marking the divisions will then indicate the positions for each stud.

DC Motors Nomenclatures

Domestic Terminology
Glossary, Continued

Brush Stagger.	A term used to indicate the proper placement of brushes to prevent wear on a commutator. The studs are placed so that two ride the inside edge and the next two ride the outside edge of the commutator surface and so on around the machine. This prevents grooves which would form if the brushes rode the same part of the commutator all the way around. Also means the entire surface of the commutator is in use.
Brush Stud.	The assembly of brushes forming a polarity. There is a brush stud for each main pole on the machine.
Buswork.	A term indicating any large copper strapping used for connections or terminals. The copper is usually bare.
Chisel.	The mark made at the intersection of the stator frame and the movable brush rigging to indicate the final setting of the brush rigging for best commutation. It is called a chisel as it is made by placing a chisel at the intersection and striking it to make the mark.
Commutator End.	The end of a D. C. machine on which the commutator is located.
Commutator Slot.	The groove formed between the commutator bars by under cutting the mica between them so there is a small slot between each bar.
Conductor.	A main coil of the armature. These usually cannot be seen too clearly except for the ends as they are covered along the rotor or stator by the wedges used to hold them in place.
Core.	The solid or laminated iron frame on which the armature or pole windings are wound. The term usually refers to the iron as it shows between the wedges holding the conductors in place (Heat Runs).
Dog–Ear.	A term identifying the metal gadget used to place the IRD pickups or thermal pickups on a bearing pedestal. It consists of a metal bar with a large hole on one end to fasten it to the pedestal with a cap bolt and a threaded hole on the other end to which the pickup is fastened.
Dowel.	A press fit steel rod used for the alignment of two parts which must be reassembled in the exact same position. For instance, the movable portion of the brush rigging is doweled to the stator frame by drilling a hole through the rigging into the frame and placing the dowel in this hole so the rigging can be placed in the same position it has been set in test for best commutation. The stator frames are doweled to the base of a machine as are the bearings so that the end play will be the same as it was set in test.
Electrical Neutral.	The point where the brush rigging is set so that when commutator bars are being commutated, their coils are electrically lined up so they are equally under the resultant flux and produce the same electrical conditions for a set field current in either direction. This is usually done only on reversing machines so that the same control mechanism can operate the machine properly in either direction.
End Clips.	The point on the end of the outer periphery of a D. C. rotor where the risers are brazed to the end of the coils.

DC Motors Nomenclatures

Domestic Terminology Glossary, Continued

End Play.	The amount of longitudinal play allowed in the shaft by limiting thrust bearings. The stator positions on any machine must be set so that when field is applied and the rotor magnetically aligns itself with the stator, the machine will ride within this end play.
End Shields.	The sheet metal covers used on A. C. or D. C. machines to direct the air flow for the best possible cooling of the machine parts.
End Turns.	The small loop formed on the other end of a D. C. rotor by the main coils as they are looped to make the return trip around the rotor.
Engineering Notice.	The specification and instruction sheet issued by the engineer on a job which lists the rating and testing and other special items on the machine.
Field–Auxiliary.	The small extra field, usually wound on the same pole with the main shunt field, which is connected across the commutating field to give additional stability and a precise means of setting regulation.
Field–Commutating.	The pole, wound on its own core, located between each main pole to distort the main pole flux in such a way as to help the commutation of the machine by allowing no change in flux as the brush is actually commutating the coil.
Field Compensating.	The buswork field windings connected in series with the armature and placed in the face of the main field poles which is used to offset the effect of armature reaction and make the machine more stable.
Field–Cumulative.	An auxiliary or series field which is connected so that its flux adds to the flux of the main field.
Field Differential.	An auxiliary or series field which is connected so that its flux subtracts from the flux of the main field.
Field–Series.	A buswork type field connected in series with the armature of the machine to make the machine more stable and to allow fine changes in regulation. The series field and the auxiliary field are essentially the same and the use of either is governed only by which is the easiest to install.
Field–Shunt.	The main field winding of a D. C. machine.
Frame.	The metal casting on which the machine's stationary electrical parts are assembled.
Front End.	The end of a part on a D. C. machine nearest the commutator end of the machine.
High Mica.	Small pieces of mica which have not been removed from the slots of a commutator.
Inter Pole.	Another name for commutating poles.
Leading Edge.	The edge of a brush or pole which is facing against the rotation of the machine.
Left Side.	The left–hand side of a machine as seen when facing the machine from the commutator or connection end.

