General Specifications

Model SLCD(Style E)
Indicating Controller

YEWSERIES 80

GS 01B04C01-01E

■ GENERAL

The Model SLCD Indicating Controller is a microprocessor-based instrument with the following features:

•New intelligent self-tuning model automatically optimizes PID parameters.

•Using side-panel keypad, you can select PID or PD control algorithms, functions such as remote setting, feedforward control and output tracking. Adjustable set-point filtering allows response to setpoint changes to be optimized. Signal-processing functions include square-root, linearization and cascade setpoint scaling computation.

•Communication functions allow the SLCD controller to be used with a central CRT-display operator station. DDC or SPC operation is also possible.

•Incorporates I/O signal level checks and self diagnostics.

■ STANDARD SPECIFICATIONS

Analog Input/Output Signals

Item	Signal	Points	Specification
Analog inputs (Note 1)	1 to 5 V DC	4	Input resistance at least 1M Ω
Analog outputs (Note 2)	1 to 5 V DC	2	Load at least 2k Ω
Analog outputs (Note 3)	4 to 20 mA DC	1	Load up to 750 Ω

Note 1: Process variable, Cascade set point, Input for output tracking, Feedforward.
Note 2: Manipulated variable, Set point signal.
Note 3: Manipulated variable.

Input Conversion Accuracy:± 0.2 % of span.
Output Conversion Accuracy:
For current output, ± 1 % of span.
For voltage output, ± 0.3 % of span.

Status I/O Signals

Status input signal (Tr.Contact) : 1 point	Non-voltage status input	Contact rating at least 5 V DC, 20 mA	
		Source	ON: up to 200 Ω
			OFF:at least 100k Ω
	Voltage input	Max. input voltage 30 V DC	
		Source	ON: –0.5 to +1 V DC (low)
			OFF:+4.5 to +30 V DC (high)
	Min.pulse width	220 ms (for 0.2 sec. scan period) 120 ms (for 0.1 sec. scan period)	
Status output signal (Tr.Contact) : 6 points	Status rating	Transistor open collector contact 30 V DC, 200 mA (resistive load)	

Isolation

Isolation	Each analog circuit	Not isolated (–line common)
	Between analog circuit and internal circuit	Not isolated
	Each status circuit	Isolated
	Between status circuit and internal circuit	Isolated
	Between signal circuit and power supply	Isolated

Indicators

Process Variable & Set Point Indicators:
Moving coil meter, Vertical scale.

Common Specifications:
Indication Range: 0 to 100 %
Scale: 100 mm long, interchangeable.
Scale Marking:
Signal scale with units marking.
Major divisions are marked.

Moving Coil:
Dual index (dual pointer) meter.
Index Color: Process variable-red, Set point-blue.
Indicator Accuracy: ± 0.5 % of span.

Output Indicator:
Moving coil type, with two memory indexs for limits, and with valve open/close marks.
Horizontal scale.
Scale: 39 mm scale with 20 equal divisions.
Indicator accuracy: ± 2.5 % of span.

Mode Transfer:
By cascade (C) /Auto (A)/Manual (M) switches on front panel. Mode indicator lamp is built into each switch button. Mode can also be set by contact input or remotely (see “Communication Functions” below). Transfers between cascade, auto and manual modes are bumpless and balanceless.

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Set point:
Manual, cascade (Note) or remote (SPC) setting. (Side panel switch selects whether the set point comes from analog “cascade” input or via optional communications bus - see “Communication Functions” below).
Manual SET buttons (on front panel) vary set point at rate of 40 sec./full scale change.
Cascade Set Point: In C mode, in set point tracking mode (side-panel SV TRK switch ON), and in M mode, set by cascade set point signal input.
Note: In manual mode, using a side-panel switch, either manual or cascade set points can be selected and displayed.

Manual Output:
Set by two-speed level action.
SLOW: 40 seconds/full scale
FAST: 4 seconds/full scale

Parameter Setting:
Keyboard on side panel allows parameters to be displayed on side panel — three-digit parameter name, four-digit parameter value — and set.

Signal Conditioning Computations

Computational functions may be selected, and computational parameters set, using side panel keys.

Square Root with Low-Signal Cutoff:
Used for process variable or cascade setpoint input. For signals below the “cutoff” point (adjustable between 0.0 and 100.0 %), a linear characteristic “output = input” applies.

