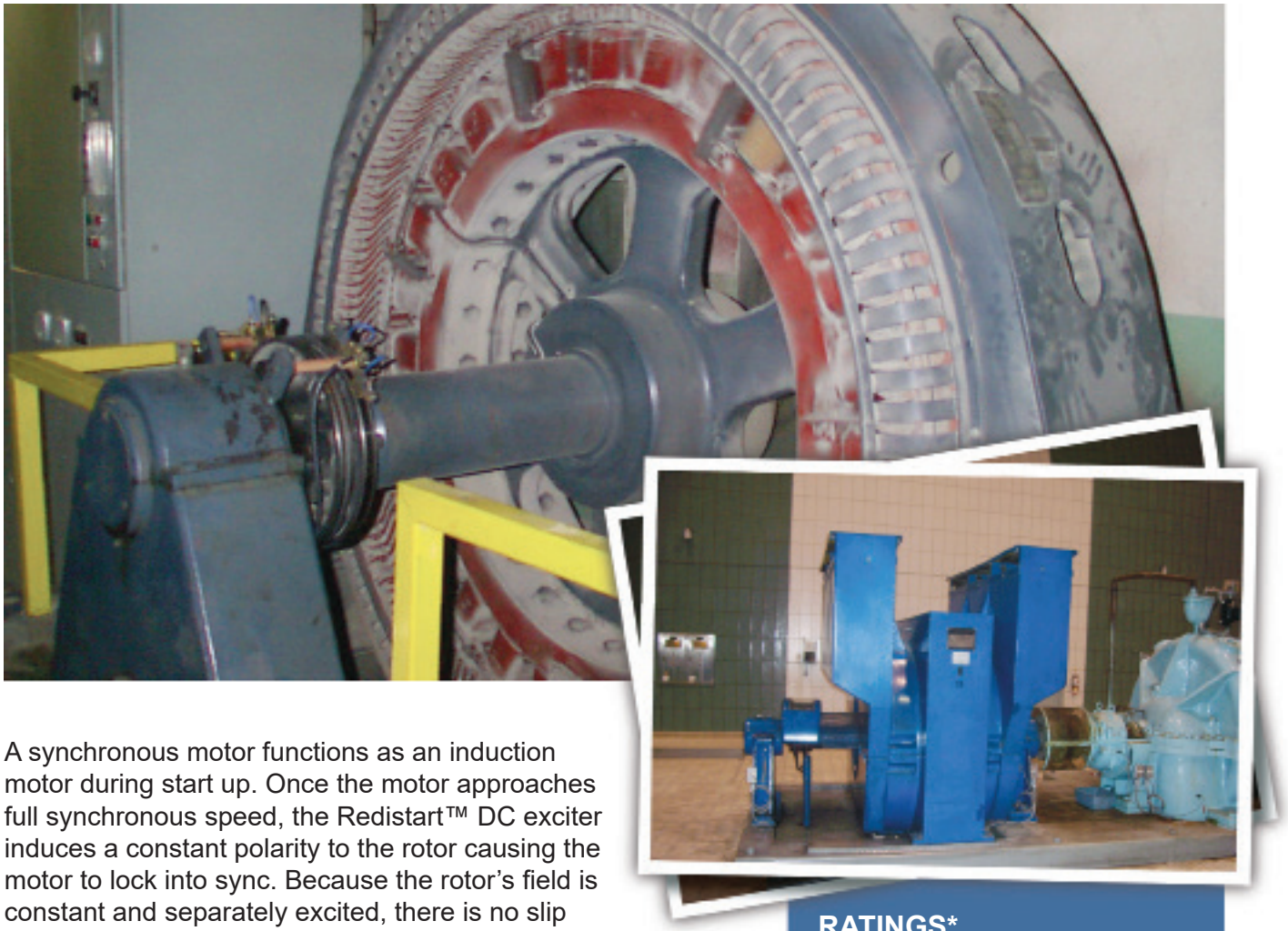
BENSHAW
Applied Motor Controls
AN AMCONEX GROUP COMPANY

Solid State Synchronous Excitation Control

MICROPROCESSOR-BASED CONTROLLER FOR BRUSH TYPE OR BRUSHLESS SYNCHRONOUS ELECTRIC MOTORS

Rapid | Rugged | Global

INTRODUCTION



A synchronous motor functions as an induction motor during start up. Once the motor approaches full synchronous speed, the Redistart™ DC exciter induces a constant polarity to the rotor causing the motor to lock into sync. Because the rotor's field is constant and separately excited, there is no slip required to produce torque. This allows the motor to run at synchronous speed.

