

# ***Kinetics Industries, Inc.***

*Trenton, NJ*

609-883-9700 sales ext 122

- ◆KinetSync-SR
  - ◆SVR regulated excitation rectifier
  - ◆Solid state field application system
  - ◆Type ENB-Brushless motor complete excitation system
- ◆KinetSync-NB
  - ◆MVR constant potential exciters
  - ◆Contactor applied field application panel
  - ◆Type ESR-Brush type motor complete excitation system

Large Motor – Rolling Mill Excitation Systems

## **Synchronous Motor Excitation Systems For Mill Process Applications**

◆◆*Kinetics A One Source System Solution*◆◆

◆◆*Manufacturing Expertise For Field Excitation Products*◆◆

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**Manufacturer of: Exciters, Field Application Systems and Control Logic / Annunciation Circuitry**



### ***What makes Kinetics, a made in USA designer & manufacturer of excitation systems, the favored supplier over the competition's offerings?***

Kinetics is an integrated manufacturing company, located in Trenton New Jersey, dedicate to the design and manufacture of synchronous motor excitation systems specifically for the demanding application requirements of mill duty brush and brushless synchronous motors. Kinetics designs and manufactures component sections and entire systems for optimum motor production performance.

Kinetics' design team incorporates unit characteristics that manage the unique excitation system demands of a synchronous motor operating in a mill application with large swings in operational loadings, critical reliability and requiring optimum motor performance.

All power assemblies, circuitry, logic software, electrical components, transformers, panel / enclosures and product construction techniques are designed and manufactured by Kinetics' engineers specifically for the demanding applications and operating environments common to mill installations. Kinetics offers a product line from the most basic cost sensitive system to the multiple layer of redundancy system integrated into a smart plant or mill automation and communication system.

*What Kinetics does not” do”, is an important Kinetics system reliability feature.*

Kinetics does *not* supply a collected packaging of system sections manufactured by numerous un-related manufacturers.

A Kinetics system or unit will *not* include:

- The use of system critical circuitry by an outside vendor.
- The use of a DC motor drive as an exciter.
- The use of control or protective relays designed for “other” types of motors (non-synchronous).
- The use of a synchronous generator exciter and protective circuitry as a marginally acceptable solution for a synchronous motor excitation system.
- The use of critical component sections, covered by multiple product service organizations, in possible commercial “servicing” conflicts and / or varying warranty terms of coverage.

If an excitation unit is *not* specifically designed and manufactured for a heavy industrial mill duty synchronous motor application, the resulting product will be a compromise in motor performance, product serviceability and mill productivity.

*Note 1: Kinetics will manufacture system with non-Kinetics component sections upon a customer’s request.*

*Note 2: Kinetics does manufacture generator excitation system. Unit design, power assemblies, control scheme, circuitry, protective relays and operational characteristics that are specific to a generator’s application specific requirement(s). See Kinetics model types SVRI, SVRFP and SVRSP.*

All power components, circuitry, software control logic and operating system sections, within a Kinetics synchronous motor excitation systems, are designed by Kinetics’ staff engineers for optimum synchronous motor operation and protection.



***Brief History:***

Since the company’s founding in 1939, Kinetics has been involved in industrial production process motor control. Today, Kinetics applies 50 plus years of heavy industrial motor oriented experience into designing, manufacturing and testing the excitation system solutions that result in optimum synchronous motor operation, motor protection and serviceability. Kinetics has established a technical design team, with the large mill motor experience, to manufacture state-of-the-art synchronous motor excitation systems of the highest quality and technical capability for the modern motor room or mill environment.

In the early 1960’s Kinetics entered the mill power rectifier business supplying SCR and diode rectifiers in the 1 to 2000 Kw range for heavy industrial motor oriented applications. In the early 1980’s it was a natural progression in the service of our mill customer, to develop a solid state field application system using the field power / discharge resistor application via SCR switching

with crow-bar circuit protection to compliment Kinetics excitation rectifiers. Kinetics' many years of design and rectifier manufacturing experience for motor oriented systems makes Kinetics a uniquely qualified manufacturer of excitation for the specialized product demands of synchronous motor field excitation and solid state field application circuitry.