Ten-Segment Line-Segment Function:
Ten equi-spaced input break points, corresponding outputs may be set in the range 0.0 to 100.0 %.
Applies to process variable input.

Input Filters:
Can be applied to process variable input, cascade setpoint input, output tracking input, and feedforward input. First order lag time constant may be set in the range 0.0 to 799.9 sec.

Cascade Setpoint Scaling Computation:
Expression CSV = CGN (CIN + CBI) + CBO
Here CSV is computed output, CIN is cascade input,
CGN (gain) is set in range - 8.000 to 8.000
CBI (input bias) is set in range - 106.3 to 106.3 %
CBO (output bias) is set in range - 800.0 to 800.0 %

Feedforward Signal Computation:
Applies only to cascade or auto mode operation.
Expression FF = FGN (FIN + FBI) + FBO
Here FF is feedforward output, FIN is feedforward input,
FGN (FF gain) is set in range - 8.000 to 8.000
FBI (FF input bias) is set in range - 106.3 to 106.3 %
FBO (FF output bias) is set in range - 800.0 to 800.0 %

Control Functions

Control Action: Set by DIR (direct)/RVS (reverse) switch on side panel.
Control /Output Period: 0.2 sec.
Control Type: PID or PD, set by side-panel switch.

PID Control
P (Proportional band): 2.0 to 999.9 %.
I (Integral time): 1 to 9999 sec.
D (Derivative time (Derivative of Process Variable)): 0 to 9999 sec. (Note)
Note: Action range is 2 to 9999 sec. (0 & 1: OFF)

Adjustable filter option allows response to set-point changes to be optimized. (Parameters adjustable).
Self-Tuning Functions (in SLCD-_81). Self-tuning may be switched ON/OFF by status input. Limits can be set for tuning of PID parameters.
Adjustable Output Limiter with Reset Bias (limits reset windup): Reset bias adjustable in the range 0.0 to 106.3 %.

PD Control
P (Proportional band): 2.0 to 999.9 %.
I (Integral time): 1 to 9999 sec.
D (Derivative time): 0 to 9999 sec. (Note)
Note: Action range is 2 to 9999 sec. (0 & 1: OFF)

Manual Reset:
Reset bias adjustable from - 6.3 to 106.3 %.

Common Items which Apply to Both PID and PD Control

Non-Linear Control:
Control dead band (gap) adjustable off (0) to 100 %, dead band gain adjustable off (0) to 1.0.

Output Signal Limiting:
Applies only to cascade or auto mode operation.
MH (high limit) is set in range - 6.3 to 106.3 %
ML (low limit) is set in range - 6.3 to 106.3 %

Preset MV (PMV) Output:
Applies only to cascade or auto mode operation. Status input causes preset value to be output.

Output Tracking (TRK):
Applies only to cascade or auto mode operation. Status input causes output to track external signal.

Mode Swiching by Contact Status Input:
External status input can be used to switch mode, as selected by side-panel M/A/PMV/TRK or INHIBIT switch.

Switching Action	Operation Mode	Status input contact	
		Closed	Open
External CAS, AUTO ⟷ MAN	CAS or AUTO	CAS or AUTO	MAN
	MAN	—	—
External CAS ⟷ AUTO	CAS	CAS	AUTO
	AUTO or MAN	—	—
Preset MV output	CAS or AUTO	CAS or AUTO	Preset MV
	MAN	—	—
Output tracking	CAS or AUTO	CAS or AUTO	Output tracking
	MAN	—	—
Self-tuning	CAS or AUTO	with STC	STC OFF
	MAN	—	—

Notes: Mode can be switched while status input is open.

“Mode Setting” Contact Status Output:

“Mode” contact output	C mode	A mode	M mode
C/(A or M) contact	closed	open	open
(C or A)/M contact	closed	closed	open

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Alarm Functions

Alarm Action: High limit, low limit, deviation alarms.
Input High Limit Alarm Setting: - 6.3 to 106.3 %
Input Low Limit Alarm Setting: - 6.3 to 106.3 %
Deviation Limit Alarm Setting: 0.0 to 112.5 %
Alarm Hysteresis: Less than 2 % of span.

Output Contacts:

High, low and deviation limit alarms one each.
Contact status; during alarm, open/closed (switch selectable); during power failure, open.

Alarm Indication:

"ALM" lamp on front panel of instrument lights.

