# FC SERIES MANUAL LOADER
(STEP OUTPUT TYPE)

PND1

The FC series manual loader is available in two types, a manual control type and a remote control type used in combination with a compact controller.

This instrument is equipped with a solid state indicator and pushbutton operation circuit to provide easy readouts and handling for process operation by man-machine communication.

It can be directly connected to a thermocouple, resistance bulb or 4 to 20mA input optionally.
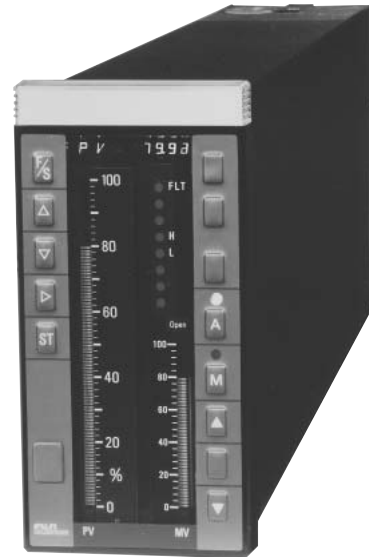
FEATURES

1. High reliability
   The manual loader is a solid state instrument having few mechanical parts. The indicator and other units which formerly consisted of mechanical parts are also designed with solid state circuits to provide high reliability.
2. Application of international standards
   The instrument is compact, and the external dimensions comply with international IEC. The power supply and signal also comply with IEC standards (24V, 1 to 5V DC). Operation on 100V or 200V AC power supply is possible.
3. Front panel operation
   Process values, valve position input, etc. can be read accurately from the digital display on the panel front. Parameter setting and manual operation are also possible from the front of the panel.

