

General Specifications

Model SCMS Programmable Computing Station

YEW SERIES 80

The SCMS Programmable Computing Station is a micro-processor-based, user-programmable instrument which can provide signal processing and "sequence" functions. It can communicate with the SLPC*E or SLMC*E to add extra I/O and program capacity and provide more computational power in time-critical applications.

- Variable/parameter selector switch and five-digit data display on front panel.
- Five-segment bar graph provides analog display.
- The user can write sophisticated programs by combining calculator-like instructions and functions — I/O instructions such as "read analog input" or "set contact-status output", computational functions and signal-processing functions such as square root with "low-signal cutoff", linearization and dead-time compensation. Conditional branching and subroutines are supported.
- There are ten status I/O points; each may be user-defined as either input or output. There are four PF function keys and lamps on the front panel; they are also treated as status I/O points, and are convenient for sequence control.
- Computational period is selectable: 0.1, 0.2 or 0.4 sec.
- Incorporates I/O signal level checks and self diagnostics.

STANDARD SPECIFICATIONS

Analog Input/Output Signals

Analog inputs	1 to 5V DC	4 points	Input resistance at least 1 M Ω
Analog outputs	1 to 5V DC	2 points	Load at least 2k Ω
	4 to 20mA DC	1 point	Load up to 750 Ω

Input Conversion Accuracy: $\pm 0.2\%$ of span.

Output Conversion Accuracy:

For current output, $\pm 1\%$ of span.

For voltage output, $\pm 0.3\%$ of span.

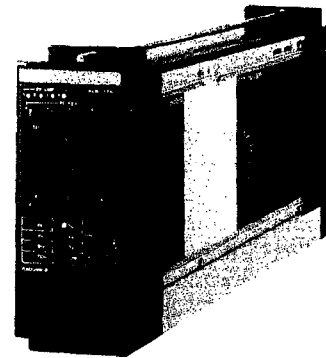
Status I/O Signals

Input	Input status — ON	Input status — OFF
Contact*	Contact closed — source up to 200 Ω	Contact open — source at least 100k Ω
Voltage	Low: -0.5 to +1V	High: +4.5 to 30V

* Contact rating at least 5V DC, 20mA.

Minimum Input Pulse Width: 420ms (for 0.4 sec. scan period); 220ms (for 0.2 sec. scan period); 120ms (for 0.1 sec. scan period).

Programmable Status I/O Signals: 10 points, each user-defined as either input or output. (The program can read the status of contact or voltage status inputs, and set the status of contact status outputs).



Function Key Status Input: Four PF keys on front panel.

Function Key Lamp: May be turned on/off by program, like status output. (Four PF lamps, above PF keys).

Fail Output Signal: 1 point (transistor contact status).

Status Outputs, Transistor Contact Rating:

30 V DC, 200 mA (resistive load).

On: Contact closed, Off: Contact open.

(Contacts open during power failure).

Note: Status I/O signals are isolated from internal circuitry; analog I/O signals are not — they use a common negative line. Power supply is isolated from internal circuitry.

Data Selection

Data Selection: By TYPE (data "type" or "item") and NO. keys. Selected data type is indicated by the corresponding lamp at left of TYPE/NO. keys, and item no. is indicated by large NO. (numeric) display. Corresponding data value is displayed on 4-digit-plus-sign numeric DATA display.

Data "Type" and "No.":

Xn; Input data*, four points corresponding to the analog input signals. (*May be displayed as a value in engineering units, but the units themselves are not displayed). Such input data is read in, and the register updated, at the start of each program cycle.

Yn; Six registers — three are output data, used to update the analog output signals at the end of each program cycle; three are general-purpose registers.

DI_n; Total of 10 DI "input" status flags and 16 DO_n; DO "output" status flags. There are ten I/O terminals; user may decide proportion which are to be DI inputs or DO outputs. DO status flags that are not used as outputs may be used as normal (read/write) flag registers.

(PF keys/lamps on front panel are treated as four additional status inputs/outputs respectively).

Pn; Coefficients/Parameters, 16 are for general use, 20 "belong" to program set function.

Tn; Temporary registers, 16 points. The data stored in temporary register T01 at the end of each program cycle is displayed on the front-panel bar graph.

CHK; Selected to display self-diagnostic error code.

For Communication Between SCMS and SLPC or SLMC:

En type selected to display the following communications data:

En; Transmitted numeric-input data; 15 points.

Dn; Transmitted numeric-output data; 15 points.

ClN; Transmitted status-input data; 15 points.

COn; Transmitted status-output data; 15 points.

Data Setting: First parameter TYPE Pn and NO. n are specified, then data setting keys (▼, ⋄, ▲) are used to increase/decrease the data.

Setting speed 100%/200 sec. for ▼ and ▲ keys alone, and 100%/20 sec. when fast setting key ⋄ also pressed. Setting enable/disable switch is on side panel.