The Benshaw synchronous package consists of a Synchronous Excitation Package (SEP) that is connected to the rotor section in conjunction with a discharge resistor. This SEP is supplied for brush type and brushless exciters.

RATINGS*

Motor: 50 - 50,000HP
200 - 1000VAC

Includes discharge resistor and synchronous excitation package for brush type or brushless motor.

Exciter: 50 - 500VDC
30 - 750A

* For rotor control only: Please consult factory for details.

RediStart™

KEY FEATURES

Synchronous motors are utilized for a number of reasons; applications that require precise motor speed, to obtain greater efficiencies and facility power factor correction. Since synchronous motors can be operated at leading power factor, they are also used to correct a facility's lagging power factor created by all the other induction motors being operated. This correction reduces the penalty a customer pays the utility company for creating poor power factor.

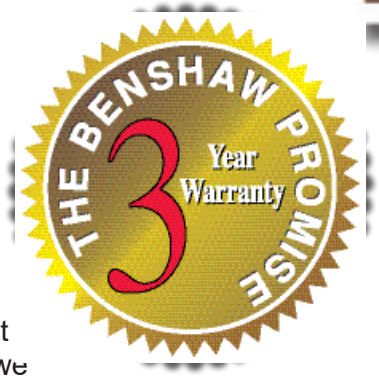
Synchronous motors are not sensitive to harmonic problems.

- Modular power stack design
- Solid state synchronous rotor control
- Benshaw synchronous technology
- Can be supplied with MX2 or MX3 starter control
- Modbus communication
- Stepless control
- Reduced maintenance
- Configurable output relays
- Can be added to existing equipment
- Integral bypass contactor design
- Brush type and brushless control
- Advanced synchronous motor protection
- Reduction in size compared to existing field control
- Reduces inrush while maintaining torque

Factory Warranty

Benshaw offers a three year warranty on all of our solid state starters.*

Other manufacturers limit their warranties to one year. But at Benshaw, we believe that because we build them better, we can guarantee them longer.



* With factory startup

TECHNICAL SPECIFICATIONS

Multiple Control Functions

- Slip percentage
- Field apply delay
- Field forcing level
- Field forcing time
- Stop mode
- Brake level
- Dynamic braking time
- Inch field level
- Inch field application time
- Inch UTS relay delay time

Patented Soft Start Functionality

- TruTorque ramp
  - Adjustable initial current
  - Adjustable max. current
  - Adjustable ramp time
- Current ramp
  - Adjustable initial current
  - Adjustable max. current
  - Adjustable ramp time
- Power ramp
  - Adjustable initial current
  - Adjustable max. current
  - Adjustable ramp time
- MV built-in self test (BIST)
- CYCLO converter control
- Linear/tach feedback control
- Programmable decel modes
- Adjustable kick current
- Dual ramp selection
- Voltage ramp

Integrated Electronic Protection

- Motor thermal overload
- Phase loss
- Up to speed timer exceeded
- Low line voltage
- Instantaneous overcurrent
- Overcurrent
- Undercurrent
- Current imbalance
- Inline contactor fault
- Control power low
- Stack over temperature
- Motor PTC input
- Shorted or open SCR
- Disconnect fault
- Phase reversal
- RTD modules
- Low line frequency
- Residual ground fault
- Independent starting and running OL's

Real-Time Metering and Diagnostics

- VARS
- KW hours
- Run time - hours / Run time - days
- MW hours
- Phase order
- Current imbalance %
- Line frequency
- Analog input
- Peak starting current
- Analog output
- Power %
- RTD temperatures
- Real-time clock
- Last starting duration
- Ground fault current

Eight Digital Inputs Configurable To

- Stop
- Fault
- OL reset
- Fault reset
- Bypass/inline confirmation
- Local/remote selection
- Heater enable / disable
- Brake enable/disable
- One dedicated start input
- Disconnected
- Dual ramp selection
- Slow speed

Six Outputs Configurable To

- Faulted
- Running
- Up to speed
- Alarm condition
- Ready condition
- Locked out
- Over/under current
- OL alarm
- Shunt trip
- Ground fault
- Energy saver indication
- Heating indication
- Slow speed forward/reverse
- DC braking
- Cooloing fan