FUNCTIONAL DIAGRAM

EDS11-104e

| Date | Jan. 27, 1999 |
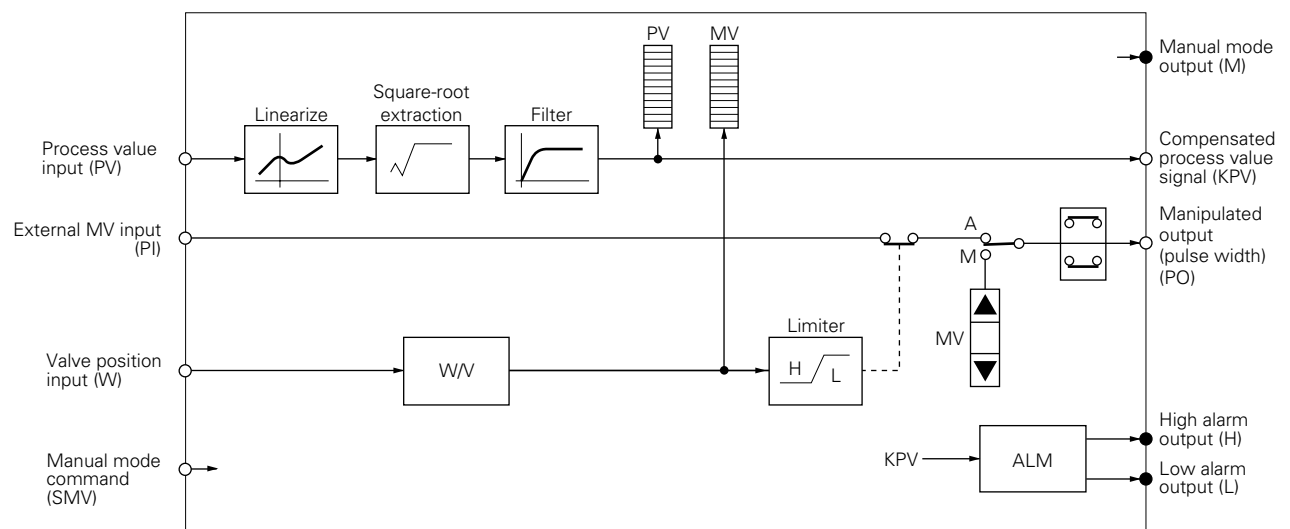
SPECIFICATIONS

1. Input signal
(1) Process value input signal:
One point of signal select from the following inputs

Voltage input signal		1 to 5V DC	Input resistance, more than 1MΩ	Allow. error ±0.2%/FS*
Current input signal	I+ I0 I−	4 to 20mA DC	24V DC power supplied to transmitter during AC operation	Allow. error ±0.2%/FS*
Thermocouple input		Type J:0 to 600°C K:0 to 1200°C E:0 to 800°C R:0 to 1600°C	10mV DC span or more Basic contact compensating function	Allow. error ±0.5%/FS*
Resistance bulb input		JPt100/Pt100 −50 to 500°C	50°C span or more	Allow. error ±0.5%/FS*

Note: * FS: Full scale

(2) Valve position input signal: 1 point

Voltage input signal	W0	1 to 5V DC	Input resistance, 1MΩ or more Allow. error ±0.5%/FS*
Resistance input signal	W+ W0 W−	50 to 1000Ω span**	3-wire system potentiomenter Allow. error ±0.5/FS*

Note: ** : Basic design: 10 to 100 to 10Ω, others should be specified.

(3) Pulse width input signal: 1 set

Pulse width input signal	PI+ PI−	Contact input (photo-coupler insulation)	ON 0V, OFF 24V (input current, approx. 11mA/24V DC)

(4) Digital input signal: 1 point

Manual mode command	SMV	Contact input (photo-coupler insulation)	ON 0V, OFF 24V (input current, approx. 11mA/24V DC)

2. Output signal
(1) Control output signal: 1 set

Pulse width output signal	P0+ P0−	Open-collector output (phone-coupler insulation)	Output rating, 30V x 0.1A DC, max.

(2) Analog output signal: 1 point

Compensated process value signal	KPV	1 to 5V DC	Output resistance, 1Ω or less Allow. error ± 0.2%/FS

(3) Digital output signal: 4 points

Fault output	FLT	Open-collector output (photo-coupler insulation)	Output rating, 30V x 0.1A DC, max.
Manual mode output	M		
High alarm output	H		
Low alarm output	L		

3. Indication, setting, operating functions
(1) Bar graph indication

	PV indicator	MV indicator
Indication method	LED (red)	LED (red)
No. of indicating segments	101 + 2	51 + 2
Indication range	0 to 100%, linear	0 to 100%, linear
Indication resolution	1 %/FS	2%/FS
Scale length	100mm	50mm
Indicating mode	0 to 100% bar graph indication, 0 to 100% reverse bar graph indication, 0 to 100% dot indication	

(2) Operation mode indication
Indicating method:
LED (red and green)
Red: M
Green: A
(3) Numerical indication, setting
Indication method:
LED (red), name in 3 digits + number in 5 digits (negative sign included)
Indication contens:
Process variable (engineering unit), high/low alarm, limiter value etc.
Indication contents are select with F/S,△, ▽, keys on front panel.
Setting method: By using F/S , △, ▽, ▷, ST, keys on front panel
(4) Operating functions
Manual operating method:
By use of ▲ , ▼ , buttons on front panel
Auto operating method:
By pulse width input signal
(5) Operation mode selection
By using front panel A/M pushbutton

A ⇄ M selection	Balanceless bumpless

(6) Alarm function
High/low limit alarm can be set in engineering units for process value input signal.

4. Power failure processing function
Power failure detection:
Control output OFF at power failure detection.
During power failure:
Data backed up by capacitor when power failure occurs within 5 minutes.
Initial value of data stored in non-volatile memory (last for more than 10 years at ambient temperature of 50°C or less).
Power failure recovery time:
Initial or continuous start set for power failure within 5 minutes.
Recovery from power failure lasting longer than 5 minutes is done by initial.
Note: Control mode at initialization set.
M: Manual mode or A: Auto mode

5. Self-diagnosis functions
Process value input signal abnormality:
FLT indicator lights and FLT contact output turns ON.
Fault contents indication:
Cause of fault is indicated numerically on numerical indicator on the front panel.

