

# FC SERIES MANUAL LOADER (CONTINUOUS OUTPUT TYPE)

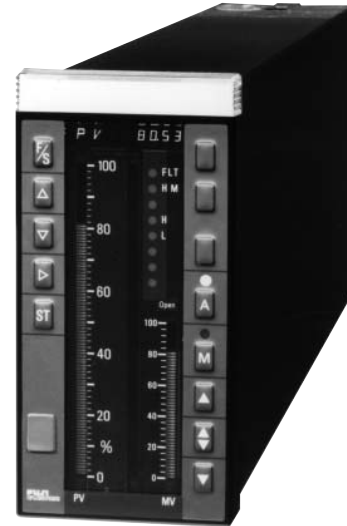
DATA SHEET

PNB1

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.

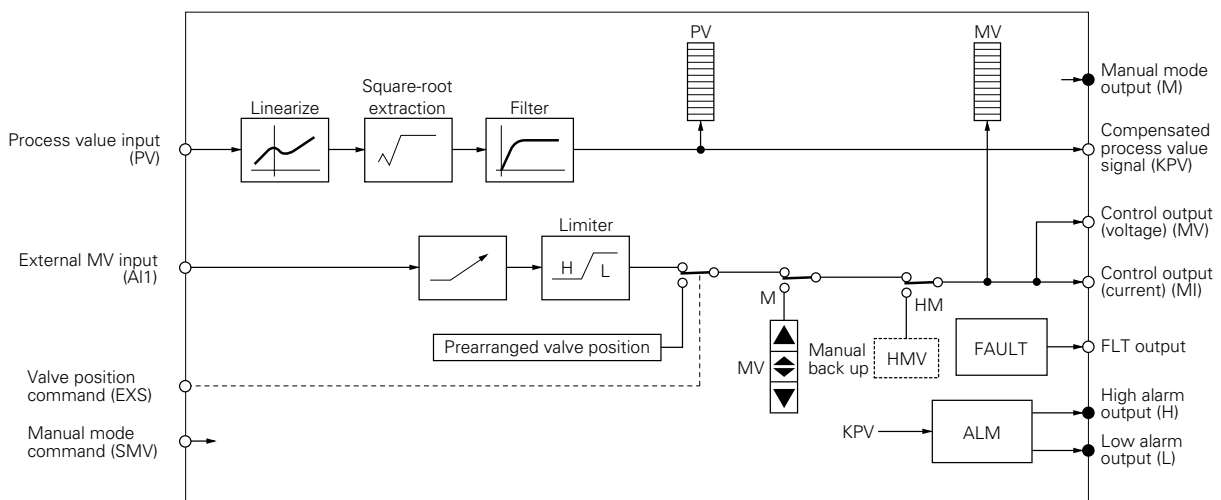
### 2. Application of international standards

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



## SPECIFICATIONS

### 1. Input signal

#### (1) Process value input signal:

One input selectable from the following

Voltage input signal	1 to 5V DC	Input resistance, 1M $\Omega$ or more	Allow. error $\pm 0.2\%/FS^*$
Current input signal	4 to 20mA DC	24V $\pm 2V$ DC can be supplied to transmitter in case of AC power supply (approx. 3.5mA max)	Allow. error $\pm 0.2\%/FS^*$
Thermo-couple 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 cold junction compensation comprised	Allow. error $\pm 0.5\%/FS^*$
Resistance bulb input	JPt100/Pt100 -50 to 500°C	50°C span or more	Allow. error $\pm 0.5\%/FS^*$

Note \*: FS: Full scale

#### (2) Analog input signal: 1 point

External MV input signal	AI 1	1 to 5V DC	Input resistance, 1M $\Omega$ or more Allow. error $\pm 0.2\%/FS$
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#### (3) Digital input signal: 2 point

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

### 2. Output signal

#### (1) Control output signal: 1 point

Current output	MI <sub>+</sub> MI <sub>-</sub>	4 to 20mA DC	Allow. load resistance, 600 $\Omega$ or less Allow. error $\pm 0.2\%/FS$
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#### (2) Analog output signal: 2 points

Compensated process value signal	KPV	1 to 5V DC	Output resistance, 1 $\Omega$ or less Allow error $\pm 0.2\%/FS$
Control output	MV		

#### (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) Bargraph indication

	PV indicator	MV indicator
Indication method	LED (red)	LED (red)
No of segments	101 + 2	51 + 2
Range	0 to 100%, linear	0 to 100%, linear
Resolution	1 %/FS	2 %/FS
Scale length	100mm	50mm
Indication mode	0 to 100% bargraph indication, 0 to 100% reverse bargraph indication, dot indication, -50 to +50% deviation indication	

#### (2) Operation mode indication

##### Indicating method:

LED (red and green)  
Red: M, HM  
Green: A

#### (3) Numerical indication, setting

##### Indication method:

LED (red), name in 3 digits + number in 5 digits (negative sign included)

#### Indication contents:

Process value (industrial value), high/low alarm, limiter value, etc.

