# SMOR-B™

## DDS Feeder Management System

*Numerical protection, monitoring, analysis and energy management system.*

### Features and Benefits

- Microprocessor-based
- Programmable logic I/Os for easy configuration
- Three selectable time/operating curves
- Drawout modules for serviceability
- Complete overcurrent protection
- Event recording and oscillography
- IRIG-B synchronization

### Applications

- Medium voltage lines and distribution feeders
- Main or backup protection in power transformers
- NEW enerVista.com compatible (see page 275)
- Capacitor banks, busbars and motors
- IEDs in substation automation and co-generation applications

### Protection and Control

- Phase, ground and negative sequence protection for TOC
- Over and undervoltage and frequency

### Monitoring and Metering

- Breaker health, trip circuit monitor, failure to close detection

### User Interfaces

- Configurable LED indicators
- RS232 ports, optional RS485 or fiber optic port

## Protection and Control

The SMOR-B, a digital feeder management system, provides feeder protection and control in one integrated package.

### Overcurrent Units

Overcurrent elements include:

- Phase and ground time delay
- Hiset and loset phase and ground instantaneous
- Negative sequence time delay

### Directional Units

Directional supervision of the phase and ground units, polarized by phase-to-phase voltage and zero-sequence respectively, with adjustable torque angle.

### Three-Phase Voltage

The three-phase under and overvoltage units can be adjusted to act on phase-to-phase voltage values. The undervoltage unit will not activate when the breaker is open.

### Ground Overvoltage

High and low voltage is calculated from the phase to ground inputs. The SMOR7000 has a dedicated open delta input.

### Breaker Control/Failure

Breaker opening and closure are supervised by separate opening and closing failure detectors.

### Autoreclosure

This function allows up to four shots and 50 trips per hour. Dead time is programmable for each shot. Programmable logic is also available.

### Cold Load Pickup

This function to prevent operation of the breaker overcurrent functions during breaker re-energization.

### Settings Tables

Three alternative settings tables are available.

### Time Synchronization

Synchronization can be controlled through the keypad, communication software or the IRIG-B input.

## Monitoring and Metering

The SMOR performs advanced monitoring and metering that includes:

### Monitoring

- Circuit breaker status
- Alarm and operation indicators
- Breaker tripping and closing circuit supervision (except for SMOR-0)
- Breaker health monitoring ($I^2t$)
- Phase sequence selection (ABC or CBA)
- Protection status self-checking

### Metering

- Measurement of I, $I_2$, V, VA, VAR, cos φ, and f
- Optional energy metering (kwh, kVarh)

### Load Profile Recorder

The average and RMS current are calculated for a 15, 30 or 60 minute period for each phase.

### Event Recording and Oscillography

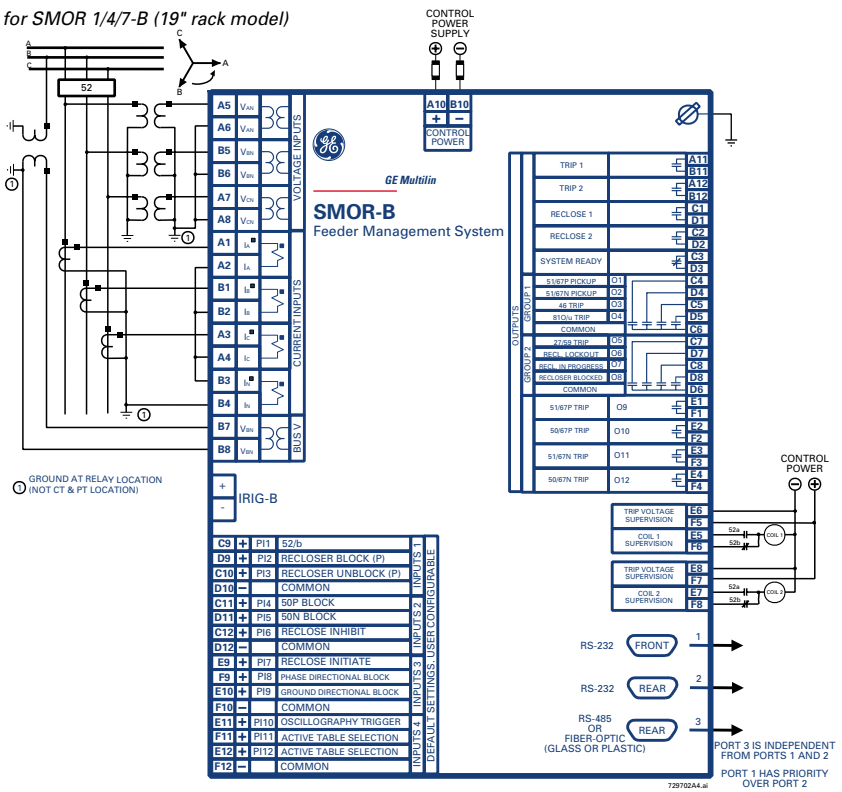
The SMOR-B is capable of storing 165 time-tagged events (one millisecond tagging) in non-volatile EEPROM memory. The oscillograph can be triggered by events or inputs, and records either digital or analog signals at 16 samples per cycle. The SMOR can also record up to 255 time-stamped alarms. The relay stores a up to four records of 66 cycles each (pre-fault cycles are adjustable between two and 10) stored in Comtrade® file format, and visualized and analyzed with GE-OSC™ software.

