SST-2000A/H Series

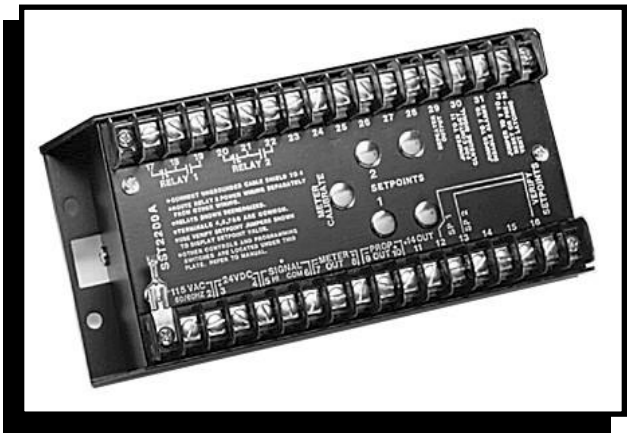
DYNALCO CONTROLS

Speed Switches/ Transmitters

SST-2000A™ and SST-2000H™ Series Speed Switches/Transmitters receive signal input from a passive or active magnetic pickup, shaft encoder, contact closure, flowmeter, etc., to provide proportional analog outputs and either 0, 2, or 4 relay trip setpoints.

2-Year Warranty

See: THIRD PARTY APPROVALS*



*THIRD PARTY APPROVALS

CSA *(Canadian Standards Association)*

SST-2000A Series: General certification: LR 92270

SST-2000H Series: Cl. I, Div. 2, Grp. D approval: LR 45322

Approval contingent upon housing an SST-2000H Series device in a CSA-certified enclosure.

CE *(Conformité Européen)*

SST-2000A & SST-2000H

89/336/EEC, Light Industrial;
72/23/EEC, Low Voltage Directive

ABS *(American Bureau of Shipping)*

SST-2000A Series only

American Bureau of Shipping: type approval for use in classed vessels.

FEATURES

- Proportional outputs of either 4–20 mA (standard), 0–5 Vdc, or 0–10 Vdc are field-selectable. Standard 0-1 mAdc meter output included.
- Models available with up to four alarm setpoints.
- Field-selectable frequency range.
- Field-adjustable sensitivity control.
- Field-programmable for many types of sensors, including contact closure input.
- Repeater output drives counters and self-powered digital tachometers such as Dynalco's SPD-100 and SPD-700.
- Regulated 14 Vdc output powers active pickups (e.g. M910), accessories, and digital meters such as DPM-105 or MTH-103D, and the 12 Vdc versions of the internally lighted SPD-100L and LST-100L.
- Alarms are field-configurable for DPDT (SST-2400 A or -H only), overspeed, underspeed, energize, de-energize, latch, auto-reset.
- Integral VERIFY, requires external meter. Permits viewing and setting of setpoint value without actuating the relays.
- **Input Frequency:** Full-scale values from 0–0.1Hz (6 pulses per minute) to 0–50,000 Hz.
- **Function:** Converts frequency input (speed, rate) into linear proportional dc output. Provides alarm setpoints for over- and underspeed control and for sequential, startup, and shutdown switching.
- **Applications:** Includes engines, machines, I/P drivers, instrumentation, process control, recording, measurement.
- **Signal Sources:** Includes magnetic pickups, ac generators, contact closures, photocells.
- **Output Range Capability:** Current source up to 50 mAdc output always included.
- **Alarm Setpoints:** Available with two or four relays. Also available with no relays if only proportional outputs are required.

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SPECIFICATIONS

ELECTRICAL

Input Signal Frequency Range: Standard input range is field-selectable from 0–80 Hz to 0–20 kHz. Ranges as low as 0–0.1 Hz and up to 0–50,000 Hz are available options. Waveform can be pulsed, sinusoidal, square, TTL, or CMOS. Full-scale frequency adjustable using switches and a calibration potentiometer underneath the cover plate.

Input Signal Sensitivity: Field-adjustable from approximately 5 mVrms to 100 mVrms by internal sensitivity potentiometer. Normal factory setting is 25 mVrms. Jumpering terminal 30 to 11 desensitizes the unit to a 1.0 volt threshold for operation from logic levels, shaft encoders, Dynalco PG-278 pulser, or contact closures. Maximum permissible signal is 50 Vrms for the standard unit.