In the late 1990's Kinetics designed and began manufacturing two digital annunciation and logic modules, the under the trade name *KinetSync*, for the control and protection of synchronous motor field application. At the request of OEM, utility and heavy industrial customers, Kinetics has brought two units to market; the *KinetSync-SR* for brush type slip ring motors and the *KinetSync-NB* for brushless motors. By offering two motor specific units, Kinetics addresses the very specific needs for the two different types of synchronous motors. The two units eliminate confusing and potentially problematic non-applicable features between the two motor types. An emphasis was made to incorporate user friendly programming adjustment features, a history register and operational information display directed specifically at the two types synchronous motor - brush or brushless.



The *KinetSync-SR and KinetSync-NB* digital control and annunciation modules are UL and CUL Listed products.



Kinetics is the only manufacturer in the U.S.A. to design and manufacture, in one facility or a single source manufacturer, all the system critical sections of an excitation system specifically designed for brush and brushless synchronous motors. The critical sections are the power rectifier / regulator, solid state field application package, *KinetSync* digital logic and control annunciation module, operational software, exciter power transformers, discharge resistor grid, enclosures & panels and application specific power or control functions.

Kinetics' system segment packaging design is configured for flexibility of application to OEMs or retro-fit modernization of older vintage excitation configurations. By manufacturing all the segments of excitation system, Kinetics can tailor the scope of a system to the customer's budget, level of sophistication and desired system segments.

Building from Kinetics' many years of synchronous motor experience, each system segment of

the excitation system includes numerous “user friendly” features for ease of installation, maximum motor protection, useful operational information display, modern plant informational transport capacity and ease of service. The system segments include the circuitry flexibility to be suitable for customers who desire to install a partial retro-fit of an excitation system or combine Kinetics product with system segments manufactured by another manufacturer.

Kinetics has the application expertise to offer excitation that smoothly integrate with retro-fit or new equipment motor starters.

- Across the line breaker starters
- Across the line contactor starters
- Auto-transformer reduced voltage starters
- Reactor reduced voltage starters
- Solid state SCR “soft start” motor starters / controllers
- Part winding starters
- Pony motor with synchro-scope system

*Commercial note: The traditional path of purchase for a motor starter and exciter system is for the excitation system to be supplied through the “motor starter” supplier or as a separately purchased item. If the project requires a “starter” provided with the excitation system, Kinetics can supply a motor starter as an integrated package with the excitation system.*

By producing a product line that specifically addresses the needs of a mill process applied synchronous motor, Kinetics’ products are the right selection based on years of manufacturing experience, customer input, pricing and system responsibility.

Kinetics Is An Integrated Manufacturer With Manufacture Capabilities:

- \* All electrical and mechanical engineering done by Kinetics engineers.
- Dry type transformer manufacturing capacity up to 2000 KVA, 15 KV class.
- Modern / automated sheet metal fabrication department for manufacture of all Kinetics’ electrical bus bar assemblies, enclosures, panels and mounting brackets.
- Circuit board assembly and electronic testing department.
- Automated control wire harnessing and lug crimping department.
- Power and system assembly department.
- Product testing with a synchronous motor in the test stand. All synchronous motor excitation units are factory tested via synchronous motor prior shipment.



### ***Do Not Overlook The Critical Importance Of The EPT.***

( Isolation Exciter Power Transformer)

The EPT, exciter power transformer, is a very critical link in the power system and should not be over looked as a very important component in a well designed and manufactured system.

Although “transformers” are a mature product, a “problem” with an EPT can cause the longest lead time of repair or replacement of any component within the excitation system. To achieve a highest standard of product quality and reliability, Kinetics designs, manufactures and tests all

the EPT transformers used in Kinetics systems up to 15 KV class and 2000 KVA capacity. All Kinetics transformers are wound with copper conductor. A Kinetics isolation dry type EPT transformer is designed and constructed to comfortably handle the electrical and mechanical loading stresses associated with a SCR regulated exciter rectifier with repeated wide ranges of load swings and operating cycles. The EPT transformer's magnetic steel, conductor and insulating materials are given a wide safety margin to take into account power system disturbances, "high" operating ambients, industrial dirt / air contaminants and floor / mounting vibrations common to mill environments and the harmonic content of the excitation rectification.