DC Motors Nomenclatures

Domestic Terminology Glossary, Continued

Mechanical Neutral.	Aligning the brush rigging so the brushes are set approximately half way between the main poles of the machine and are therefore commutating the machine when the least amount of flux charge is occurring in the coil. It differs from electrical neutral in that mechanical neutral is set by alignment of the coils and placement of the brushes mechanically rather than electrically.
Mica.	A special type of insulating material which is used to insulate the various electrical parts of the machine from one another and ground.
Other End.	The end opposite the connection or commutator end (Back end, Pulley end).
Overspeed Switch.	A device connected to most direct current machines which is designed to operate a switch to kill power if the machine is run over its rated speed for any reason. It operates mechanically, usually on a centrifugal force principle.
Pigtail.	The small copper strip used to connect the carbon brush to the stud.
Pole.	A general term used when referring to one of the windings and cores of a field.
Pole Tip.	The outermost, or unsupported end of a field pole.
Pole Base.	The end of a field pole connected to the rotor or stator.
Pulley End.	The end opposite the commutator end of a D. C. machine (Other end, Back end).
Pressure (Brush).	The force with which the brush is held against the commutator, or collector ring. A constant pressure is exerted on the brush by the spring, a component part of the brush box.
Resistance Temperature Device.	A special temperature reading device installed in machines usually A.C. stators). It is a permanent device which comes to a special terminal board on the outside of the frame. By connecting to this terminal board and using a special meter, the temperature at the point where the device is located can be read directly from the meter.
Right Side.	The right–hand side of a machine as seen facing it from the commutator or connection end.
Riser.	The thin metal strip or wire used to connect the copper commutating bar to its proper coil.
Running Light.	A term applied to running a machine with no load on it. That is, it is at rated speed and voltage and the only current required is to overcome the friction, windage and core losses. Other losses are usually negligible.
Rotation.	The direction in which the machine is revolving. On a D. C. machine, rotation is called as seen from the commutator end.
Rotor.	The revolving portion of the machine.

DC Motors Nomenclatures

Domestic Terminology Glossary, Continued

Seasoning.	The process in which a commutator is heat cycled and ground until a cylindrical shape at all temperatures is obtained.
Seater.	A fine powdery substance pressed into sticks which is used to fit the brushes to the shape of the commutator. By placing the stick against the commutator and moving it back and forth along the commutator, the fine spray of dust given off can be directed under the brushes to wear the brushes rapidly to their proper shape.
Shunt.	To refer to the resistors used to adjust the commutating and auxiliary fields. To refer to the meter shunts used to read high D. C. currents.
Spider.	The basic rotor on which the core and conductors are wound on a D. C. machine.
Stator.	The stationary portion of a machine.
Stoning.	An abrasive used to clean and smooth the surface of a commutator. This process is called stoning.
Straps.	The bare or lightly covered copper buswork which is used to form the windings of high current fields.
Thermocouple Potentiometer.	The special meter bridge used for reading the temperature as taken from thermocouples.
Thermocouples.	A device consisting of a junction of two dissimilar metals that produce an EMF, proportional to temperature. The common materials used are copper–copnic.
Trailing Edge.	The edge of a brush or pole which is facing with the direction of the rotation of the machine.
Tram.	A device for locating the brushes at the same point they were set for best commutation in test. The tram consists of two points on the stator of the machine and a special metal rod which is bent so that when one end is placed in each of the above holes and an arc scribed from each on the end of the commutator bars, the brushes will be in the correct position if they are set with the center line of one of the brushes over the mark and the rest of the studs spaced properly.
Undercutting.	The process of removing mica insulation from between commutator bars.

DC Motors Nomenclatures

European Terminology Glossary

Here are a number of terms commonly found in English–language European (especially British) catalogs, handbooks, or technical papers concerning rotating machinery, controls, or power circuits.

Bedding. This is the process of fitting brushes to their final contact against the surface of a commutator or collector— what we call seating.

Bitumen. This is an insulating material, little used today although many large generators can still be found with coil tape insulation systems based on asphalt—our name for bitumen.

Black–heat space heaters. Typically used for warming a motor or generator interior, these are what we call low surface temperature heaters, which operate at a surface temperature below the orange or red heat stage. Such heaters will not overheat nearby machine components or ignite a possibly explosive atmosphere. That is, they remain “black” or dark on the surface when operating at full power.

Boucherot effect. If you don’t know the name, you’ll never get this one. We call it the deep–bar effect or more generally, the current displacement effect—the tendency for alternating current in a squirrel cage rotor to crowd towards the outermost part of each rotor bar until the accelerating rotor nears full speed. In Europe this effect is named for the French engineer, Paul Boucherot, who based his 1898 invention of the double–cage rotor on the phenomenon.

Brick. In a d–c stator or synchronous machine rotor, we would call this the pole piece or pole—the steel structure, normally laminated, on which a field coil is wound.

Brush flexibles. A brush that bends in the middle? No. This refers to the flexible lead wire connecting a brush to its external circuit. We call these pigtails.

Bush. As in “bushing,” this refers to the body or basic structure of a sleeve or journal bearing.

Cable tails. “Cable” is the clue. This describes the lead cable ends that project into a motor terminal box, and to which the incoming power cables are connected. We would call these simply leads.

Carcase (or carcass). The word basically means an outer shell or structure devoid of contents. Thus, the carcass of a motor or generator means its frame or yoke.

Coreplate. We would call this the insulating coating on laminations, needed to minimize core loss. In Britain, it’s commonly used to denote what we call the lamination—the steel sheet or “plate” used to build a core.

Cross–locked. Used to describe a problem with assembly or disassembly of a ball bearing on a shaft, this condition is better known in the country as cocked. Like the more familiar “cross–threaded,” it describes a “crossing” or non–parallelism between the axes of the two components involved.

Dahlander winding or connection. Neither Edison nor Steinmetz discovered all the electrical answers. A European technologist is honored here in this name for what we call the two–speed consequent pole connection of a single winding in an a–c stator.