Indication contents are selected with  $[F/S]$ ,  $\triangle$ ,  $\nabla$  keys on front panel.

**Setting method:** By using  $[F/S]$ ,  $\triangle$ ,  $\nabla$ ,  $\boxleftarrow$ ,  $\boxrightarrow$ ,  $[ST]$  keys on front panel

#### (4) Operating functions

##### Manual operating method:

By using of  $\blacktriangle$ ,  $\blacktriangledown$ ,  $\blacktriangledown$  pushbuttons on front of the panel  
Setting speed, approx. 40 sec/FS  
Simultaneous press of  $\blacktriangledown$  button, approx. 8 sec/FS

##### Auto operating method:

By using external control input signal  
Output limiter:  
High limit setting range, -25 to 125%  
Low limit setting range, -25 to 125%  
Tracking speed setting range; 0 to 900 sec/FS

##### Hard manual operating method:

By using control knob on front panel of HMV unit

#### (5) Operation mode selection

By using A/M pushbutton and HM switch on front of the panel

M $\rightarrow$ HM selection	Balance bumpless
M $\leftarrow$ HM selection	
A $\leftarrow$ M selection*	
A $\rightarrow$ HM selection	
A $\leftarrow$ HM selection*	
A $\rightarrow$ M selection	Balanceless bumpless

Note: \* Balanceless bumpless by setting tracking speed

#### (6) Alarm function

High/low alarm can be set in industrial values for process value input signal.

### 4. Power failure processing functions

#### Power failure detection:

Control output holds at power failure detection.

#### During power failure:

Operating parameters backed up by capacitor when power failure occurs within 5 minutes.

Initial value of control output is stored in non-volatile memory (lasts for 10 years expected at ambient temperature of 50°C or less).

#### Power failure recovery time:

Initial or continuous start mode can be 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 can be registered

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".

#### Control output abnormality:

FLT lamp lights and FLT contact output goes "ON".

Other function is processed at all times.

#### Fault contents indication:

Cause of fault is indicated numerically on numerical indicator on the front panel.

## 6. Transmission functions

### (1) Transmission items

#### Supervisory items:

PNB → host  
 Process value, control output, operation mode, alarm information, fault information, various limiter values, constants, etc.

#### Setting operation items:

Host → PNB  
 Control output, operation mode, various limiter values, constants, etc.

### (2) Transmission setting inhibit:

Parameter setting enable/inhibit can be designated by transmission from the host. Designation is done by keys on the front panel.

### (3) Communication interface

#### (a) T-link: Private interface

Transmission speed: 500Kbps  
 No. of units connectable: 32 max.  
 Transmission distance: 1km max.  
 Transmission form: Multi-drop  
 Control method: I/O transmission and message

#### (b) RS-422A/485: Universal interface

Transmission speed: 2400, 4800, 9600 or 19200bps configurable  
 No. of units connectable: 31 max.  
 Transmission distance: 1km max.  
 Transmission form: Multi-drop  
 Control method: Polling/selecting

#### (c) CC data line: Private interface

Transmission speed: 19.2Kbps  
 No. of units connectable: 15 max.  
 Transmission distance: 500m max.  
 Transmission form: Multi-drop  
 Control method: Polling/selecting

## 7. Other functions

Data protective function by use of pass code

## 8. Additional functions (options)

### (1) Hard manual unit (HMV)

Control output: 4 to 20mA DC

#### Allowable load resistance:

600Ω or less (24V DC power only)

## 9. 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 (187 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

Rating plate (Name plate):

100 (H) x 72 (W) mm, white acryl

Dimensions: 144 (H) x 72 (W) x 391 (D) mm, IEC

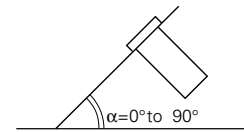
(DIN) standards

Mass {weight}: Approx. 2.9kg

## Mounting method:

Flush with indoor panel; vertical mounting is standard.

