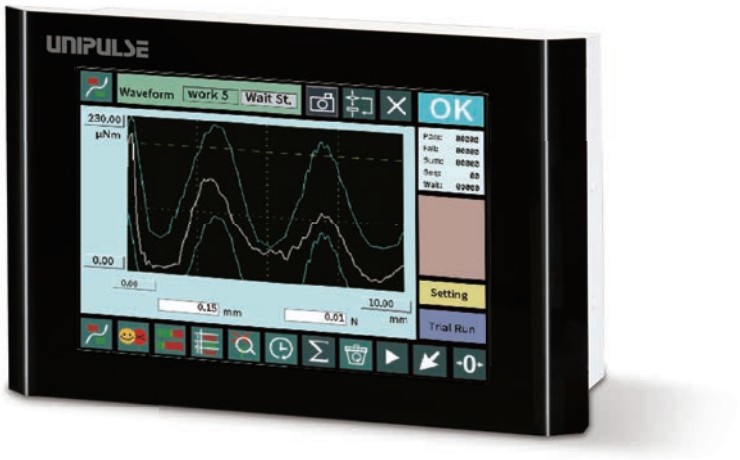
PFA

PRESS FORCE ANALYZER

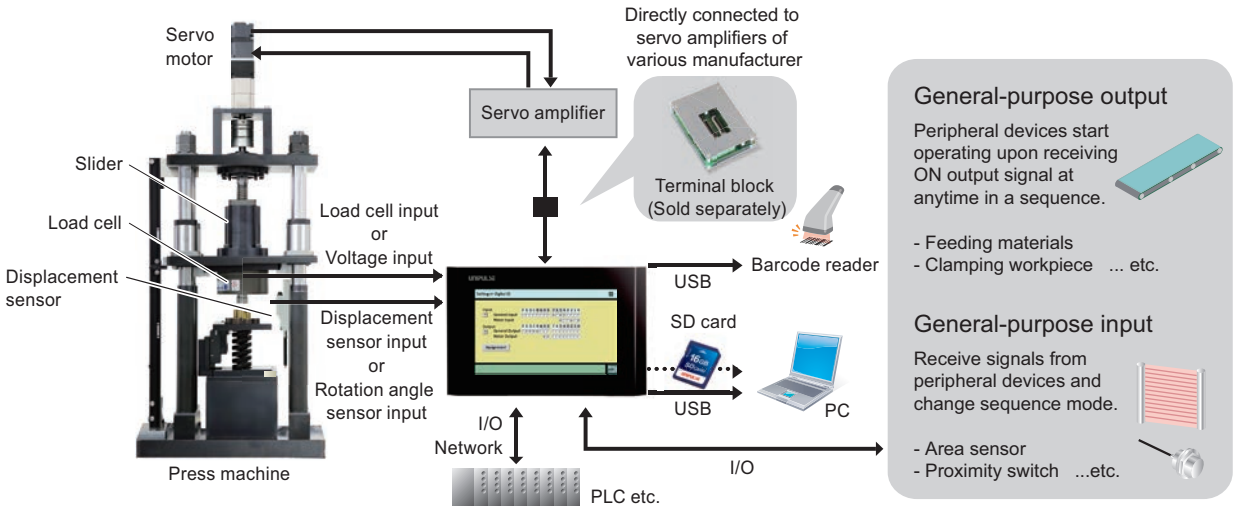
CC-Link
EtherNet/IP
RoHS2
WATER&DUST PROOF



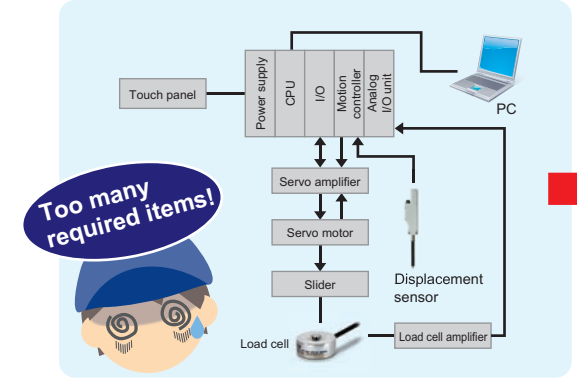
Monitor & handle sequence control of press machine!
Anyone can easily setup sequence control of pressing!
All-purpose type press force analyzer variety of judgment functions

- Enable process monitoring and control such as screw tightening, capping, etc.
- Can be connected to servo motors of any manufacturer.
- 5000 times/sec. high-speed processing.
- There are 256 types for both Work No. & Recipe No.
- Can use various commands to setup complex sequence easily
- Connectable to peripheral devices by general-purpose I/O.
- Logging of measurement results up to 2.5 million times can be saved into SD card.