DC Motors Nomenclatures

European Terminology Glossary, Continued

Discriminate.	Referring to the selection of protective device ratings, this is what we call coordination. The idea is to arrange fuse, circuit breaker, or relay characteristics such that when a fault occurs on the power system, only the device nearest the fault will operate to open the circuit. Thus, other loads upstream from the fault can remain energized. Devices thus chosen are said to be properly “coordinated,” and by the same token will “discriminate” as to which device operates soonest.
ETD.	We’re more accustomed to the term RTD. Actually, however, the RTD (Resistance Temperature Detectors is only one type of ETD, which stands for “Embedded Temperature Detector” and may be either an RTD or a slot thermocouple.
Falling–Torque design.	The British use this term to describe a two–speed motor in which the torque on the lower speed connection is less than that on the higher speed. In this country, we use the term variable torque design.
Final contactor.	We don’t actually have a specific term corresponding to this one. It’s the set of contacts that short–circuit the final step of secondary resistance when a wound–rotor motor is brought up to full speed. It must carry current continuously, whereas the intermediate or “step” contactors that short out earlier steps of starting resistance see only short–time duty.
Fixing.	To Europeans, though, “fixing” refers to a “fixed position”—that is, to mounting a piece of equipment in its location, using “fixing hardware” (what we would call “mounting bolts”) to hold down its “fixing feet.”
Flameproof.	Actually more descriptive than the U. S. equivalent, which is explosion–proof. An explosion–proof motor is not proof against internal explosions, but only against discharge of the resultant flame into the surrounding atmosphere. In other words, it’s “flameproof.”
Fleece.	European’s use this name for what we call felt, commonly used for end coil support in a motor or generator winding, or for oil seals.
Glasspaper.	A useful tool for “bedding” new brushes, this abrasive is made from sand that in turn is an ingredient of glass. Our name for it is sandpaper.
Global impregnation.	It doesn’t mean world–class varnishing, or refer to the use of an outsize dip tank. It signifies the varnish or resin treatment of an entire wound core assembly, rather than pre–treatment of individual coils. In this country, post–impregnation is the common term.
Japan.	Because of its predominance in highly colored Oriental artwork, the delicate finish coating we call lacquer was once simply known as “japan.” Finishing a surface with lacquer was called “japanning.” This term has been used in Europe to describe what we call “coreplate” (see above).
Lining bars.	These are bars meant to keep slots in a straight line during stacking of a laminated core. We would call them slot drifts.
Lining–out or line–out.	The term refers to the alignment of shafts during installation of drive components.
Lyre contacts.	We refer to these as fuse clips. The shape of a typical set of clips is similar to the frame of a lyre, and that’s how the term was derived.

DC Motors Nomenclatures

European Terminology Glossary, Continued

Mains.	As in "water mains," this in Europe describes the principal or main source of energy supply to an electrical device. Depending upon the installation, we would call it the bus or the power line.
Mesh.	This can have two meanings. In a simple three–phase circuit, it signifies a delta connection as contrasted with a wye or star. In a power supply system, it describes a network arrangement.
Plant.	To us, this is the factory where apparatus is built, or where it's later installed by a user. Not in England, though, where the word for that is "works." There, "plant" means the equipment or apparatus itself; what's being built or installed; the machinery being worked on.
Ragbolt.	You'll find this in some American dictionaries—though you may not find hardware quite like this in many American machinery foundations: "Ragbolt: A foundation bolt having an enlarged and jagged shank, secured in an undercut hole by running in molten lead…" Also sometimes called a "fang bolt" because of the teeth on its shank, this is probably nearest to our expansion bolt.
Robust.	"Particularly strong or powerful"—as applied to apparatus, robust means sturdy, powerful, strongly built.
Run up.	This is usually decipherable from the context. "Up" implies that whatever is running is increasing its speed, and that's what happens when a motor accelerates. "Run up," then, means accelerate, or acceleration.
Skirt.	This is a fabricated steel assembly attached at the top to the frame structure of a vertical motor, and at the bottom to the pump head upon which the motor is mounted. Usually, though not always, it includes a wrap–around outer cylindrical shell of relatively thin steel, containing openings for ventilating air or for access to the lower bearing assembly. We would call it a lower bracket.
Slanted, referring to bars/slots in a rotor or stator core.	The alternative construction is "straight"—meaning parallel to the core axis. Slanting slots, not straight, are what we describe as skewed.
Stoving.	Our term for the process is baking, as in a bake oven. The British use "stove" in place of our word "oven," and derived the term "stoving" to describe processing material in a bake oven.
Sweating.	"Sweat–soldering" has been used in the U. S. to label the process of bonding close–fitting parts, such as a joint in copper tubing, by heating the joint until molten solder "sweats" or oozes through the joint to appear at the far end, as though it were actually "sweating" out of the material as perspiration oozes from the skin. So, sweating in Europe is what we call soldering or brazing.
Wedge–gauges.	Used to measure air gap between rotor and stator in an assembled machine, different thicknesses being inserted into the space until they fit snugly or "wedge" into place. We call them feeler gauges.
White metal.	This bearing–related term is the British way of saying Babbitt, derived from the metal's typical silvery appearance.