### Inputs and Outputs

- Up to 12 digital user configurable inputs are available
- Up to 17 configurable outputs are available

## Typical Wiring

*for SMOR 1/4/7-B (19" rack model)*



# SMOR-B™ Technical Specifications

## METERING

| | |
|---|---|
| **Frequency:** | 50/60 Hz |
| **Nominal phase current:** | 1 or 5 A (depending on model) |
| **Nominal ground current:** | 1 or 5 A (depending on model) |
| **Nominal voltage:** | 100/√3 – 220/√3 VAC |
| **Auxiliary voltage:** | 24 – 48 VDC, ±20%<br>110 – 250 VDC, ±20% |

## COMMUNICATIONS

| | |
|---|---|
| **Local communication:** | LCD alphanumeric display with two lines of 16 characters per line; 20 button frontal keypad |
| **Remote communication:** | |
| (local or remote PC and communications net): | |
| **Mode:** | half duplex |
| **Speed:** | 1200 – 19200 bps |
| **Physical media:** | |
| **RS232 (ports 1, 2 and 3)** | |
| **RS485 (port 3 optional)** | |
| **Plastic fiber optic (port 3 optional):** | |
| | Type of connector: HFBR-4516 |
| | Power supplied: 8 dBm |
| | Receptor's sensitivity: -39 dBm |
| | Wave length: 660 nm |
| **Glass fiber optic (port 3 optional)** | |
| | Type of connector: STA |
| | Power supplied: 17.5 dBm |
| | Receptor's sensitivity: -24.5 dBm |
| | Wave length: 820 nm |
| **Synchronization:** | IRIG-B |

- DB9 connector for RS232 ports on the front (1) and on the rear (2).
- Three-pin Phoenix type connector for RS485 port on the rear (3) with 1 mm plastic fiber optic or 50/125 glass fiber optic option.

*Specifications subject to change without notice.

## INPUTS

### THERMAL CAPACITY

| | |
|---|---|
| **Current circuits:** | |
| **Continuously:** | 4 x $I_n$ |
| **During 3 sec:** | 50 x $I_n$ |
| **During 1 sec:** | 100 x $I_n$ |
| **Voltage circuits:** | |
| **Continuously:** | 2 x $V_n$ |
| **During 1 min:** | 3,5 x $V_n$ |

### BURDENS

| | |
|---|---|
| **Current circuits:** | 0.5 VA for $I_n$ = 5 A<br>0.1 VA for $I_n$ = 1 A |
| **Voltage circuits:** | 0.2 VA, $V_n$= 63.5 V |
| **DC burden:** | |
| **During operation:** | 12 W |
| **Per each activated input:** | 8 mA/1 W, $V_{aux}$: 125 VDC |

## OUTPUTS

### TRIPPING CONTACTS

| | |
|---|---|
| **Contact capacity:** | |
| **Maximum operating voltage:** | 440 VAC |
| **Continuous current:** | 16 A |
| **Make and carry:** | 25 A |
| **Breaking:** | 4000 VA |

### SIGNALING CONTACTS

| | |
|---|---|
| **Contact capacity:** | |
| **Maximum operating voltage:** | 380 VAC, 250 VDC |
| **Continuous current:** | 8 A |
| **Make and carry:** | 8 A |
| **Breaking capacity:** | 1760 VA |

## ENVIRONMENTAL

| | |
|---|---|
| **Temperature:** | |
| **Storage:** | -40 to +85° C |
| **Operation:** | -20 to +70° C |
| **Humidity:** | Up to 95% without condensing |