Input Impedance: Nearly infinite at low signal levels; a minimum of 10 kΩ at signal levels exceeding +15.0 V peak or –1.0 V peak.

Power: 115 Vac ±10%, 47–420 Hz/22–30 Vdc, maximum 5 W or 150 mAdc. Optional: 220 Vac, ±10%, 50/60 Hz/22–30 Vdc.

Proportional Output: 4–20 mAdc. The maximum load is 1 kΩ with the unit powered by 115/220 Vac or 30 Vdc; and 750 ohms with the unit powered by 22 Vdc. The maximum load is approximately linear between 22 Vdc and 30 Vdc. Switches beneath the cover plate allow selection of 0–5 Vdc or 0–10 Vdc for use into an external load resistance of 20 kΩ or higher. Other custom ranges are available. The output current is independent of load resistance up to the rated load resistance.

Span and zero adjustment potentiometers are located beneath the front cover plate. They have a minimum adjustment range of ±5% of full-scale.

Auxiliary Meter Output: Proportional 0–1 mAdc, filtered, for meter or recorder loads up to 750 Ω. A meter adjustment potentiometer allows calibration for the particular meter used. If a meter is not connected, these terminals yield an unloaded proportional output of 0–10 Vdc with an internal resistance of approximately 10 kΩ.

Supply Output: Regulated +14 Vdc (±5%), at terminals 11(+) and 4(–); maximum load 40 mAdc.

Repeater Output: Square wave 14 V peak-to-peak, positive going, at terminals 29 and 4 to operate signal-powered digital tachometers SPD-100 and SPD-700. Output usable as a high level signal source for counters, etc. Maximum load: 2 mA.

Output Ripple and Noise: 0.1% of full-scale maximum over 10% to 100% of full-scale.

Verifying Setpoints: *No input signal required.* Jumpering specific terminals overrides the 0–1 mA auxiliary meter output at terminals 7 and 8; instead, the actual setpoint value is output and viewed using an external meter at terminal 7 and 8. For example, jumpering terminals 12 and 16 provides the value of setpoint 1 at terminals 7 and 8. This allows viewing and adjusting relay setpoints without having to run the engine. (Unit must be powered.)

Response Time: 150 milliseconds, 10% to 90% rise, is standard. Full-scale frequency ranges below 80 Hz are proportionally slower.

Linearity: 0.1% of full-scale (0.05%, typical), all outputs.

Output and Setpoint Stability: Less than 0.05% of full-scale change with a 10% change in supply voltage. The typical temperature coefficient is ±0.01% per °F (±0.018% per °C).

RELAYS

Logic: Field-programmable by switches for overspeed, underspeed, energize, de-energize, latch, auto-reset, and DPDT.***

Ratings: ***"A" series:*** *Contact rating: 6.0 A @ 28 Vdc or 115 Vac (resistive); 2.0 A @ 220 Vac. Maximum inductive load 75 Vdc, 1.0 A, into 500 mH, for up to 100,000 cycles; SPDT.****

"H" series: *Contact rating: 5 A (resistive) @ 24 Vdc; 1.0 A @ 120 Vac; 0.5 A @ 220 Vac; SPDT.****

****For DPDT, relays 1 & 3 and 2 & 4 work together as separate DPDT trips.*

Alarm Setpoints: Relay setpoints are easily adjustable using 25–turn cermet potentiometers. Potentiometer adjustments are accessible through holes in the cover plate.

Hysteresis (differential between pull-in and dropout) is typically 1% of full-scale frequency.

INTERNAL COMMONS, ISOLATION: Signal input (low side, terminal 6) is common to: the auxiliary output (low side, terminal 7), to the dc supply (terminal 4), and to the main proportional output low side (terminal 9). Relay contacts are always isolated.

a. When powered with ac, all circuitry is isolated from the power line by the built-in supply transformer.

b. When powered with dc, the transmitter output is *not* isolated from the dc power source. Any load driven by the transmitter (i.e. recorder, controller, etc.) must have the same common as the negative side of the dc supply or should have an isolated and floating input circuit totally isolated from the dc

*(**RELAYS, internal commons, isolation** — continued)*

power source powering the transmitter. A loop isolator should be used for these applications.

A signal isolation transformer option is available to isolate the transmitter input from the probe or sensor.