DC Motors Nomenclatures

Anti Reverse Mech.	Non Reverse Assembly
Armature Special (Description in Parts Look Up System).	Either high speed or high temperature wound. It is a complete armature.
Bearing Bracket.	End Shield, End Bell, Bearing Support, End Bracket
Bearing Cover.	Bearing Cap
Bearing Support.	End Shield, End Bell, Bearing bracket, End Bracket
Bearing Temp Detector.	BTD, Oil Temp Sensor
Belt End.	Opposite Comm End, Pulley End, Shaft End, Fan End, Pinion End, Drive End, Gear End, Sheave End, Opposite Connection End
Blades.	Fan
Bonnet.	Top Cap
Brackets.	End Shield
Brush End.	Comm End, Opposite Drive End, Front End, Yoke End, Connection End, Opposite Pinion End
BTD.	Bearing Temp Detector, Oil Temp Sensor
Centrifugal Mech.	Rotating Mech, Governor
Centrifugal Switch.	Rotating Mech
Centrifugal Switch.	Stationary Switch
Clutch.	Pin Carrier
Clutch Plate.	Ratchet Plate
Comm Coil.	Commutating Coil, Interpole, Comm Pole (Not the same as a comm coil and pole assembly)
Comm End.	Opposite Drive End, Brush End, Front End, Yoke End, Connection End, Opposite Pinion End
Commutating Coil.	Comm Coil, Interpole, Comm Pole (Not the same as a comm coil and pole assembly)
Commutating End.	Comm End
Conduit Box.	J Box, Terminal Box, C Box, Peckerhead, Wiring Box
Connection End.	Comm End, Opposite Drive End, Brush End, Front End, Yoke End, Opposite Pinion End
Cover.	Louver, Screen, Brush Cover

DC Motors Nomenclatures

Crossovers.	Jumper Leads
Drive End.	Opposite Comm End, Pulley End, Shaft End, Fan End, Pinion End, Belt End, Gear End, Sheave End, Opposite Connection End
End Bell.	End Shield, Bearing bracket, Bearing Support, End Bracket
End Bracket.	End Shield, End Bell, Bearing Support, Bearing Bracket
End Shield.	Bearing bracket, End Bell, Bearing Support, End Bracket
Fan.	Blades
Fan Casing.	Fan Cover, Fan Shroud
Fan Cover.	Fan Shroud, Fan Casing
Fan End.	Opposite Comm End, Pulley End, Drive End, Fan End, Pinion End, Belt End, Gear End, Sheave End, Opposite Connection End
Fan Shroud.	Fan Cover, Fan Casing
Feet.	Base, Frame, Shell
Field Coil.	Main Coil, Main Field Coil, Windings
Front End.	Comm End, Opposite Drive End, Brush End, Yoke End, Connection End, Opposite Pinion End
Gear End.	Opposite Comm End, Pulley End, Shaft End, Fan End, Pinion End, Belt End, Drive End, Sheave End, Opposite Connection End
Governor.	Centrifugal Mech, Rotating Mech
Impellar.	Fan Furn by Customer
Interpole.	Comm Coil, Commutating Coil, Comm Pole(Not the same as a comm coil and pole assembly)
Iron.	Pole Piece
J Box.	Conduit Box, Terminal Box, C Box, Peckerhead
Jumper Leads.	Crossovers
Junction Box.	Conduit Box, J Box, Terminal Box, C Box, Peckerhead, Wiring Box
Klixon.	Thermal Protector, Overload
Louver.	Cover, Screen, Brush Cover
Main Coil.	Field Coil, Main Field Coil, Windings
Main Field Coil.	Main Coil, Field Coil, Windings

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DC Motors Nomenclatures

Mounting Ring.	Resilient Ring
Non Reverse Assembly.	Anti Reverse Mech
Oil Temp Sensor.	Bearing Temp Detector, BTD
Opposite Comm End.	Drive End, Pulley End, Shaft End, Fan End, Pinion End, Belt End, Gear End, Sheave End, Opposite Connection End
Opposite Drive End.	Comm End, Brush End, Front End, Yoke End. Connection End, Opposite Pinion End
Opposite Pinion End.	Comm End, Opposite Drive End, Brush End, Front End, Yoke End, Front End
Overload.	Thermal Protector, Klixon
Peckerhead.	Conduit Box, J Box, Terminal Box, C Box, Peckerhead, Wiring Box
Pin Carrier.	Clutch
Pinion End.	Opposite Comm End, Pulley End, Shaft End, Fan End, Drive End, Belt End, Gear End, Sheave End, Opposite Connection End
Pole Piece.	Iron
Pothead.	Top Cap
Pulley End.	Opposite Comm End, Drive End, Shaft End, Fan End, Pinion End, Belt End, Gear End, Sheave End, Opposite Connection End
Ratchet Plate.	Clutch Plate
Resilient Ring.	Rubber Mount
Rotating Mech.	Centrifugal Mech, Governor
Rubber Mount.	Resilient Ring
Screen.	Cover, Louver, Brush Cover
Shaft End.	Opposite Comm End, Pulley End, Drive End, Fan End, Pinion End, Belt End, Gear End, Sheave End, Opposite Connection End
Sheave End.	Opposite Comm End, Pulley End, Shaft End, Fan End, Pinion End, Belt End, Gear End, Drive End, Opposite Connection End
Shell.	Stator Frame
Slingers.	Labyrinth Seals
Slingers.	Lab Seals
Slip Rings.	Collector, Commutator