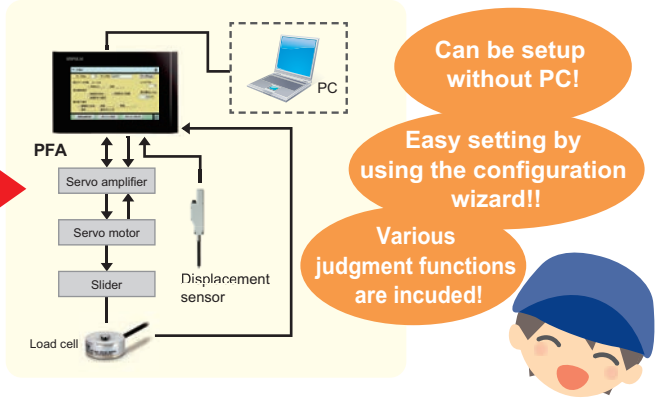
Can easily assemble press machine



Conventional press control...



If you use PFA... so shapely!



Monitoring using waveform display

■ 2 input: Force & Displacement

PFA

Force
- Load cell input
- Voltage input

Y-axis

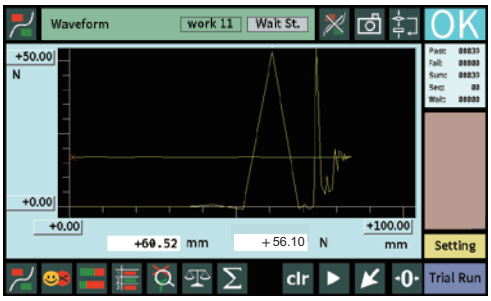
Displacement
- Line driver input
- Voltage input

X-axis



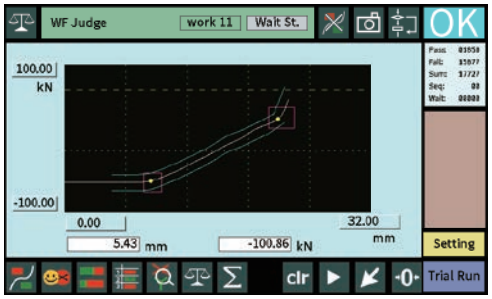
■ Two types of waveform display

<Real time waveform>



Waveforms are always drawn when the power is turned on.
Able to detect abnormality immediately.

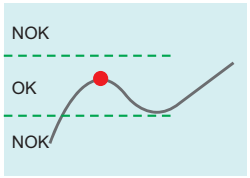
<Measuring waveform>



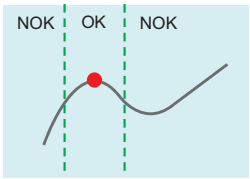
Waveform that used for various judgments.
Waveform data can be also saved into SD card.

■ OK/NOK judgment at 2 inputs

Pressure, force, torque sensor on Y-axis
A displacement/rotation angle sensor is connected to the X-axis, and two-dimensional OK/NOK judgment is possible.



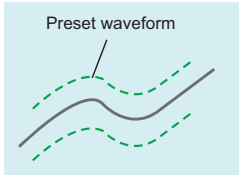
Judgment for Y-axis (force)



Judgment for X-axis (displacement)

■ Waveform comparison judgment

Always compare preset waveform and measured waveform.
If even one point exceeds the preset waveform, it will be judged as NOK.



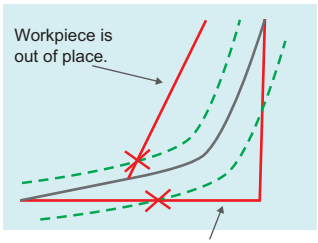
Within range, OK



Exceeded, NOK

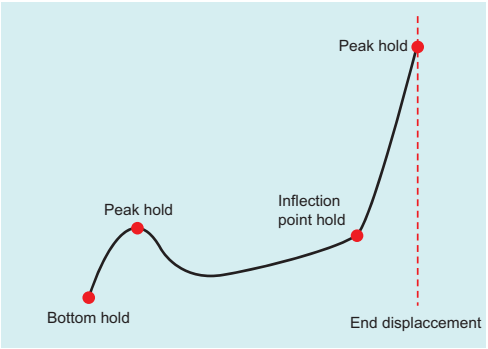
Utilization of waveform comparison

Judgment will output at the moment the preset waveform is touched, so it can be used for branching the sequence operation.



