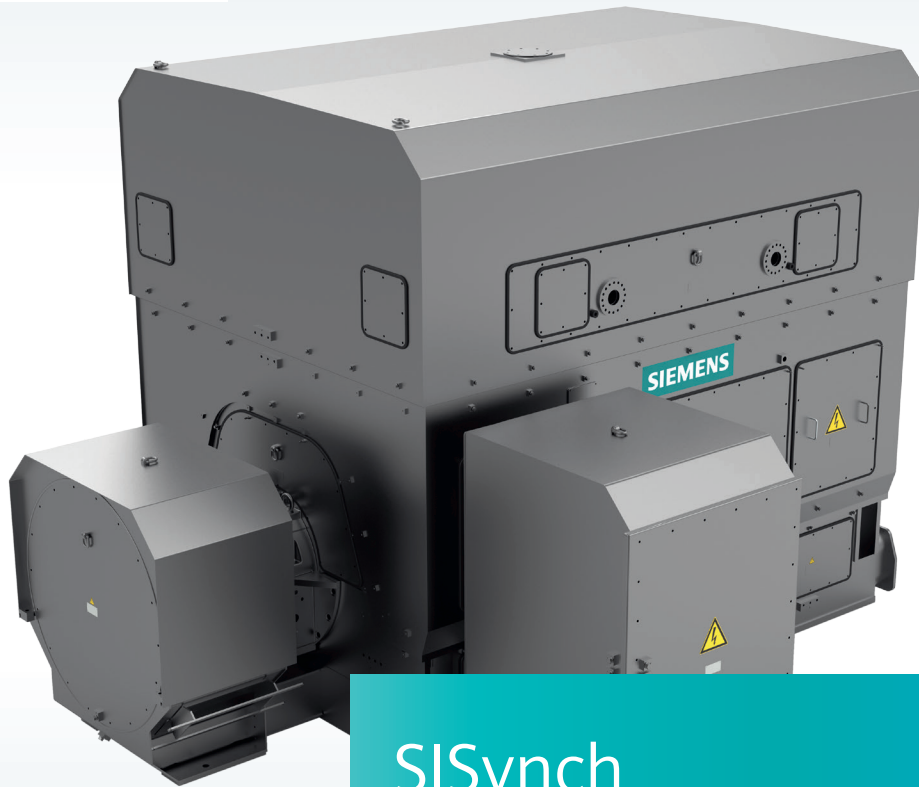# SIEMENS
Ingenuity for life

SISynch

Synchronous Motor Control System

usa.siemens.com/drive-retrofit

SISynch provides excitation, control and field circuit protection for brushless and brush type synchronous motors. The product is available in a variety of standard ratings for a broad range of excitation requirements and can be supplied in several physical configurations appropriate for both new equipment installations and older existing equipment retrofit.

Product benefits:

- Improved motor performance and reliability is provided by proven Siemens DC drive technology

- Operational flexibility to control motor excitation current or local/remote power factor

- Simplified commissioning with Siemens motor control application development software

- Reduced troubleshooting effort and time with event recording and operational data transparency

- Applicable to synchronous motors by Siemens and other manufacturers

How it works

SISynch is based on the SINAMICS DC Master Base Drive product line of high performance DC drives for industrial motor control and process power applications. All system functionalities are implemented by a synchronous motor management software program running within the Base Drive using the incorporated SINAMICS drive control automation platform which provides a complete library of control, calculation and logic function blocks for complex industrial control applications. The overall excitation system topology incorporates the DC excitation power supply, control and rotor protection functions into a single SINAMICS DC drive resulting in simplified design, reduced parts count and improved reliability vs. other solutions implemented with numerous dedicated purpose devices.

SISynch controls and protects the motor throughout the entire starting, synchronizing and running process. Principal control functions include operation of the motor main circuit breaker or contactor, field application, excitation current regulation, rotor protection and comprehensive monitoring via local HMI.

Local operator interface is implemented with a Siemens TP700 touchscreen HMI running Windows CE with PROFINET/PROFIBUS interface and synchronous motor application specific screens. Available options include displays for outdoor and hazardous locations. TP700 provides simple control mode selectivity and displays all system information in a brilliant full color display. Status details and logs increase operator awareness and decrease troubleshooting time. SISynch regulates field excitation based on the control mode selected by the operator and provides time-stamped logs of alarms, faults and other relevant events.