ALARM DISABLE: Jumpering terminal 31 to terminal 7 disables all alarms, allowing for startup conditions and special functions.

ALARM RESET: Momentary jumpering of terminal 32 to terminal 7 resets all latched alarms. Permanent jumpering converts all latching alarms to auto-reset.

OPTIONS

ENCLOSURES: XP and NEMA rated enclosures are available.

OPEN PICKUP: Relay 1 switches in the event of an open or disconnected magnetic pickup. Relay 1 will still react when its setpoint is traversed. ***NOTE:*** *Not available with signal isolation transformer option.*

PNEUMATIC TRIP: Pulses relay 1 for 100 milliseconds; trips optional Dynalco SPV-200 Solenoid Pneumatic Valve on overspeed.

UNDERSPEED CLASS "C" LOGIC: Arms relay 2 as setpoint 2 is traversed on increasing speed. Pulses relay 2 as setpoint 2 is traversed on decreasing speed. Use for tripping the pneumatic SPV-200 on underspeed or for general underspeed electrical shutdown.

EXPANDED SCALE INPUT: Provides full meter output, full proportional output, and full setpoint range over a limited input range e.g. 0–1 mA and 4–20 mA over 800–1000 Hz input frequency.

ENVIRONMENTAL

TEMPERATURE RANGE: –40°F to +160°F (–40°C to +71°C) operating. –40°F to +180°F (–40°C to +82°C) storage.

Weight: 2.6 lbs (1.17 kg)

HOW TO ORDER

Although many SST-2000A & SST-2000H parameters are field-programmable, most units are set at the factory. Standard Power: 115 Vac/22–30 Vdc [See item (i) for optional power.]

Please specify:

1. **Full-scale frequency range:** for example: 0-1000 Hz corresponds to the meter display range of 0-2000 rpm.

   Full-scale signal frequency (Hz) =

   $$\frac{\text{Full-scale rpm X no. of sensed gear teeth}}{60}$$

   - Standard ranges: from 0–80 Hz to 0–20 kHz.
   - See 8(g) for *nonstandard* ranges.
2. **Signal source:** See 8(l) & 8(m) for optional inputs.
3. **Specify Model:** (See *Third Party Approvals*, front page)

   [Second digit = number of setpoints]

   SST-2000A or SST-2000H = 0 Setpoints
   SST-2200A or SST-2000H = 2 Setpoints
   SST-2400A or SST-2000H = 4 Setpoints
4. **Specify for each relay setpoint**
   (a) Value of the setpoint
   (b) Overspeed or underspeed alarm
   (c) Energizes or de-energizes on alarm
   (d) Automatic reset or latching on alarm
   (e) DPDT relay function [See 8(f)]
5. **Proportional output** (e.g. 4–20 mA) over the full-scale frequency range specified in item 1.
6. **Specify any peripheral equipment** to be furnished e.g. magnetic pickup, pulser, remote analog meter, remote digital meter.
7. **Optional enclosures:** XP and NEMA rated enclosures available.
8. **Specify optional features needed:**
   Refer to OPTIONS (above) for details.
   (a) Signal isolation transformer.
   (b) Signal isolation transformer and input limiting resistor to sense the frequency of a power line. (Specify input voltage range.)
   (c) Open Pickup Alarming on setpoint 1.
   (d) Set up relay 1 to transfer for only 100 milliseconds on overspeed: used to pulse Dynalco's Solenoid Pneumatic Valve SPV-200.
   (e) Set up relay 2 for Class "C" logic transfer for only 100 milliseconds on underspeed.
   (f) DPDT for relays 1 and 2 available *only* on four setpoint units: provides two DPDT relays.
   (g) Nonstandard input ranges (minimum: 0–0.1Hz; maximum: 0–50,000 Hz).
   (h) Expanded scale input. Specify display range.
   (i) 220 Vac, ±10%, 50/60 Hz/22–30 Vdc.
   (j) Custom proportional output range (50 mA @ 20 V, maximum.
   (k) Custom meter output range (2 mA @ 10 V, maximum).
   (l) Desensitized input.
   (m) Nonstandard (e.g. TTL, contact closure) input signal.