Mounting on tilted surface possible (angle "α")



Finish color: Munsell N 1.5 for front panel and case

Scope of delivery: Manual loader and mounting bracket

Item to be ordered separately:

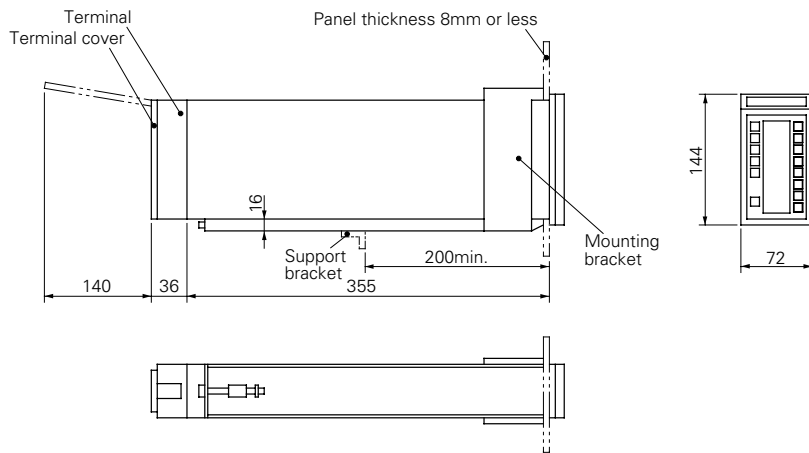
Communication cable (type PNZ)

## CODE SYMBOLS

1 2 3 4 5 6 7 8 9 10										Description	
P	N	B	1					5			Process value input signal
A											1 to 5V DC
B											4 to 20mA DC
C											J thermocouple
D											K thermocouple
E											E thermocouple
F											R thermocouple
G											Resistance bulb, JPt 100, 3-wire, 50 °C
W											span or more
											Resistance bulb, Pt100, 3-wire, 50 °C
											span or more
A											Operating method
B											M type
											A-M type
1											Power supply
2											24V DC (20 to 30V DC)
3											100V AC (85 to 132V/47 to 63Hz AC)
											200V AC (187 to 264V/47 to 63Hz AC)
											Hard manual back-up unit
											(24V DC power only)
1											None
2											With
											Transmission function
Y											None
T											T-link
R											RS-422A
S											RS-485
C											CC data line

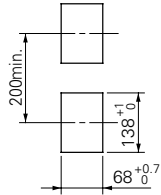
Notes: Symbols of resistance bulbs are as follows.  
 JPt100.....JIS C 1604-1981  
 Pt100.....IEC Pub 751-1983  
 (Selection of JPt100/Pt100 is possible by using front panel key.)

OUTLINE DIAGRAM (Unit:mm)

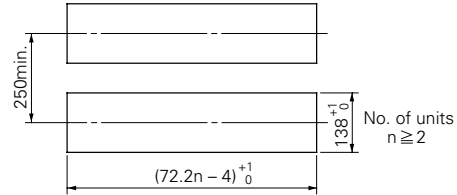


Panel cutout

When mounting one unit

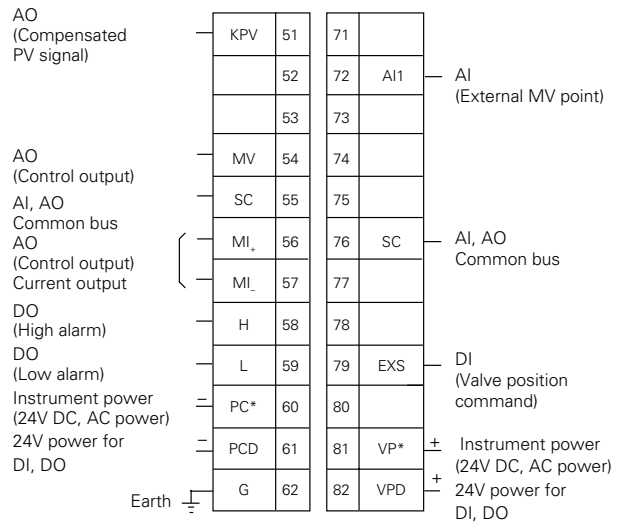
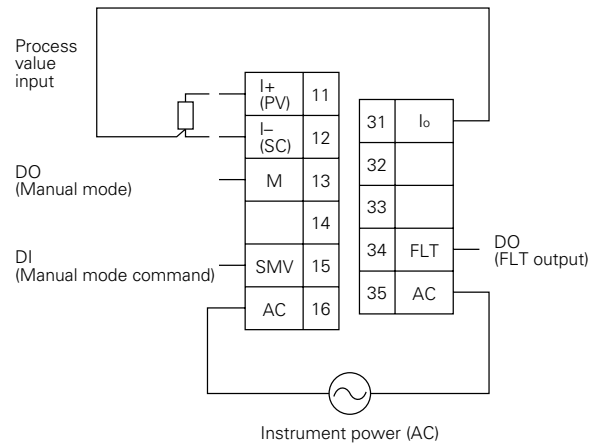