Displayed Data

Bar Graph Display: Horizontal five-segment fluorescent bar graph display, corresponds to T01 (see above).

Programming

Program Size: For main program, 99 steps*.

For subprograms, total of 99 steps*.

No. of subprograms, 30 max.

* Computational functions and data read/write instructions each take one step.

Programming: The SPRG Programmer is connected, and the program is entered using a calculator-like language. The completed program is written to UV EPROM (Erasable Programmable Read Only Memory).

Computational Period: 0.1 sec., 0.2 sec. or 0.4 sec.

Maximum No. of Steps (including subroutine calls):

Can execute approx. 60 steps in 0.1 sec. period,

Can execute approx. 240 steps in 0.2 sec. period.

Can execute approx. 500 steps in 0.4 sec. period.

Computational Functions

Constants: 19 (fixed when program is stored in ROM).

Computational Coefficients/Parameters (default value is preset by user): 16 are for general use, 20 "belong" to program set function.

Temporary Registers: 19 numerical, 16-n for status flags (n is number of DOn points used as outputs).

Registers For Communication Between SCMS & SLPC/SLMC:

Transmitted numeric data; 15 inputs (En), 15 outputs (Dn).

Transmitted status data; 15 inputs (DIn), 15 outputs (DOn).

Function	Function name	Max. no. of times function may be used in program
General Functions	Addition, Subtraction,	—
	Multiplication, Division,	—
	Magnitude (absolute value),	—
	Square root with "low-signal cutoff",	—
	High selector, Low selector,	—
	High limiter, Low limiter	—
Functions with Unit Addresses	Two 10-segment transfer function (break points user-definable, equi-spaced segments)	2
	Two transfer functions with user-definable segment spacing	2
	High limit alarms	4
	Low limit alarms	4
	First order lag	8
	First order lead	2
	Dead time, velocity computations and moving average	3 total
	Velocity limiter	6
	Timers	4
	Program set unit	1
	Detection of status change	8
	Pulse input counter	4
	Pulse rate output	2
	Logical Functions	AND, OR, XOR, NOT
CMP (test if greater than or equal)		—
Branching, Conditional branching,		—
Subroutine calls		—
Signal switching		—

Note: 1. Where limits are indicated by a dash "—" above, this means that there is no preset limit.

2. There are also instructions such as register load/store and stack register push (load)/swap/rotate instructions.

Communication Functions

The SCMS can communicate with an SLPC/SLMC (style E). Maximum length of (SCCD) cable to SLPC/SLMC is 100 m (328 ft). Communications (update) period is 480 ms (not synchronized with computational period).

Power-Fail/Restart Functions

For a Power Failure of Up to Approx. Two Seconds:

Status prior to power failure retained.

For a Power Failure Longer than Approx. Two Seconds:

Restart mode can be selected from the following by "(backup) mode" parameter setting —

HOT (Computational data, and status prior to power failure, preserved).

COLD (Status of functions such as 1st order lag filters, dead time, velocity computation and other buffers are initialized; temporary registers and status outputs are reset to 0; 4 to 20 mA manipulated variable outputs are set to -20%, and 1 to 5 V outputs to -6.3%). Restarts from initial start status.

Data Memory Backup During Power Failure: By internal battery.

Life of Backup Battery (temperature up to 45°C):

- At least 5 years (normal operation),
- At least 1 year (backup operation).

Self-Diagnostic Features

Computation and Control Abnormalities: "FAIL" lamp lights, "FAIL" contact output opens. (Fail contact is also open during power failure).

Input/Output Signal Abnormalities (Input overflow, current output wire open circuit, computational overflow): "ALM" lamp lights.

Memory Backup Battery Low: "ALM" lamp flashes. For diagnostic purposes, numeric error codes corresponding to faults can be displayed using CHK item on front panel.

Normal Operating Conditions

- Ambient Temperature:** 0 to 50°C (32 to 122°F).
- Ambient Humidity:** 5 to 90% Relative Humidity (non-condensing).
- Power Supply:** Two versions, for "100 V" (standard) or "220 V" (option /A2ER). Both versions may use AC or DC, without change to the instrument:

Version	"100 V"	"220 V"
DC (polarity reversible)	20 to 130V	120 to 340V
AC (47 to 63Hz)	80 to 138V	138 to 264V

Maximum Power Consumption:

	24 V DC	100 V AC	220 V AC
SCMS-100	317 mA	15.2 VA	18.9 VA

Insulation Resistance:

- Between I/O Terminals and Ground: 100 MΩ/500 V DC.
- Between Power and Ground: 100 MΩ/500 V DC.

Withstanding Voltage:

- Between I/O Terminals and Ground: 500 V AC for 1 minute.
- Between Power and Ground:
 - 1000 V AC for 1 minute (100 V version).
 - 1500 V AC for 1 minute (220 V version).