A variety of hold judgment

OK/NOK judgment can be done in one single process. (Max. 5 points)
Choose from a variety of hold functions*.



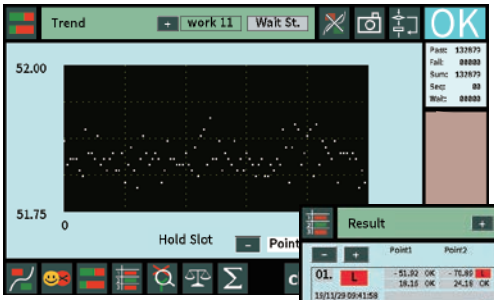
<Judgment range>
Can choose from various condition like external signal, displacement, sequence linkage, etc.

* Refer to page 92 for hold types

Trend analysis

With trend analysis, abnormality can be detected earlier to prevent unwanted failures.

<Monitor the deviation of zero point and changes of hold points>



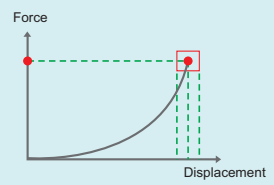
Abnormality of sensors and equipment can be detected immediately.

<Monitor the judgment result>



Able to check latest 100 judgment results.

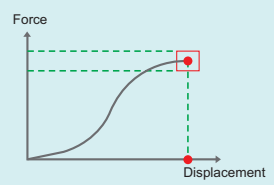
Force and position control is selectable



Force control

Drive slider based on preset force target.

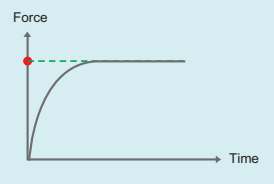
Feedback control of load cell value.



Position control

Drive slider to the preset position.

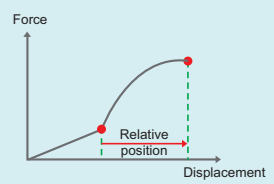
Feedback control with the value of the displacement meter is also possible.



Keep control

Press control with constant load.

Can perform precise pressing based on feedback control.



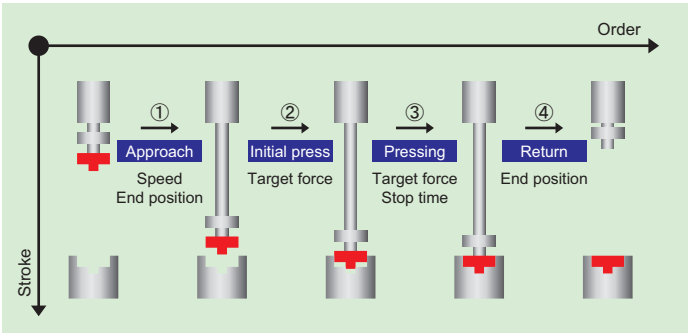
Position control (relative position)

Drive preset distance-slider from position when row is reached.

Relative position control is possible.

Easy setup of press sequence

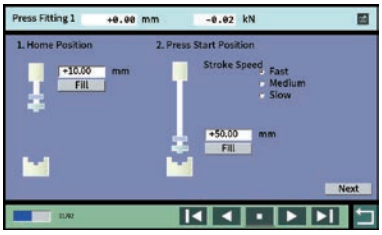
Common press sequence



Templates available for frequently used sequence.
Setting is completed just by entering setting values such as position and load.

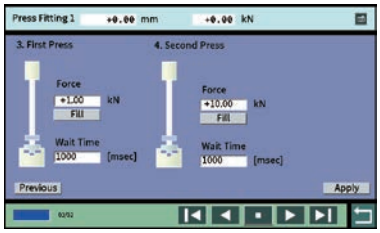


The set sequence is registered in the control recipe.



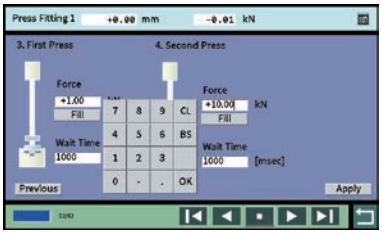
1. Home position

2. Press start position



3. First press (Initial press)

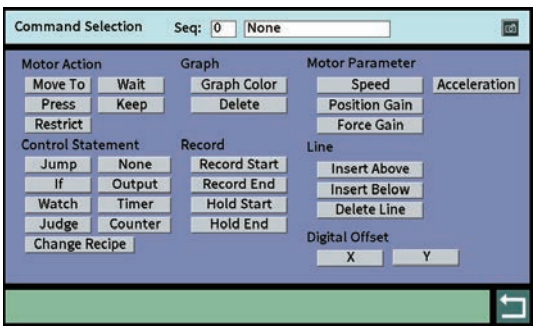
4. Second press (Pressing)



Values can be entered not only with the keypad, but also with the current value.

