

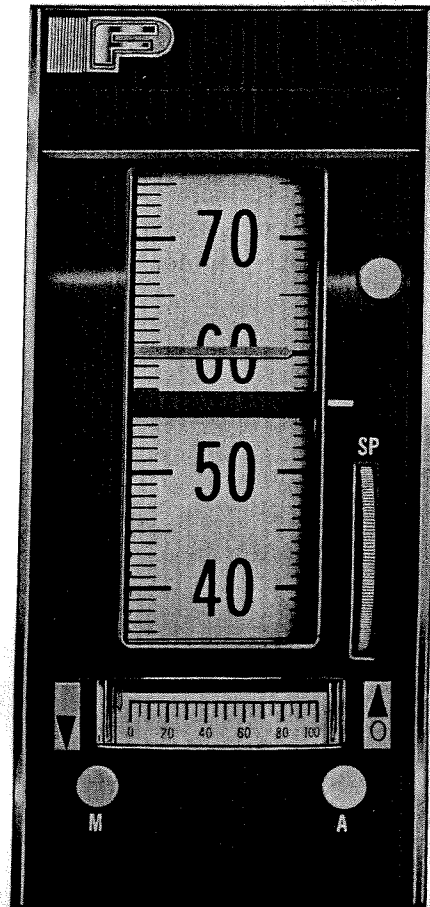
## Electronic SCAN-LINE® Indicating Control Station

### Type 53EL/EM/EP

The Fischer & Porter SCAN-LINE indicating control stations (Type 53EL, 53EM and 53EP) provide exceptionally distinct visual indication of process variable from the set point with a single pointer. The output signal of the controller is indicated on a separate meter, thus allowing the operator to determine the process status at a glance, and makes the SCAN-LINE station particularly useful in multi-station, high-density applications. Balanceless-Bumpless Transfer from automatic to manual and vice-versa is a standard feature. On manual, push-buttons provide two speed control of the output.

#### DESIGN FEATURES

- Rapid reading — direct indication on process variable/set point scale.
- Individual instrument cases allow total flexibility in panel layout.
- Balanceless-Bumpless Transfer and two speed manual station output for operator's convenience.
- Versatile; — standard remote-local switch makes unit compatible with ratio, cascade, or computer applications.
- 24 Vdc or 120 Vac operation.
- High input impedance allows paralleling of instruments.
- Solid state design including integrated circuits for reliability.
- Motor driven units for remote setting of set point and its indication.



#### CONTROL STATION TYPES & DESCRIPTION

**TYPE 53EL:** Basic analog controller with local setpoint set via a thumbwheel and an internal switch allowing cascade (remote setpoint) application.

**TYPE 53EP:** Same as Type 53EL, but with servo driven remote setpoint indication, for cascade control applications.

**TYPE 53EM:** Same as Type 53EL, but with motor driven local setpoint scale, for computer applications.



## ENGINEERING SPECIFICATIONS

### PROCESS VARIABLE INPUT SIGNAL

Standard: 1-5 Vdc or 1-5, 4-20, 10-50 mAdc with use of external shunt resistors.

### SET POINT INPUT SIGNAL

Type 53EL and 53EP: 1-5 Vdc or 1-5, 4-20 10-50 mAdc with use of external shunt resistors.

Type 53EM: Contact closure.

INPUT IMPEDANCE (Process variable and set point): 1 meg ohms for voltage inputs; 250 ohms for 4-20 mAdc; 100 ohms for 10-50 mAdc; 1000 ohms for 1-5 mAdc.

OUTPUT: 4-20 mAdc into loads of 0-750 ohms; 0-1000 ohms with output isolator (reduce load by 100 ohms when Valve Holder is specified).

### PERFORMANCE

Gain: Zero frequency gain greater than 1000.

Set Point Calibrated Accuracy:  $\pm 0.4\%$ .

Linearity:  $\pm 0.25\%$

Tracking:  $\pm 0.1\%$

### OPERATIONAL LIMITS

Temperature Limits: 40 to 125 °F (4 to 52 °C).