Wiring:

Signal Wiring to/from the Field: ISO M4 size (4 mm) screws on terminal block.

Power and Ground Wiring:

- 100 V version: JIS C 8303 two-pin plug with earthing contact. (IEC A5-15, UL498).
- 220 V version: CEE 7 VII (CENELEC standard) plug.
- Power Cable Length: 30 cm (11.8 in).

Mounting:

Flush panel mounting. Instruments are in housings, and may be mounted individually or side-by-side. Instrument may be inclined with front up to 75° from vertical (rear of instrument lower than front).

Nameplate: Size 8 × 65.3 mm, cream semi-gloss finish. Lettering: In black, one or two rows each up to 14 alphanumeric characters long.

Front Panel Finish: Dark green (Munsell 2.5GY 3/1).

Bezel: Aluminium diecast, black baked-enamel finish.

Housing: Open front.

Housing Dimensions: 182.5 (H) × 87 (W) × 480 (D: depth behind panel) (mm) (7.2 × 3.4 × 18.9 in).

Weight:

- Less Housing: 3.0 kg (6.6 lb).
- Housing: 2 kg (4.4 lb) (excluding mounting kit).

OPTIONS

- /A2ER:** For "220 V version" power supply.
- /NPR:** Controller supplied unprogrammed (with blank EPROM). The user can write a program to EPROM using the SPRG Programmer.
- /UPR:** Controller supplied with user program.
- /MTS:** Controller supplied with kit for individual mounting. For mounting in groups, see GS 1B4F1-E.
- /SCF-G□M:** Mounting kit bezel color change from standard color (black). Choose color from set of optional colors (see GS 22D1F1-E). Specify color code in space □.
- /NHS:** No housing, instrument only. See GS 1B4F1-E to order housing separately.
- /NPE:** With letters* engraved on front panel nameplate. *See GS 22D1C4-E.

ACCESSORIES

- Data memory backup battery, part no. E9711DH. (Order spare as required).
- 1 A fuse, quantity one.

MODEL AND SUFFIX CODES

Model	Suffix codes	Style	Option codes	Description
SCMS	Programmable Computing Station
	-100	Normally -100
Style code		*E	Style E
Options			/NPR /UPR	Unprogrammed With user's program
Common options			/A2ER /MTS /SCF -G□M /NHS /NPE	220V power supply* With mounting kit Bezel color change Without housing Nameplate engraving

* Specify /A2/NHS to order without housing.

TERMINAL CONNECTIONS

Terminal Designation	Description	Terminal Designation	Description
1	+ Analog input 1	17	+ Communications (*1) with SLPC/SLMC
2	- Analog input 1	18	-
3	+ Analog input 2	19	+ Status signal 8 (IN8, OUT3)
4	- Analog input 2	20	- Status signal common (5 thru' 8)
5	+ Analog input 3	21	- Fail (negative terminal)
6	- Analog input 3	A	+ Analog output 1 (*2) (current output)
7	+ Analog input 4	B	- Analog output 1 (*2) (current output)
8	- Analog input 4	C	+ Analog output 2
9	+ Status signal 1 (IN1, OUT10)	D	- Analog output 2
10	+ Status signal 2 (IN2, OUT9)	F	+ Analog output 3
11	+ Status signal 3 (IN3, OUT8)	H	- Analog output 3
12	+ Status signal 4 (IN4, OUT7)	J	+ Status signal 10 (IN10, OUT1)
13	- Status signal common (1 thru' 4)	K	- Status signal 10 (IN10, OUT1)
14	+ Status signal 5 (IN5, OUT6)	L	+ Status signal 9 (IN9, OUT2)
15	+ Status signal 6 (IN6, OUT5)	M	- Status signal 9 (IN9, OUT2)
16	+ Status signal 7 (IN7, OUT4)	N	+ Fail (positive terminal)

Notes

- *1: Use shielded twisted-pair cable (SCCD, see GS 34B6T1-01E).
- *2: If these terminals are not used, connect them together.

=====**ORDERING INSTRUCTIONS**=====

Specify the following when ordering:

1. Model, suffix and option codes.
2. Nameplate marking, if required (option /NPE).
3. Mounting kit (option /MTS), if the instrument is to be mounted individually (see OPTIONS above).
4. Fill out program worksheets and data sheets if a special user's program is required.

=====**RELATED EQUIPMENT**=====

Related Instruments

Model SPRG Programmer GS 1B4W1-E
 Model SLPC Programmable Controller GS 1B4C2-E
 Model SLMC Programmable Controller ... GS 1B4C3-E
 Model SCCD Cable GS 34B6T1-01E

Related Spare Parts

User's EPROM Part no. A1123LQ
 Memory Backup Battery Part no. E9711DH