DC Motors Nomenclatures

Spring Washer.	Wavy Washer
Start Switch.	Stationary Switch, Start Switch
Start Switch.	Stat Switch, Stationary Switch
Stationary Switch.	Centrifugal Switch
Terminal Box.	Conduit Box, J Box, C Box, Peckerhead
Thermal Protector.	Klixon, Overload
Thrust Bearing Carrier Hub.	Coupling LH
Top Cap.	Bonnet
Top Cap.	Pothead
Windings.	Main Coil, Main Field Coil, Field Coil
Yoke End.	Comm End, Opposite Drive End, Brush End, Front End, Connection End, Opposite Pinion End

DC Motors Nomenclatures

European Terminology Glossary, Continued

In the table below are some additional terms you'll find in technical literature from Europe. These generally require little or no explanation. Some of them may already be familiar to you. But just as there's a world market our there for electrical apparatus, there's also a world of terminology that may be new to us. Knowing "what it means" is the first step towards proper specification, application, and operation of equipment

European	*American*
Airstream rated motor	—Air–over motor
Ancillary	—Associated or auxiliary
Anti–clockwise	—Counterclockwise
Anti–condensation heater	—Space heater
Attenuator	—Noise muffler or silencer
Brushgear	—Brush rigging
Cater for	—Allow for, accommodate
Change–over	—Bus transfer
Clock gauge	—Dial indicator
Clampmeter	—Clip–on or clamp–on meter
Commission	—Put into service
Conduit bush	—Coupling or clamp
Cowl	—Hood, cover, bonnet
Direct–on–line (DOL)	—Across–the–line
Earth	—Ground
Earth frame	—Grounding mat or grid
Epoxide	—Epoxy
Evolute	—End turn knuckle or nose
Filament lamp	—Incandescent lamp
Filter gland	—Breather
Fitted	—Provided, equipped, furnished
Flick test	—Kick or inductive kick test
Incomers	—Feeders
Klaxon	—Alarm horn or buzzer
Light–running	—Unloaded
On load	—Loaded
Outgoers	—Branch circuit connectors
Re–switching	—Reclosing
Scavenge	—Flush out
Screw fuse	—Plug fuse
Set current	—Tripping current
Slipover (current transformer)	—Window type
Spanner	—Wrench
Switch off	—Deenergize
Valve	—Diode rectifier

DC Motors TREC™ Coil

Whether specifying a new DC motor, or securing renewal parts, GE TREC™ Coils make your decision easy!

Specify TREC
Expect Quality and Reliability
Increased motor performance; extended life; ease of maintenance; less motor down time; reliability and durability. All of these benefits are a result of the TREC (Tape Reinforced Encapsulated Construction), GE's patented field coil process.

TREC Coil Development and Testing
Recognizing that a motor performs only as well as its individual component parts, GE dedicated five years to the research and development of the TREC field coil. Rigorously tested at high and low humidities, under vibration levels of 10G to 12G, and temperature extremes from minus 50°C to plus 225°C, TREC coils passed test cycles where other coils failed. In life tests, TREC coils surpassed 4,000 hours of operation at 200°C (the equivalent of over 14 years of normal field use). In addition, TREC coils have over seven years of actual field experience with an outstanding track record–your guarantee for quality performance.

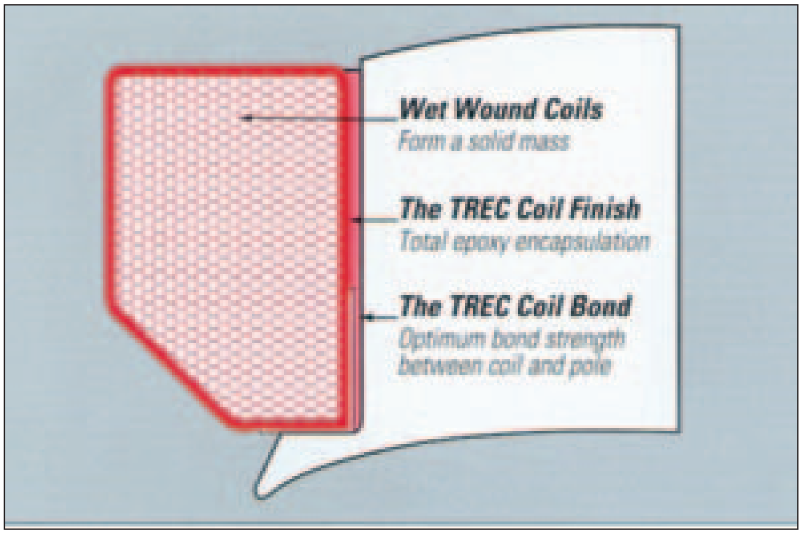
The Revolutionary3-Step TREC Process

1. TREC Precision Winding
The TREC coils are precision wound while wet, then cured to form a solid mass. This process allows each conductor to be individually coated with an epoxy varnish that provides superior turn-to-turn bonding, with maximum protection against contamination. The resulting construction eliminates heat pockets and improves heat transfer so coils operate cooler and last longer.

2. TREC Encapsulated Coil Construction
Solid TREC coils are wrapped with tape, then dipped into a specially developed epoxy compound for total encapsulation. This viscous compound completely penetrates the tape to form a durable solid structure that provides protection from chipping, cracking and peeling under the most rugged operating conditions. The encapsulation protects the coil from moisture, dust and other industrial contaminants.