When mounting "n" units



# CONNECTION DIAGRAM

Block terminals (M4 screws)

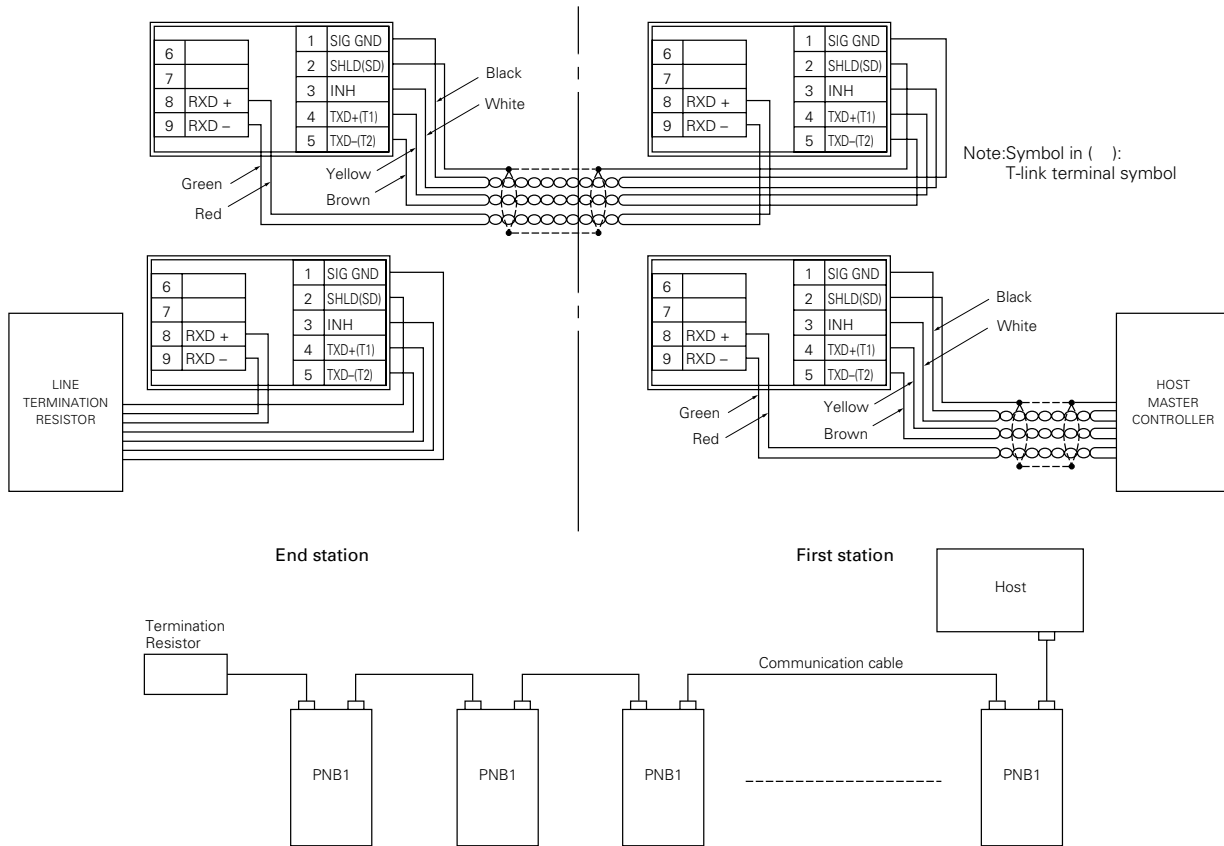


Note: \* Symbols for AC instrument power are VPO, PCO.  
Output: Approx. 24V DC (0.1A max.)

## 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 with inner DC power supply of CC-S The 5th digit of code symbols: B			

# COMMUNICATION CONNECTOR



⚠ Caution on Safety

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

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