6. Other functions
Data protective function by use of pass code

7. Operating conditions
Power supply: Selected from the following 3 types
24V DC (20 to 30V DC)
100V AC (85 to 132V/47 to 63Hz AC)
200V AC (87 to 264V/47 to 63Hz AC)
Power consumption:
Approx. 11W (DC)
Approx. 20VA (AC)

Dielectric strength:
　　　　1500V AC, 1 min.
Insulation resistance:
　　　　100MΩ or more at 500V DC
Ambient temperature:
　　　　0 to 50°C
Ambient humidity:
　　　　90% RH or less
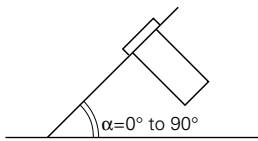Enclosure:　　　Steel case
Nameplate:　　　100 (H) x 72 (W) mm, white acryl
Dimensions:　　 144 (H) x 72 (W) x 391 (D) mm, IEC
　　　　　　　　(DIN) standards
Mass {weight}:　Approx. 2.9kg
Mounting method:
　　　　Flush with indoor panel; vertical mounting
　　　　is standard.
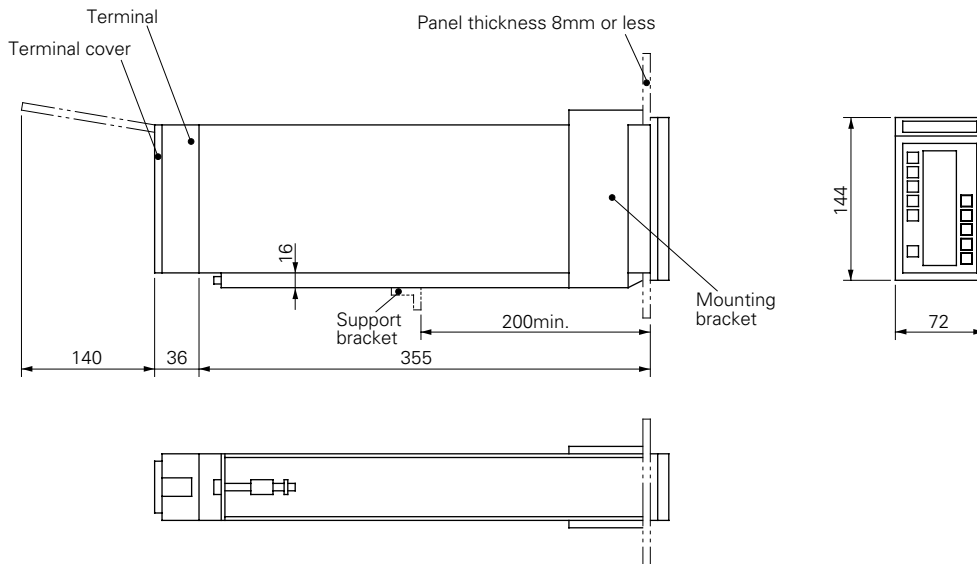　　　　Mounting on tilted surface possible (angle
　　　　"α")

α=0° to 90°

Finish color:　　Munsell N1.5 for front panel and case
Range of delivery: Manual loader and mounting bracket

CODE SYMBOLS

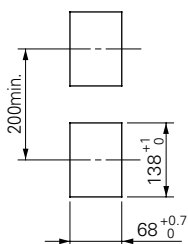|	Description
	Process value input signal
A	1 to 5V DC
B	4 to 20mA DC
C	J thermocouple ⎫ 10mV DC span or
D	K thermocouple ⎪ more, with reference
E	E thermocouple ⎬ contact compensating
F	R thermocouple ⎭ function
G	Resistance bulb, JPt100, 3-wire, 50°C span or more
W	Resistance bulb, Pt100, 3-wire, 50°C span or more
	Operating method
A	M type
B	A-M type
	Power supply
1	24V DC (20 to 30V DC)
2	100V AC (85 to 132V/47 to 63Hz AC)
3	200V AC (187 to 264V/47 to 63Hz AC)
	Valve position input signal
1	Voltage input signal (1 to 5V DC)
2	Resistance input signal (50 to 1000Ω span) (Note 1)