Communication Functions

Item	Function/Specification
Interface	via LCS card in field control unit
	via LCS card in field control station
Communication parameter	Process variable (Note), set point (Note), manipulated output, instrument mode, output limits, PID constants
	Remote parameter setting can be disabled.
Cascade mode	Cascade signal can be local or remote. (transmitted from a supervisory computer)
DDC/SPC mode	Remote setting of manipulated output in DDC mode.
	Remote setting of set point in SPC mode.
Backup mode selection	If the communications or supervisory computer systems fail, the YS80 system reverts to backup mode.
	Backup AUTO mode and Backup MAN mode
Comm. distance	Max. length of SCCD cable to LCS card is100 m (328 ft).

Note: For a cascade loop, or where selector functions are involved, these apply to the primary loop.

Power-Fail/Restart Functions

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

Status prior to power failure retained.

For Power Failure Longer than Approx. Two Seconds:

Restart mode can be selected from the following by a switch on the side panel.
HOT (Computational data and status prior to power failure preserved).
COLD (Status reset to manual mode, 4 to 20 mA manipulated variable outputs set to - 20 %)

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).
Manual operation is possible.

Input/Output Signal Abnormalities

(Input overflow, current output wire open circuit): "ALM" lamp lights.

Memory Backup Battery Low:

"ALM" lamp flashes.

Communications Abnormal:

"C" lamp flashes (during communications).

For diagnostic purposes, numeric error codes corresponding to faults can be displayed on side panel display.

■MOUNTING AND APPEARANCE

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). (Indicator zero may need readjustment).

Nameplate

Size: 8 × 65.3 mm, cream semi-gloss finish.
lettering in black, one 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, connector for SPBD portable manual station

Wiring

Signal Wiring: ISO M4 size (4mm) screws on terminal block.

Power and Ground Wiring

100 V version: JIS C 8303 two-pin plug with earthing contact(IEC A5-15, UL458)
220 V version: CEE 7 VII(CENELEC standard) plug.
Cable Length: 300 mm (11.8 inch).

External Dimensions:

182.5 (H)×87(W)×480 (D) depth behind panel (mm)
7.2 (H)×3.4(W)×18.9 (D) depth behind panel (inch)

Weight

Instrument weight: 3.4 kg (7.5 lb) less housing
Housing weight: 2.0 kg (4.4 lb) excluding mounting kit

■STANDARD PERFORMANCE

Maximum Power Consumption

323 mA with 24 V DC supply
15.4 VA with 100 V AC supply
19.2 VA with 220 V AC supply

Insulation Resistance

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

Dielectric Strength

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)

■NORMAL OPERATING CONDITIONS

Ambient Temperature:

0 to 50 °C (32 to 122 °F)

Ambient Humidity:

5 to 90% relative humidity(non-condensing)

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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 130 V	120 to 340 V
AC (47 to 63 Hz)	80 to 138 V	138 to 264 V

■ OPTIONS

/A2ER: For “220 V version” with power supply plug.
/A2: For “220 V version” without power supply plug.
/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.
/LH: Long housing type with power supply terminal.
/NPE: With letters engraved on front panel nameplate. (see GS 22D1C4-E)
/HTB: For “100 V version” with power supply terminal.

■ ACCESSORIES

1A fuse, quantity one.
Data memory backup battery, parts no. E9711DH.

■ TERMINAL CONNECTIONS

Terminal Designation	Description
1	+ Process variable input (1 to 5 V DC)
2	–
3	+ Cascade set point input (1 to 5 V DC)
4	–
5	+ Tracking input (1 to 5 V DC)
6	–
7	+ Feedforward input (1 to 5 V DC)
8	–
9	
10	
11	+ Instrument mode switching
12	–
13	+ C, A/M contact output
14	–
15	+ C/A, M contact output
16	–

Terminal Designation	Description
17	+ Communications (Note1)
18	–
19	+ Deviation alarm output
20	–
21	– Fail output (neg. terminal)
A	+ Manipulated output Note 2(4 to 20 mA DC)
B	–
C	+ Manipulated output (1 to 5 V DC)
D	–
F	+ Set point signal (1 to 5 V DC)
H	–
J	+ Input high limit alarm
K	–
L	+ Input low limit alarm
M	–
N	+ Fail output (pos. terminal)

Note 1: Use shielded twised-pair cable Model SCCD.
Note 2: If these terminals are not used, connect them together.