## MECHANICAL CHARACTERISTICS

- Metallic package in 19" rack 2 units high or half 19" rack 4 units high.
- Frontal MMI with LCD display and keypad.
- Four rear terminal blocks (six in models with expansion board) including connector for IRIG-B time synchronization.
- Protection class IP52 (according to IEC 529)

## PACKAGING

| | |
|---|---|
| **Dimensions:** | 17.12" x 7.95" x 3.46"<br>(435 mm x 202 mm x 88 mm) |
| **Mod 04B:** | 271 mm W x 260.3 mm D x 176 mm H |
| **Weight:** | |
| **Not packaged:** | 13.2 lbs (6 kg) |
| **Packaged:** | 15.4 lbs (7 kg) |

## TYPE TESTS

| | |
|---|---|
| **Isolation test voltage:** | 2 kV, 50/60 Hz, 1 min |
| **Surge test voltage:** | 5 kV peak, 0.5 J |
| **Interference:** | Class III according to IEC 255-22-1 |
| **Electrostatic discharge:** | Class IV according to IEC 255-22-2 |
| **Radio interference:** | Class III according to IEC 255-22-3 |
| **Fast transient:** | Class IV according to IEC 255-22-4 |
| **Sinusoidal vibration:** | Class II according to IEC 255-21-1 |
| **Shock:** | Class I according to IEC-22521-2 |
| **Radiofrequency emission:** | according to IEC 41B(Sec) 81 and EN55022 class B |

## APPROVALS

| | |
|---|---|
| CE Compliant | UL - UL listed for USA and Canada |

6

## Communications

The SMOR-B features one front and one rear RS232 port, and a second rear port that is available as RS485 or fiber optic.

GE-LOCAL™ software allows local or remote communications via computer. GE-POWER™ software can connect the SMOR to a communications net allowing it to be part of an integrated system.

## SMOR-B Guideform Specifications

For an electronic version of the SMOR-B guideform specifications, please visit: www.GEindustrial.com/Multilin/specs, fax your request to 905-201-2098 or email to literature.multilin@indsys.ge.com.




# Ordering

**SMOR * * * * * 21 * * * * B**

| | | |
|---|---|---|
| SMOR | | |
| 0 | | 3 x $I_{ph}$ + $I_n$ (without voltage function and without recloser) |
| 1 | | 3 x $I_{ph}$ + $I_n$ + 3 x V |
| 2 | | 3 x $I_{ph}$ + $I_n$ (only available in half-rack case) |
| 4 | | 3 x $I_{ph}$ + $I_n$ + 3 x V – isolated ground |
| 7 | | 3 x $I_{ph}$ + $I_n$ + 3 x V + $V_0$ (dedicated) |
| 8 | | 3 x $I_{ph}$ + $I_n$ + 3 x V – Petersen coil |
| 1 | | Plastic fiber optic + RS232 communications |
| 2 | | Glass fiber optic + RS232 communications |
| 3 | | RS232 + RS485 |
| B | | **SMOR 0/1/2/7*B**: phase: 0.2 – 2.4 A, ground: 0.2 – 2.4 A |
| C | | only phase: 1 – 12 A, ground: 0.2 – 2.4 A |
| D | | phase: 1 – 12 A, ground: 0.5 – 6 A |
| E | | phase: 1 – 12 A, ground: 0.1 – 1.2 A |
| F | | phase: 0.5 – 6 A, ground: 0.2 – 2.4 A |
| G | | phase: 0.5 – 6 A, ground: 0.1 – 1.2 A |
| H | | phase: 2 – 16 A, ground: 0.2 – 2.4 A |
| B | | **SMOR 4/8*B**: phase: 0.2 – 2.4 A, ground: 0.005 – 0.1 A |
| C | | only phase: 1 – 12 A, ground: 0.005 – 0.1 A |
| | 1 | P1, P2, P3: M-LINK protocol |
| | 2 | P1, P2: M-LINK protocol; P3: ModBus® RTU protocol |
| | M | HMI language: Spanish |
| | D | HMI language: English |
| | | 0 SMOR 0/2-B |
| | | 1 SMOR 1/4/7-B |
| | | F 24 – 48 VDC auxiliary voltage |
| | | G 48 – 125 VDC auxiliary voltage |
| | | H 110 – 250 VDC auxiliary voltage |
| | | 0 0 Options (special models) |

†In the ordering code, the last three digits are to be replaced by the MOD code. Example: SMOR-B in half-rack case SMOR*****21**04B

## Special Models†

MOD 03B: Energy metering + sequence coordination

MOD 04B: Half-rack case

MOD 06B: Energy metering + half-rack case