CONNECTION DIAGRAM

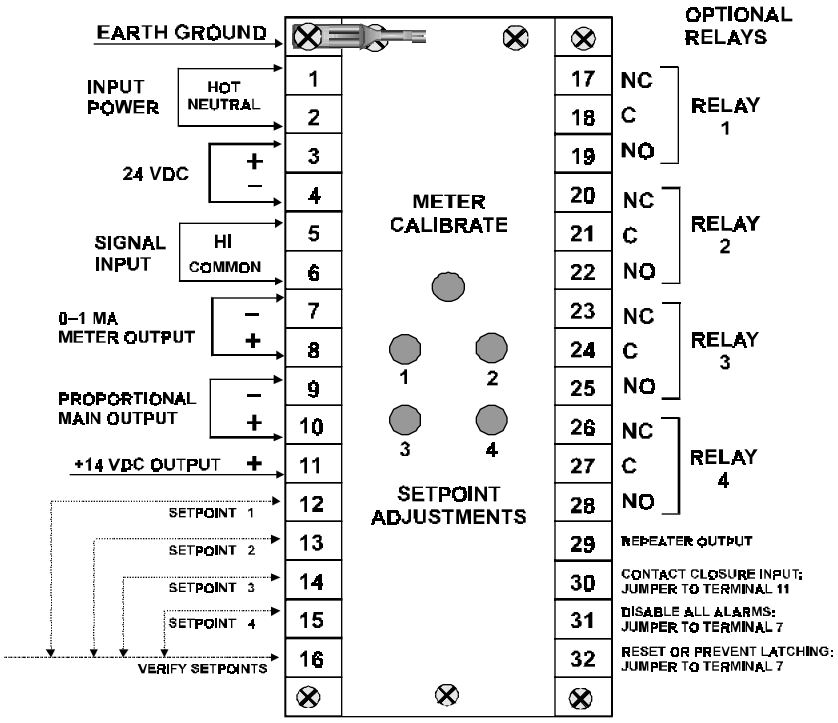
◆**USE SHIELDED CABLE:** Connect ***ungrounded*** shield to terminal 4. To prevent electrical noise interference, route power line and all relay connections separately from the signal, meter, and reset lines.

CAUTION: If shield contacts ground, a ground loop may occur; damage to the unit can result.

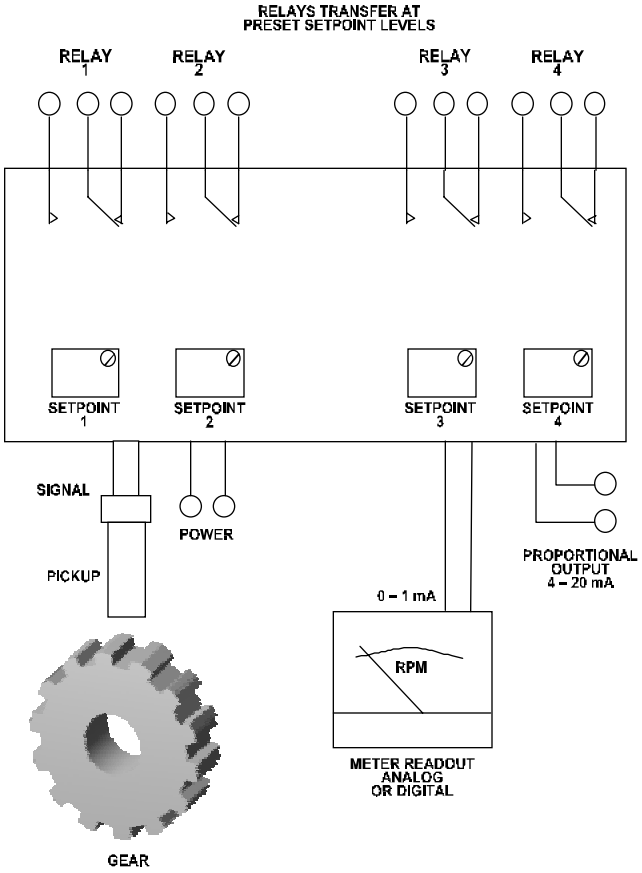
◆Terminals 4, 6, 7, and 9 are internally tied together to common.

◆Any single VERIFY setpoint jumper will enable the corresponding setpoint value to be displayed on a meter connected to terminals 7 and 8.

Drawings shown are identical for both an SST-2400A or SST-2400H



RELAY AND WIRING DIAGRAM



OUTLINE DRAWING

Dimensions in inches (cm)