P N D 1 ☐ ☐ 5 - ☐
1 2 3 4 5 6 7 8　9

Notes:　(1)　Basic: 10 to 100 to 10Ω, others should be specified.
　　　　(2)　Symbols of resistance bulbs are as follows.
　　　　　　　JPt100 ... JIS C 1604-1981
　　　　　　　 Pt100 ... IEC Pub751-1983
　　　　　　　(JPt/Pt changeover is possible with front key.)
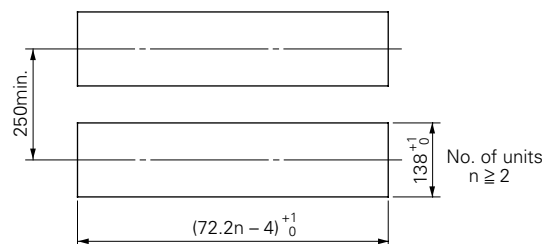
OUTLINE DIAGRAM (Unit:mm)

Terminal
Terminal cover
Panel thickness 8mm or less
16
Support bracket
200min.
Mounting bracket
144
72
140　36　355

Panel cutout

When mounting one unit

200min.
138^{+1}_{0}
$68^{+0.7}_{0}$

When mounting "n" units

250min.
138^{+1}_{0}
$(72.2n - 4)^{+1}_{0}$
No. of units
$n \geqq 2$

CONNECTION DIAGRAM

Block terminal (M4 screws)

Process value input	I+ (PV) 11	
	I− (SC) 12	31 Iₒ
DO (Manual mode)	M 13	32 PI+
	14	33 PI−
DI (Manual mode command)	SMV 15	34 FLT
	AC 16	35 AC

Pulse width input
DO (FLT output)

Instrument power (AC)
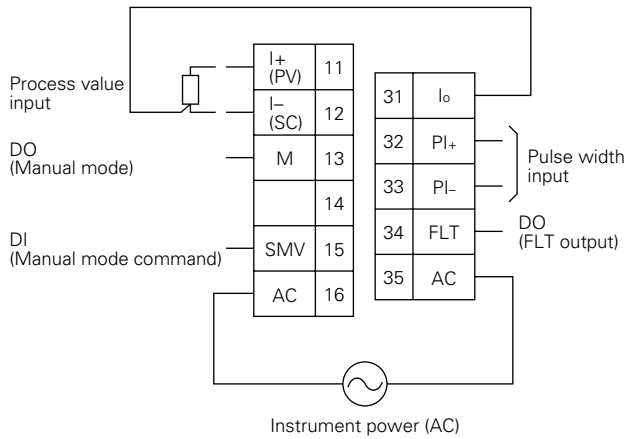
AO (Compensated PV signal) — KPV 51 | 71
52 | 72
53 | 73
W0 (Valve position input) — W₀ 54 | 74 W₊ — W₋ (Valve position input)
AI, AO Common bus — SC 55 | 75 W₋ — W₊ (Valve position input)
PO (Control output) — PO₊ 56 | 76 SC — AI, AO Common bus
PO₋ 57 | 77
DO (High alarm) — H 58 | 78
DO (Low alarm) — L 59 | 79
Instrument power (24V DC, AC power) — PC* 60 | 80
DI, DO 24V power — PCD 61 | 81 VP* — + Instrument power (24V DC, AC power)
Earth — G 62 | 82 VPD — + DI, DO 24V power

Note: * Symbols for AC instrument power are VPO, PCO.
Output : Approx. 24V DC (0.1A max.)

Process value input terminal connections

1 to 5V DC The 5th digit of code symbols: "A"		Thermocouple The 5th digit of code symbols: C,D,E,F	
4 to 20mA DC The 5th digit of code symbols: "B"		Resistance bulb The 5th digit of code symbols: G,W	
4 to 20mA DC power The 5th digit of code symbols: "B"			

△ Caution on Safety

*Before using this product, be sure to read its instruction manual in advance.

Information in this catalog is subject to change without notice.