One Analog 4-20MA / 0-10VDC Input Configurable To

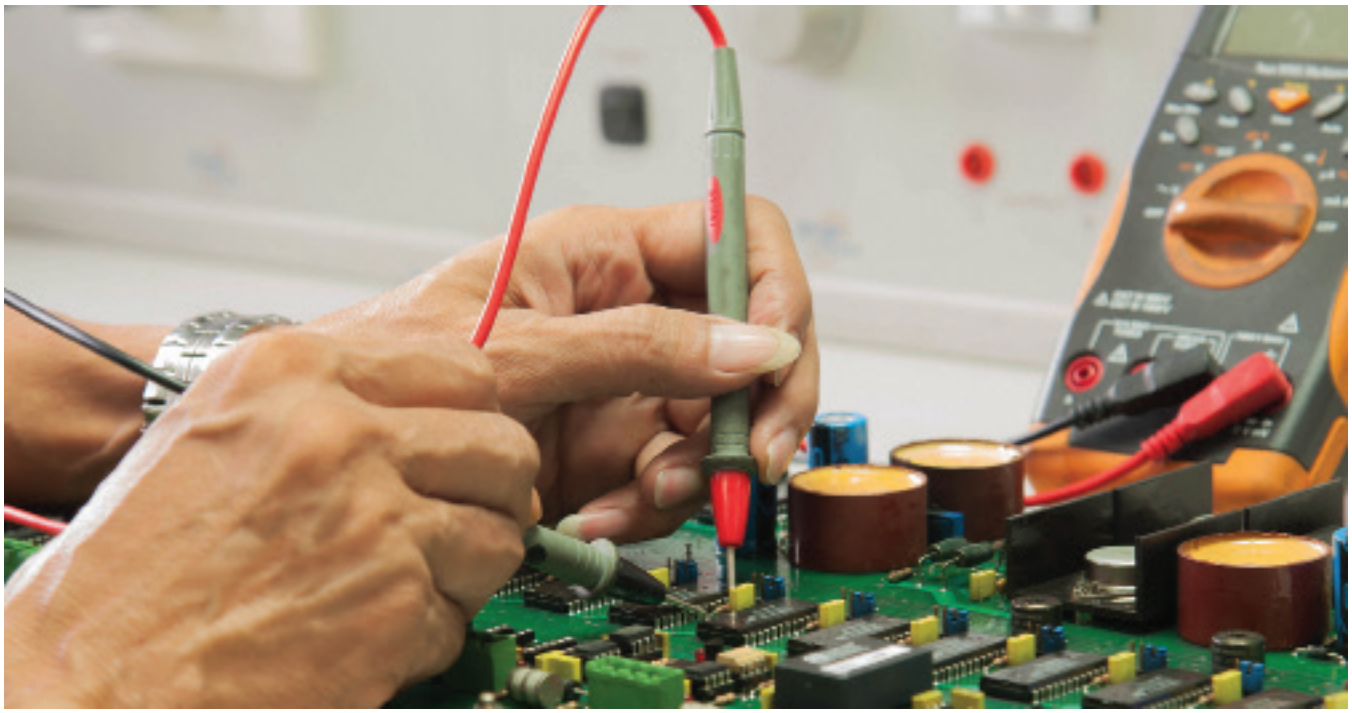
- Trip high/low level

One Analog 4-20MA / 0-10VDC Output Configurable To

- Current (0-200%/0-800%)
- Voltage (0-150%)
- MW (0-1 MW)
- Analog input (0-100%)
- Firing (0-100%)
- Calibration
- OL (0-150%)
- KW (0-10 KW/0-100 KW)

RediStart™

SUPPORT



Benshaw is dedicated to providing comprehensive 24/7 technical support. Our support personnel provide repair, spare parts, field engineering, retrofit and training services, when and where you need us. Our experienced support team is backed by the latest diagnostics and repair tools and an extensive parts inventory to minimize downtime and maximize productivity.

- Phone support hotline (1-800-203-2416)
- Centralized coordination of all support services
- 24-hour dispatch from our operations in Pittsburgh, PA (USA) and Listowel, ON (Canada)
- Overnight parts shipment available

Synchronous Motor Checklist

Motor Data:

HP: _____

Voltage: _____

FLA: _____

Secondary Voltage: _____

Secondary Amps: _____

Select one:

☐ Brush Type ☐ Brushless

For Use with (select one):

☐ Existing starter (provide drawings & details of existing unit)

☐ New Benshaw starter (provide additional details for Benshaw starter as applicable)

_____

_____

_____

Additional Requirements:

Power Factor Control _____

Enclosure Type (select one): ☐ NEMA 1 ☐ NEMA 12 ☐ 3R Other

Additional Options (specify any pilot devices, meters, etc.):

_____

_____

_____

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SBR-100018-00-01 | Updated 01-01-2026 | Printed in the USA