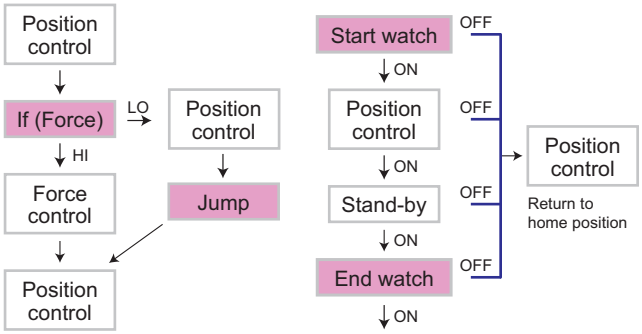
Various commands

Complex sequences such as load limits during position control and linkage between control and measurement can be easily set.



Sequence can be branched out

Sequence can be branched out based on the condition of current load, current displacement, I/O, timer, counter, etc.



Specifications

Sensor input section	Strain gauge input (6-wire type)		
	Excitation voltage	DC 2.5, 5, 10 V±10% (Depending on settings)	
		Output current: Within 30 mA	
	Signal input range	−2.0 to +2.0 mV/V	
	Accuracy	Non-linearity	Within 0.02% FS±1 digit (at 2.0 mV/V input)
		Zero drift	0.2 μV/℃ RTI typ.
		Gain drift	Within 15 ppm/℃
	Low-pass filter	Selectable from 2 Hz to 2 kHz (−6 dB/oct.)	
	A/D converter	Speed	5000 times/sec.
		Resolution	24 bit (binary)
	Voltage input		
	Signal input range	−10 to +10 V	
	Input impedance	Approx. 1 MΩ or more	
	Accuracy	Non-linearity	Within 0.02% FS±1 digit (at 10 V input)
		Zero drift	Within 0.2 mV/℃ RTI
		Gain drift	Within 0.01%/℃
	Low-pass filter	Selectable from 2 Hz to 2 kHz (-6 dB/oct.)	
	A/D converter	Speed	5000 times/sec.
		Resolution	24 bit (binary)
	Sensor input for stroke (pulse input: line driver)		
	Max. input frequency	1 MHz	
	Internal count range	30 bit	
	Applicable sensor	Output, Incremental type 2-phase output (A/B-phase signal output)	
		Output stage circuit specification, Line driver (Based on RS-422A)	
Analog voltage output	Output level	Load cell input Approx. 2 V per 1 mV/V	
	Load resistance	2 kΩ or more	
Display section	Display	7.0 inch TFT color LCD	
		Display area	152(W) × 91(H) mm
		Dot configuration	800 × 480 dot
	Language	Japanese / English / Chinese	
Comparison judgment function	Multiple point comparison mode 256 types (Setting values can be saved.)		
		Up to 5 points of holds can be compared & judged at the same time	
		Sample, Peak, Bottom, P-P, Relative Minimum, Relative Maximum, Inflection Point, Average, End Displacement	
	Waveform comparison mode 256 types (Setting values can be saved.)		
		Compares actual measured waveforms against preset Hi/Lo waveforms. The entire measured waveform will be compared against the preset Hi/Lo and if any of its points exceed the preset waveform, the measured waveform is treated as NOK (Not OK).	
Preventive maintenance support	Trend display	Trend analysis of measured data & detect irregularities at early stage	
	Statistics	Takes the latest 10000 measurement results	
		Displays number of measurements, number of OKs & NGs, and ratio of OKs	
	Screen capture	Capture screen display as bmp data	
	Editable work name	The work process can be displayed arbitrarily by linking to the work number	
	Setting list display	Distinguish master setting & current setting with color	
	User management	User management with login ID & password is possible	
External signal	Output signal (16 points)	Point judgment (force, stroke)/ Force overload/ Measurement complete/ Waveform comparison/ Force･stroke OK/ CPU OK/ SD card OK/ Timing output 1,2/ Servo ready/ Motor alarm/ In position/ Brake off/ Torque limit/ Zero speed/ General-purpose output/ Sequence in progress/ Return origin complete/ POT (Forward rotation lock)/ NOT (Reverse rotation lock)	
		* Selectable from the above	
		Output type: Select from PNP, NPN (Specified by model)	
		Rated voltage: 30 V, Rated current: 30 mA	
	Input signal (16 points)	Force zero/ Stroke adjust/ Measurement start/ Measurement stop/ HOLD 1 to 5/ Reset/ Backlight forced ON/ Touch panel lock/ Work selection/ Servo on/ Start sequence/ Stop sequence/ Pulse clear/ Alarm reset/ Forward rotation lock/ Reverse rotation lock/ Home position detect/ Return to home position/ Home position/ JOG+/ JOG−/ STEP+/ STEP−	
		* Selectable from the above	
		Input type: Selectable from PNP, NPN (Specified by model)	
Motor control	Compatible servo amplifier	Servo amplifier capable of pulse train input	
	Sequence function	Press sequence programmable in controller	
		Switchable control mode in sequence	
		Control recipe 256 types (Settings values can be saved.)	
		Up to 100-line action can be registered per control recipe	
	Connection between PFA ⇔ Servo amplifier		
		Pulse train for position control (Line driver) (RS-422A basis)	
		Max. 500 kpulse/sec.	
		Digital I/O: Control usage	
	Command	Motor operation	Position control/ Force control/ Stand-by/ Keep/ Restrict
		Control character	Blank/ Jump/ If/ Watch/ Out put/ Judge/ Timer/ Counter/ Recipe change
		Graph	Graph color display/ Delete graph
		Record	Start measurement/ Stop measurement/ Start hold/ Stop hold
		Motor parameter	Speed/ Position gain/ Force gain/ Acceleration
		Row	Insert above/ Insert below/ Delete row
		Digital offset	X/Y
External devices	Barcode reader (USB connection): Scan items		
	SD card: Setting data & waveform can be saved as CSV		
Interface	USB: USB interface		
	CCL: CC-Link interface (Option)		
	EIP: EtherNet/IP interface (Option)		
	ETN: Ethernet interface (Option)		* Only 1 option can be installed