3. TREC Coil Single Unit Bonding
The TREC coil is cast to the pole using a unique bonding method that produces a single unit pole construction. Optimum bond strength is achieved through a 100% epoxy fill between coil and pole. This provides an extremely strong bond that withstands vibration, impact and thermal shock and has superior heat transfer qualities.

TREC Delivers
TREC main and commutating field coil assemblies are extremely durable. The TREC coil has extended life compared with other coils, offering reliable performance under even the most demanding field conditions. TREC coils are used in all GE Mill Duty motors, CD4000 machines and Kinamatic frame sizes 360 through 500AT. TREC coils are available directly from authorized GE Motor Parts Distributors.



DC Motors Armature Coil

Discover the Advantages of the GE Armature Coil System.

Specify Genuine GE Armature Coils and Rewind Kits for Quality and Reliability

Designed for DC motors, the GE form wound armature coil system provides a reliable, fully protected, easily assembled coil with high dielectric strength. The armature coil system also includes rewind kits. These kits provide all of the insulation materials needed for winding an armature. Specify the GE armature coil system and discover these unique advantages and more.

Class H Materials Assure Reliability In the Field

The wire used for GE rectangular armature coils is Class H and is insulated with glass serving over heavy enamel. This provides armored protection for the wire and positive turn-to-turn insulation. The wire coating is tough and flexible enough to permit coil forming without damage to the enamel. The combination of the armored overwrap and glass serving provides high reliability with excellent turn insulation, particularly at mechanical stress points in the coil.

Nomex* Insulation Provides High Dielectric Strength

After the coil is precision formed, Nomex insulation is added to the high-stress coil helix angles. Nomex channels surround the slot area of the coil and provide excellent mechanical protection and electrical ground insulation for the armature coil. Nomex provides additional protection to the coil during the winding process.

Reinforcing Glass Tape Overwrap Adds Additional Protection

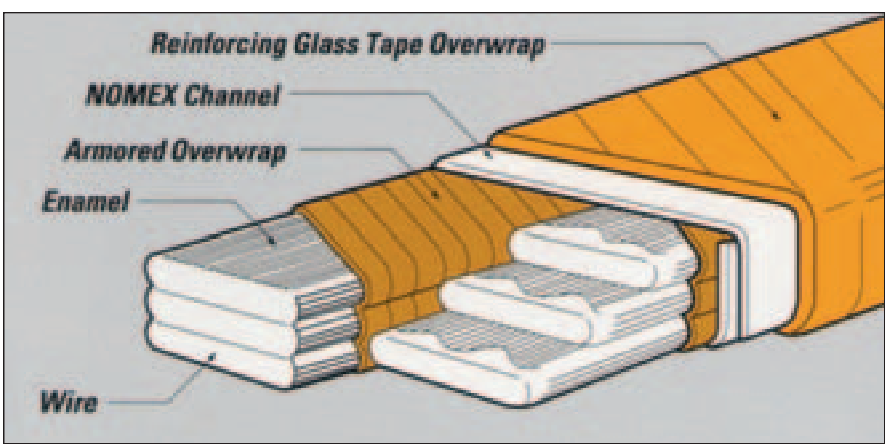
Glass overtape is applied over the entire coil body. This tape structure adds protection and keeps the channels tightly positioned against the coil. The glass tape cushions the coil during assembly into the armature, and provides a bonding structure for the varnish. The tape is then treated with a flexible varnish which protects the glass during rewinding.

Fast, Easy Rewinding

The GE armature coil system offers faster and easier assembly than other coils and rewinds require less winding time. The coils are manufactured on their original forms, using original prints. Slot wedges, soldering blocks, and brazing clips required for the armature winding are supplied free with the armature coil order. Rewind kits include winding instructions, connection diagrams and insulation materials needed for a factory rewind, making a complete armature coil system.

GE Armature Coils Deliver

GE armature coils are extremely rugged, offering reliable performance under even the most demanding service conditions. The coils are designed to meet Class H insulation system standards and maintain mechanical and electrical integrity at 200°C. GE armature coils are available directly from authorized GE Motor Parts Distributors.



**Nomex is a registered trademark of the DuPont Company.*

Glossary

Field, TREC Coils

Bonding New Coils to Poles

1. Coil position on the pole is critical to the machine performance. Prior to disassembly of the old coil and pole assembly make note of the vertical position of the coil and position of the leads.

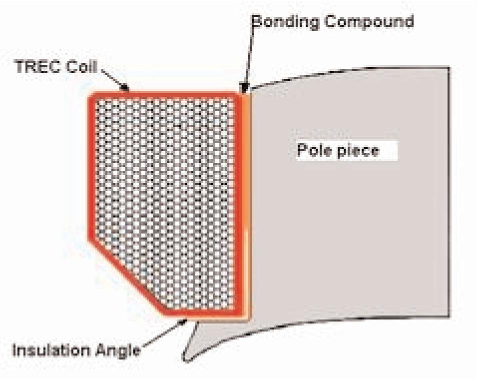
2. GE Structured Services recommends using EPC PREG X93C 1961 bonding compound, which can be purchased through Epic Resins at 1-800-242-6649 to bond coils to pole pieces.