Temperature Effect: 0.5% per 50 °F (28 °C) from ref temp of 75 °F (25 °C).

### CONTROL MODES

Proportional plus manual reset.

Proportional plus automatic reset.

Proportional plus manual reset plus derivative.

Proportional plus automatic reset plus derivative.

### CONTROL RANGES

Proportional Band: 3-500% with automatic or manual reset; continuously adjustable.

Reset: Automatic: 0.02 to 50 minutes (12 steps)

Manual: Continuously adjustable (0-100%).

Derivative: 0.01 - 8 minutes (11 steps and off).

### AUTO-MANUAL TRANSFER (and vice versa):

Balanceless-bumpless transfer (BBT) via two pushbuttons.

### MANUAL CONTROL

By two speed open and close pushbuttons; 6 or 100 seconds full scale drive.

Manual Control Drift: 1% per 8 hours at reference condition.

LOCAL REMOTE SWITCH: Two position located on instrument chassis: when on remote set point indicating light on front of instrument is energized.

OUTPUT LIMITERS: One high and one low output limiter located on instrument chassis (limiters are on automatic output only).

Approximate Range: 2-22 mAdc both limiters.

### ELECTRICAL REQUIREMENTS

Standard: 120 Vac ( $\pm 10\%$ ), 50/60 Hz.

Optional: 24 Vdc ( $^{+2}_{-0}$ ).

Motor driven Type 53EM and 53EP require an externally supplied 24 Vdc ( $\pm 10\%$ ) for motor.

Power for two wire transmitter is 45 Vdc ( $\pm 10\%$ ); 30 mAdc maximum.

### POWER CONSUMPTION: (Basic Controller)

ac powered: 16 VA; 11 watts

dc powered: 0.320 Adc

dc motor requirements: 0.280 Adc

### MATERIALS OF CONSTRUCTION

Case: Steel

Chassis: Aluminum with cast aluminum bezel

Circuit Boards: Glass-epoxy

MOUNTING: Flush panel. Requires 3x6 inch cutout. Units can be mounted on 3-inch horizontal centers and 9-inch vertical centers on a high density mounting grind.

### SCALES

Process & Set Point: Vertical, moveable 8-3/4 inches scale with 3-1/2 inches visible 1-11/32 inches wide.

See Scale Catalog S-59 for standard scales available.

Output: Horizontal, fixed, 1-5/8 inches scale graduated 0-100%.

ELECTRICAL CONNECTIONS: Barrier type terminal board. Knockout holes for 1/2" or 3/4" conduit. Dustproof removable rear cover included.

WEIGHT: Approximately 15 pounds (6.8 kg).

## MINIMUM TIME AND SIZE FOR MOTOR STEP

Motor Driven Type 53EM with internal electronics:

Two Form A Contacts:

Contact Open or Close: 3 milliseconds.

Speed: 100 steps per second, max.

Step Size: 0.05% full span per step.

Motor Driven Type 53EP:

Full Scale Drive, 20 seconds.

## OPTIONS & ACCESSORIES

### INTEGRAL PROCESS AND DEVIATION ALARMS (TYPE 53EL ONLY):

Engineering Specifications

Type of Alarms:

Process Alarms

low alarm

high alarm

low and high alarms

Deviation Alarms

minus deviation alarm

plus deviation alarm

minus and plus deviation alarms

Alarm Range: 0-100% for process alarms.  
±25% for deviation alarms.

Setting Mode: by calibrated dial(s).

Process Dial: 0-100 linear, 0-100 square root.

Deviation Dial: 0-25 linear.

Alarm Relay Contacts: Single pole, single throw, normally closed contact (contact closed on alarm or on power failure.

**NOTE:** Normally open contacts (contact open on alarm or on power failure) are available on a special basis.

**NOTE:** For two alarms (high-low construction) or plus-minus deviation three connections are brought out to rear of case.

Alarm Contact Rating: 10 watts (resistive 0.5 amp maximum).