*Caution:*

- 1 *Not using an EPT and connecting directly onto the AC power source or grid can result in power system interaction problems and is not recommend practice by Kinetics.*
- 2 *The use of a "distribution" type transformer as an EPT feeding a diode or SCR rectifier can result in loading / overheating "problems" due to wave form harmonic content associated semi-conductor loads and additional "current loading" associated with SCR rectifiers.*



**A Synchronous Motor Excitation Should Include The Follow Segments:**

**Brush or slip ring motor:**

- AC input power disconnect and / or fusing.
- EPT exciter power transformer
- Exciter / DC power source
- Field application means:

For applications where a new regulated exciter is desired, Kinetics offers a state-of-art, six pulse SCR, application control with free wheeling semi-conductors and back-to-back SCR discharge circuitry.

If the field excitation is supplied from a DC mill power supply buss, existing exciter or an exciter by "other"; an older vintage style of 2 NO / 1 NC power contactors with electrical and mechanical interlocking assembly and overlapping contacts is required.

- Application logic controller / relays. (*KinetSync-SR*)
- Interconnection cables.
- Annunciation.
- Discharge resistor grid.
- Enclosure type vented or non-vented.
- CT & PT signal from the motor starter for power factor monitoring, PF regulation and motor protection features within the field application controller (*KinetSync-SR*).

**Brushless motor:**

- Fused control power source

- EPT exciter power transformer.
- Exciter / DC power source.
- Annunciation & logic module.
- Interconnection cables.
- Enclosure type vented or non-vented.
- CT & PT signals from the motor starter for motor protection features within the *KinetSyn-NB* and PF regulation.



***A Kinetics System Includes – Total System Responsibility:***

- Kinetics’ experienced engineering design team for mill applications.
- A long-term record of successful product performance in the most demanding mill environments.
- An experienced engineer staff with a broad range of motor manufacturer and mill process experience plus the extensive engineering resources of past projects to draw upon for the application of the best product solution to a given application and costing constraints.
- Systems specifically designed for synchronous motors.
- Kinetics manufactured *KinetSync* digital annunciation & control module.
- Kinetics manufactured SCR regulated exciter, 1 to 2000 Kw.
- Power factor regulated exciter mode of operation is a standard feature on Kinetics systems using the *KinetSync* digital logic and annunciation module.
- Kinetics manufactured solid state field application circuitry.
- Kinetics manufactured dry type transformers (EPT)
- Kinetics manufactured / fabricated enclosures and mounting panels.
- Kinetics supplies a fully factory tested system via the synchronous motor in Kinetics product testing facility.
- Start-up and training by Kinetics field services personnel.
- One warranty for the entire system from one vendor – Kinetics.

***Avoid the system pitfalls of:***

- Multiple manufacturers of key component sections with vague, conflicting or murky technical or commercial responsibilities or warranties.
- DC motor drive used as a synchronous motor, highly inductive load, exciter.
- Using an AC generator exciter with non-applicable and / or overly complex generator protective circuitry features included within the exciter system, as a synchronous motor exciter.
- Using a custom builder to creating a one of kind system without a production performance track record..
- Product testing via simulated signals or first testing on an actual synchronous motor test

at the installation location.



***Mill Synchronous Motor Specific Option Features:***

- Field forcing circuitry to strengthen the motor field prior to “product” entering the milling or while the product is in “process” to prevent the motor from pulling from synchronization.
- Redundant components or parallel units for operational redundancy or mill in production maintenance to an exciter.
- Operational running “backup configuration” from a mill’s constant potential DC power bus.
- Communication system for remote annunciation, operational status and control adjustment via the customers communication bus protocol.
- Electrical motor “inching” control scheme from a remote DC power source or a Kinetics power supply rectifier within the Kinetics excitation system. Kinetics offers both a solid state SCR switching or contactor “inching” control with Kinetics’ digital logic control and annunciation module.
- Kinetics will design and manufacture systems for installation in “high” operating ambient temperatures, “high” elevations above sea level and harsh installation environments.

***Who Are Kinetics Customers: Domestic & International***

- Steel mills
- Aluminum mills
- Cement and ore mills
- Pulp & paper mills
- Petro-chemical processes
- Gas pipeline pumps and compressors
- Water & waste water pumping plants
- Government: research facilities, wind tunnels and military installation

***Can we generate you a technical specification proposal?***

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