3. Remove the old coil from the pole using a method that will not bend or distort the pole piece. Cold pressing a pole out of an assembly will often result in bending the pole piece and is not recommended. Shot blasting should not be used to clean the pole piece as this process will damage threads and can flair laminations.

4. To bond a new main coil to an old pole:

   - First, trowel the bonding compound directly onto the pole tip (ear) and up the side of the pole 3/4 inch. This should be about 1/8 inch thick. Imbed an angled piece of insulation, drawing number 943B441CA – length to slightly less than the inside length of the coil window, but longer than the pole, into the compound.

   - Next, trowel sufficient bonding material on the pole and insulation angle to ensuring the compound fills 100% of the space between the coil and pole. Air bubbles will weaken the bond system and reduce heat transfer and must be minimized. The new coil should be centered and positioned as noted in step #1. Use a putty knife to remove excess compound from the armature side and to force compound into the gap between the coil and the pole. The material should be smoothed out to eliminate/minimize jagged edges and pockets for carbon to collect.



   - Cure at 165° C for 6 hours.

Glossary

Field, TREC Coils

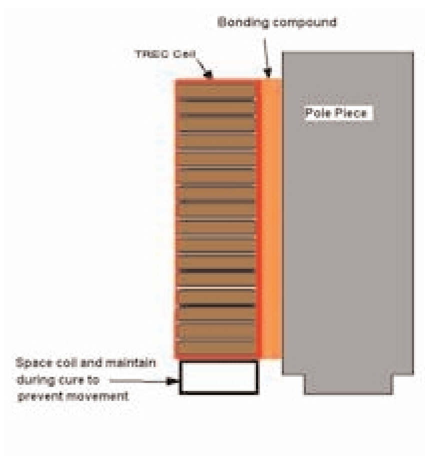
Bonding New Coils to Poles

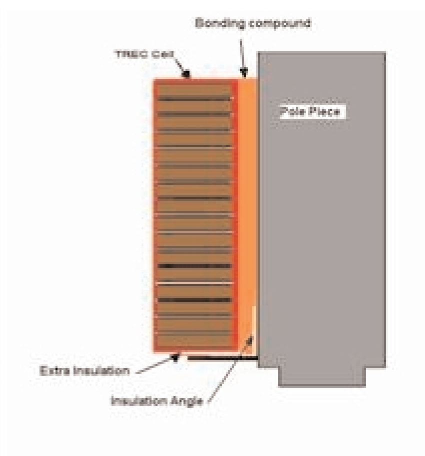
5. To bond a new commutating (interpole) coil to an old pole.

   - There are two types of Commutating (interpole) coil and pole construction. One has clips, pins or an angle supporting structure that the coil will rest on. These are assembled the same as main coil and pole assemblies, except additional insulation is required to give a minimum of 1/4 inch creepage path beyond the metal of the supporting structure.

   - The other type construction has a straight pole with no supporting structure. These coils must be supported at the proper height with spacers to insure main pole tip clearance during the cure operation. Trowel the compound onto the pole piece, center and position the coil on the pole as noted in step #1, and use a putty knife to smooth and pack the bonding material in the gap between the coil and pole, 100% fill is desirable to maximize bonding and thermal transfer. Air bubbles will weaken the bond system and reduce heat transfer and must be minimized.

   - Cure at 165° C for 6 hours.





Warning: Ensure all power has been removed from the machine before performing maintenance.

High Voltage Coils

High voltage coils are a high risk endeavor. If your customer needs to replace his high voltage coils, he needs to closely examine who is making the offer and what exactly their offering is. "High voltage" in this context means any machine over 7000 volts. The vendor we use, Transfield-GE is the only vendor we have pre-qualified for high voltage coils. We have had numerous sets of high voltage coils manufactured by them, with no complaints.

We are quoting a fully molded, cured B-stage insulation system that is press cured in the slot sections to provide a void free insulation system with coils of a uniform size. If your customer is questioning your price relative to a third party quote, make sure you are talking apples to apples. Unless the customer has stripped the unit and furnished them data for reverse engineering, the quote they receive from a third party is most likely a budget estimate only.

Often, competing quotes turn out to be coils with B-stage tapes that are uncured. These will be difficult to wind and after winding the customer will have to bake the stator in an oven to cure the insulation. This will not provide a void free insulation system, which is very important in a high voltage application because of corona.

I have also attached a file that describes the GG600 Coil System, although it talks about hydro generator in the write up, it is also applicable to motors.

Bottom line, the real key to a successful installation is the high voltage experience of your supplier.

Any questions on this or if you need help on any large coil quote, contact Mike Balles, the GESS Lone Ranger in El Paso. He can be reached at 8*438-5724. Mike has over 30 years of experience in all aspects of the coil business and can be a tremendous asset when talking to customers about large quotes.

GEGARD 600 Insulation System

The General Electric Company GEGARD 600 Insulation System is especially designed for application in high voltage hydroelectric generators. This is a full Class F insulation system designed with the latest materials and processes to meet stringent user specifications. The General Electric Company's approach to rewinding hydroelectric generators is truly a system approach. It is fully integrated where the insulation applied to the windings, the method of securing the windings in the slots and the method of bracing the winding endturns are all given full consideration to assure that the complete winding will give years of trouble free operation with minimum maintenance.