SISynch can be provided as a stand-alone synchronous motor excitation sub-system or it can be implemented with optional additional stator protection and remote Internet of Things connectivity to establish a comprehensive, complete and fully integrated motor control, monitoring and protection system. Optional stator protection can be provided using the SIPROTEC 7SK8X family of motor protection relays and Siemens MindSphere provides a cloud-based, open IoT operating system for remote data transmission and analytics to drive motor and associated process performance improvement.
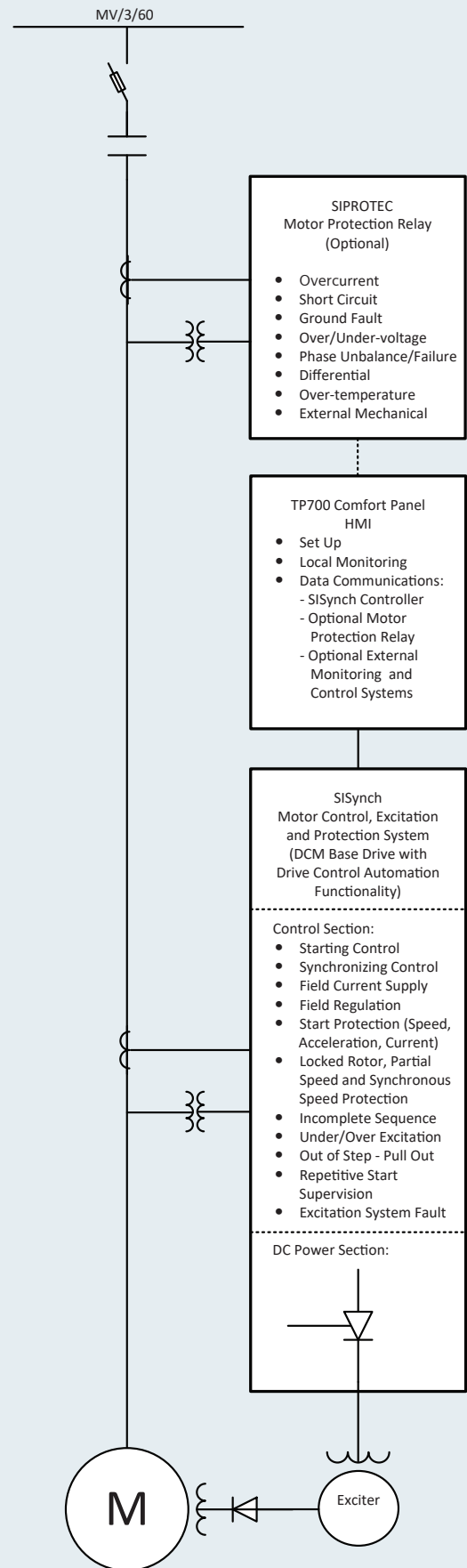

Figure 1: Typical SISynch Brushless Application

SISynch features

Power Converter:

- SINAMICS DC Master thyristor converter
- Standard ratings 30A, 60A and 210A (higher ratings are available on request)
- Advanced Control Unit
- I/O and communications interface
- Incoming power: 480/3/60, 208/3/60 (other 3-phase inputs are available on request)
- Isolating contactor

Control:

- Control logic programmed in SINAMICS DCM drive control automation software platform
- Features selected & parametrization performed through TP700 HMI

Regulation:

- Converter provides current regulated output to maintain constant current with changing excitation circuit resistance
- Control modes: excitation current, power factor, reactive power and remote bus power factor regulation
- Seamless running transition between control modes
- Limiters for minimum and maximum exciter current
- kVAR sharing or field forcing

Motor Startup:

- Initiated by external supervisory contact (control panel, process PLC, etc.)
- Methods: across the line, autotransformer, reactor, and electronic soft start implemented with one or more circuit breakers or contactors

Field Application Options:

- By stator current and timer
- By stator current and mechanical speed (rotor speed sensor required)
- By stator current and field circuit frequency (brush type)
- External supervisory contact

Protection:

- Protection algorithms programmed in SINAMICS DCM drive control automation software platform
- Locked rotor, partial speed and synchronous speed protection
- Motor startup peak current incomplete protection
- Zero motor current at start
- Breaker/contactor closed feedback missing
- Motor start completion time exceeded (Incomplete sequence)
- Over-excitation
- Under-excitation (field loss)

- Under-speed
- Out-of-step - Pull out
- Consecutive start management
- Internal hardware failure protection

Operator Interface:

- TP700 HMI for selection of control mode and set points and display of alarms, faults, events log, etc.
- "Ready to Load" signal to customer's external process control system
- SINAMICS DCM test mode provides status indication and troubleshooting parameters while motor is de-energized and stationary.
- Temperature accounts calculation
- Select or deselect built-in features
- Analog outputs of excitation current and power factor for external control system use

Packaging Options:

- Pre-wired back panel for installation within enclosure provided by others
- Fully enclosed
- Loose parts for OEM applications

Additional Features:

- Siemens SICAM-T power transducer provides SISynch motor operational value inputs
- Siemens standard "Starter" application development software simplifies commissioning setup and reduces troubleshooting time with on-demand recording of values as traces during a fault

Available Options:

- Comprehensive motor protection using SIPROTEC: (Other motor protection relay options available)
- Remote condition monitoring and operational data analytics via MindSphere
- Obsolete component replacement for legacy equipment retrofit applications: field application contactor, field discharge resistor, electromechanical control relays, etc.
- Current outputs in excess of standard ratings for high current brush type retrofit applications
- Fully redundant HMI/DCM design for high reliability applications

Additional resources (Click to view document):

- SISynch Product Specification and Request for Quote Checklist

- SINAMICS DC Master Base Drive

- SINAMICS Drive Control Chart Function Manual

- Machine-level Visualization with SIMATIC TP700 HMI

- SIPROTEC Motor Protection Relays

- MindSphere - the cloud-based, open IoT operating system

- SIMOTICS HV HP high-voltage motors up to 70 MW

- Siemens Retrofitting and Optimizing Electric Motors and Converters

- UL Documentation

Call us today, we can help

Siemens SISynch includes standard and customized solutions for brushless and brush-type synchronous motors by most manufacturers. Contact us at (800) 333-7421 to learn how SISynch can change the way your company manages service and maintenance. Let us show you how to evaluate and utilize your equipment data to gain breakthrough insights, driving the performance and optimization of your motor drive train for maximized uptime.