■ MODEL AND SUFFIX CODES

Model	Suffix codes	Style	Option codes	Description
SLCD				Indicating Controller
Indicator	-1			Moving coil type
Functions	5			Enhanced model, with adjustable filter
	8			Enhanced model, with adjustable filter and self-tuning
	1			Always 1
Style code		*E		Style E
Common options			/A2ER	220 V version with plug
			/A2 (Note)	220 V version without plug
			/MTS	With mounting kit
			/SCF-G□M	Bezel color change
			/NHS	Without housing
			/LH	Long housing with terminal
			/NPE	Nameplate engraving
			/HTB	Screw terminal for housing

Note: Specify /A2/NHS to order without housing.

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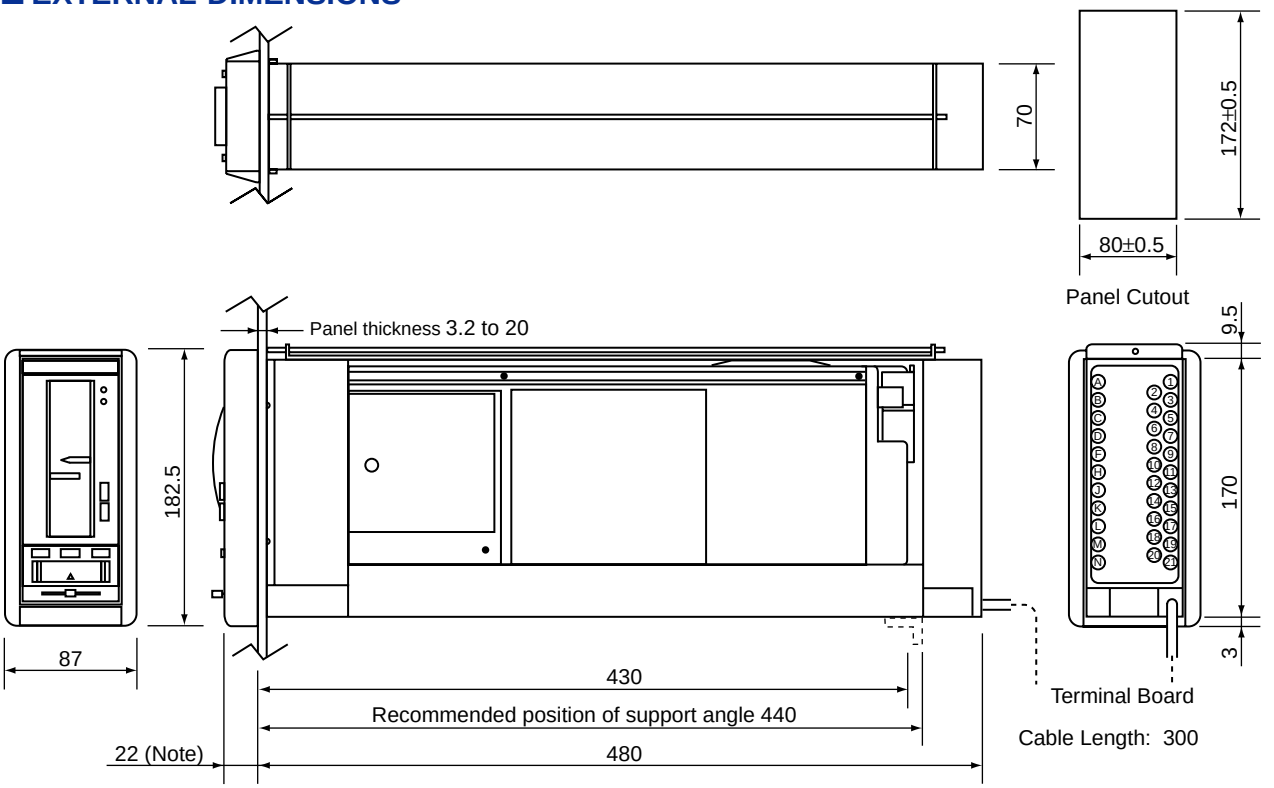
■ EXTERNAL DIMENSIONS



Note: The length is 34 when including the projection on the faceplate.

Unit: mm
(approx. inch)

ORDERING INSTRUCTIONS

Specify the following when ordering:

1. Model and suffix codes and option codes, if necessary.
2. Main scale and engineering units marking (see GS 22D1C1-E).
3. Nameplate marking, if required (option /NPE).
4. Mounting kit (option /MTS), if the instrument is to be mounted individually (see OPTIONS above).

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