Dial Setting Accuracy: ±5% for process alarms. ±2% for deviation alarms.

Repeatability: 0.5% of span.

Deadband (fixed): 0.5% of span.

**ALARM LIGHTS:** One or two alarm lights (located on front of instrument). (Available only in conjunction with integral alarms.)

**VALVE HOLDER RECEPTACLE:** Allows replacement of the controller by a portable "Hard" manual loading station (Type 55VH) without disturbing the final control element.

**ANTI-RESET WINDUP MODULE** prevents process variable overshoot in a process start-up situation.

**FEED FORWARD MODULE** provides corrective action to cancel process disturbance before it affects the controlled variable.

**OVERRIDE CONTROL** permits controller to be interconnected through a 55SC1000 override selector in an override control system.

**CORD SETS** simplifies panel wiring.

**SPECIAL BEZEL COLORS**

**OUTPUT SIGNAL ISOLATION**

**CLASS I, GROUP D, DIVISION 2** construction (120 Vac version).

## EQUIPMENT DESCRIPTION

*The indicating control station shall be Scan-Line design, solid state electronic model housed in a 3" x 6" x 20" case suitable for single, multiple, or high density panel mounting. It shall have a highly readable tape-type scale (1-11/32" wide by 8-3/4" long) and shall have an output of 4-20 mAdc into 0-750 ohms without-load adjustments. Output signal limiters shall be a standard feature.*

*The unit shall be provided with a two-position switch to provide for control from local or remote set point. When instrument is set on remote set point a light on front of instrument shall be energized.*

*Transfer from automatic to manual control (and vice-versa) shall be balanceless-bumpless and shall be accomplished by two pushbuttons located on the front of the instrument. Manual pushbuttons shall provide two speed control of the output (6 or 100 second full scale).*

*Proportional band and manual reset shall have continuous adjustments. Automatic reset ranges shall be adjusted in 12 steps, derivative ranges are to be adjustable in 11 steps plus "OFF" position.*

*Indicating control station may be motorized for remote computer operation or analog input. It shall also be suitable for future field installation of motor-driven components. Electronic Indicating Control Station shall be F&P Type (53EL), (53EM), or 53EP).*

# MODEL NUMBER DESIGNATION

## ELECTRONIC INDICATING CONTROLLER

Type No. 53EL 4 0 0 0 A A A A A

Electronic Indicating Controller

TABLE I

Control Mode  
0 = Reserved; Specials, Series, etc.

	Prop. Band, %	Reset	Derivative
3	3-500	Auto	None
4	3-500	Auto	Yes
5	3-500	Manual	None
6	3-500	Manual	Yes

TABLE II

Power  
0 = Reserved; Specials, Series, etc.

	Operating Voltage	X-Mitter Supply
3	120 Vac 50-60 Hz	45 Vdc
5	24 Vdc	None

TABLE III

Input Signals  
0 = Reserved; Specials, Series, etc.

	Process Variable	Remote Set Point
1	1-5 Vdc	1-5 Vdc

TABLE IV

Frontal Display  
A = Reserved; Specials, Series, etc.

	Alarm Light(s) for Integral Alarm(s)*		Receptacle for Valve Holder
	Top	Bottom	
B	-	-	-
D	Yes	-	-
F	-	Yes	-
H	Yes	Yes	-
K	-	-	Yes
L	Yes	-	Yes
M	-	Yes	Yes
N	Yes	Yes	Yes

TABLE V

Circuit Board for Options  
A = Reserved; Specials, Series, etc.  
B = No Options  
D = Board w/Anti-Reset Wind-up  
E = Blank Board (for future modifications)

Integral Alarm Circuit (Contact Closure Output)		
Alarm Type	Number of Contacts	Alarm Calibration
F Process	Single	0-100%
G Process	Dual	Linear
H Process	Single	0-100%
J Process	Dual	Sq. Rt.
K Deviation	Single	±25%
L Deviation	Dual	Linear

M = Board w/feed forward (with Auto Reset Only)