The stator coil consists of three turns. Each turn is made up of 0 strands arranged 0 wide by 0 deep. The number of strands and strand size is optimized to control losses within the coil and enhance the producibility.

The turn insulation is designed to withstand transient voltage spikes in addition to normal operating voltages. It is made up of two half lapped layers of mica tape. After forming, the coil is inserted in a press where heat and pressure are applied to compact the turn insulation.

The ground insulation is made up of multiple layers of 1/2 lapped mica tape. The mica tape is impregnated with a "B-staged", high molecular weight epoxy resin.

In the GEGARD 600 system the impregnated "B" staged mica tape is used to bond the basic insulation materials together and fill many small voids. The resin contributes greatly in determining the performance capability of the dielectric barrier in terms of its dielectric strength, voltage life, physical strength, power factor and temperature rating of the insulation. The high molecular weight epoxy resin used in GEGARD 600 has shown superior dissipation factor results as compared to other epoxy resins.

GEGARD 600 is dimensionally stable at elevated temperatures. Its essentially void free characteristics coupled with outstanding mechanical electrical strength and durability means that the conductors are tightly held in a corona free environment which leads to long life at operating voltage stresses, temperature and electromagnetic forces.

In the slot section of this high voltage coil, a semi-conducting corona tape is applied for suppressing surface corona. This treatment extends beyond the stator core where a gradient tape is then applied serving as a voltage stress gradient.

GEGARD 600 Manufacturing Process

The manufacturing process with the 0 insulated strands assembled into the turn package in a 0 wide by 0 deep arrangement. This turn bundle is insulated with one half lapped layer of "B" staged epoxy mica tape as the strands are brought together on the automatic turn taping machine.

From the automatic turn taping machine, the turn is pulled directly onto the "looper" or bobbin winding machine. After the taped turn is wound on the looper, it is at this point that the inverted turn transposition is formed. At the point where the transposition is made, aramid paper is woven between the layers of strands and wrapped around the turn for extra protection.

The coil loop is now stamped with an identifying number. This number is a key part of the quality control system as each coil has its own manufacturing process and test record.

After the coil is removed from the looper, a layer of sacrifice tape is applied to protect the turn insulation from damage during handling and forming.

The coil is then inserted in the coil forming machine where it is pulled to its initial shape. The final configuration is additionally assured by using a coil form (tryblock) to ensure coil shape repeatability.

A key part of the quality control program is the use of full scale mock-ups of at least one coil span to check the coil shape and dimensions. Mock-ups are used to check at various stages of coil manufacture.

The leads and endturns are hand taped with the required number of half lapped layers of mica tape. The endturn tapes will blend when the machine tapes are applied producing the required scarf joint.

Next, the coil is placed into a two sided hot press where the turn insulation in the slot sections of the coil is subjected to heat and pressure. The turn insulation is compacted and the resin in the turn insulation and between the strands is partially cured. The strands are lined up and properly oriently during this process in a neat dimensionally controlled package.

Next, the coil is placed in a constant tension taping machine for the application of the ground insulation. This machine is micro-processor controlled which means that every turn of tape is applied exactly like all of the rest, the laps are uniform and properly indexed, all of which are important for producing a homogeneous high density insulation system. This machine tapes the slot portions and the arms of the coils out around the first bend. The machine tapes will blend with the hand taped endturn creating the proper scarf joint.

Upon completion of the application of the ground insulation, the coil is taped with a glass armor. The complete coil is given a protective coat of sacrifice tape prior to molding the insulation and curing under heat and pressure.

To compact the endturn insulation during the molding process, each endturn, the knuckle included, is fitted with custom made flexible silicone rubber molding forms. The completed forms are held in place with multiple layers of high shrink sacrifice tape. After the endturn molds are applied, the coil is once again put in a two sided hot press. The coil is heated and pressed to compact the ground insulation and to form the coil to its final dimensions. The coils are then final cured in a post bake oven. After that the coil is once again checked in a mock-up to be sure that it has the proper shape and dimensions.

GEGARD 600 Factory Tests

The completed coils will be final tested in accordance with the requirements of the Specifications. There may be times when the standard test level exceeds the requirements of the specification. In those instances, our test level will be utilized. The following is a list of factory tests. However the actual sequence of application may be different.

1. **Strand continuity and strand insulation tests**
   Each strand shall be checked for continuity before the strand insulation test is performed. Each strand will be tested by applying 110 Vac rms between each strand and all other strands.

2. **Turn Insulation Dielectric Test**
   Each coil will be tested by a high frequency turn-to-turn test in accordance with IEEE 522. The test level will be 0 volts peak.

3. **Ground Insulation Dielectric Test**
   The ground insulation of each coil will be tested at 0 Vac for one minute.

4. **Power Factor Tip-up Test**
   Power factor measurements will be made on each coil at 1600 volts and 8000 volts. The numerical difference between the two power factor measurements must be 0.9 percent or lower.

5. **Dissipation Factor Test**
   Every tenth coil will be given a dissipation factor test similar to the power factor tip-up test except the coil will be tested at 1600 volts and 16000 volts. Dissipation factors shall not exceed the values given in the following table.

For each 20% interval between:	and:	The dissipation factor shall not increase by more than:
20%	60%	0.0015
60%	120%	0.003
120%	200%	0.004

Glossary

Notes

GE Structured Services, LP