TABLE VI

Case Equipment  
A = Reserved; Specials, Series, etc.  
K = Standard Case  
L = Cord Set      P = Connector-type Cord Set\*\*

TABLE VII

Output Options  
A = Reserved; Specials, Series etc.  
B = Standard Chassis; No Output Options  
C = Output Signal Isolation

Design Level: Letter assigned by factory; letter changes when some part is no longer interchangeable

TABLE VIII

Paint Color  
A = Special Paint Color  
E = F&P Black w/Green Scan-Line

\*Alarm Light(s) available only in conjunction with TABLE V, variations F, G, H, J, K, L.

\*\*Power selection in Table II must be 5 when connection-type cord set is specified as selection P in Table VI.

## ELECTRONIC INDICATING CONTROLLER W/MOTORIZED SET POINT GENERATOR

Type No. 53EM 4 0 0 0 A A A A A

Electronic Indicating Controller w/Motorized Set Point Generator

TABLE I

Control Mode  
0 = Reserved; Specials, Series, etc.

	Prop. Band, %	Reset	Derivative
3	3-500	Auto	None
4	3-500	Auto	Yes
5	3-500	Manual	None
6	3-500	Manual	Yes

TABLE II

Power  
0 = Reserved; Specials, Series, etc.

	Operating Voltage	X-Mitter Supply
3	120 Vac 50-60 Hz	45 Vdc
5	24 Vdc	None

TABLE III

Input Signals  
0 = Reserved; Specials, Series, etc.

	Process Variable	Remote Set Point
1	1-5 Vdc	1-5 Vdc

TABLE IV

Frontal Display  
A = Reserved; Specials, Series, etc.

	Receptacle for Valve Holder
B	-
K	Yes

TABLE V

Circuit Board for Options  
A = Reserved; Specials, Series, etc.

Control Contact Configuration

F = Two Form A

TABLE VI

Case Equipment  
A = Reserved; Specials, Series, etc.  
K = Standard Case  
L = Cord Set      P = Connector-type Cord Set\*\*

TABLE VII

Output Options  
A = Reserved; Specials, Series, etc.  
B = Standard Chassis; No Output Options  
C = Output Signal Isolation

Design Level: Letter assigned by factory; letter changes when some part is no longer interchangeable

TABLE VIII

Paint Color  
A = Special Paint Color  
E = F&P Black w/Green Scan-Line

# MODEL NUMBER DESIGNATION

## ELECTRONIC SERVO CONTROL STATION

Type No. 53EP 4 0 0 0 A A A A □ A

Electronic Servo Control Station

TABLE I

Control Mode  
0 = Reserved; Specials, Series, etc.

	Prop. Band %	Reset	Derivative
3	3-500	Auto	None
4	3-500	Auto	Yes
5	3-500	Manual	None
6	3-500	Manual	Yes

TABLE II

Power  
0 = Reserved; Specials, Series, etc.

	Operating Voltage	X-mitter Supply
3	120 Vac 50-60 Hz	45 Vdc
5	24 Vdc	None

TABLE III

Input Signals  
0 = Reserved; Specials, Series, etc.

	Process Variable	Remote Set Point
1	1-5 Vdc	1-5 Vdc

TABLE IV

Frontal Display  
A = Reserved; Specials, Series, etc.

	Receptacle for Valve Holder
B	-
K	Yes

TABLE V

Circuit Board for Options  
A = Reserved; Specials, Series, etc.

	Servo Drive Amplifier
B	Included

TABLE VI

Case Equipment  
A = Reserved; Specials, Series, etc.  
K = Standard Case  
L = Cord Set      P = Connector-type Cord Set\*\*

TABLE VII

Output Options  
A = Reserved: Specials, Series, etc.  
B = Standard Chassis; No Output Options  
C = Output Signal Isolation

Design Level: Letter assigned by factory; letter changes when some part is no longer interchangeable in both directions.

TABLE VIII

Paint Color  
A = Special Paint Color  
E = F&P Black w/Green Scan-Line