* Please note that there are possibilities of individual differences in a color tone on display devices such as LEDs, fluorescent display tubes and LCDs due to manufacturing process or production lots.

General Specification	Power supply voltage	DC 24 V (±15%), Power consumption 20 W typ.	
	Operating conditions	Operation temperature: −10 to +40℃	
		Storage temperature: −20 to +60℃	
		Humidity: 85% RH or less (non-condensing)	
	External Dimension	218(W) × 140(H) × 87(D) mm (Not including projections)	
	Weight	Approx. 1.8 kg	
Attachments	Power connector ……1	Power cable with ferrule terminals 3 m ….. 2	
	Power connector lever ……1	Guide rail …… 1	
	Load cell connector …….. 1	CC-Link connector	
	SD card 16 GByte …… 1	(When CC-Link option is installed) ……. 1	
	Operation manual ……..1		
	Jumper wire ……..2		
Optional accessories	CA10-USB:	USB cable (TypeA-Bmicro) 1.2 m	
	PFA-ST:	Supporting stand (VESA 100, 75 compliant)	
	PFA-CONV-MIT:	Dedicated terminal block	
	PFA-CONV-MIT-ABS:	Dedicated terminal block	
	PFA-CONV-PAN:	Dedicated terminal block	
	PFA-CONV-SIE:	Dedicated terminal block	
	PFA-CONV-TAM:	Dedicated terminal block	
	PFA-CONV-YAS:	Dedicated terminal block	
	CN71:	CC-Link connector	
	SD16G:	SD card 16 GByte (Same as the attachment)	
	SD32G:	SD card 32 GByte	

Structure of product code

PFA7 □ □
① ② ③

① Standard unit

② I/O output

Sign	Output type
PNP	PNP output (Source type)
NPN	NPN output (Sink type)

③ Interface

Sign	Interface
Standard	USB

↓ 1 optional interface can be added in addition to standard interface.

CCL	CC-Link
EIP	EtherNet/IP
ETN	Ethernet

Structure of optional cable

CAPF − □ − □ □ M
① ② ③

①

Sign	Types
I/O	36p I/O cable
SER	50p PCR cable
CON	50p MDR cable

②

Sign	Connector
S	Bare wires on one side
W	Connectors at both ends

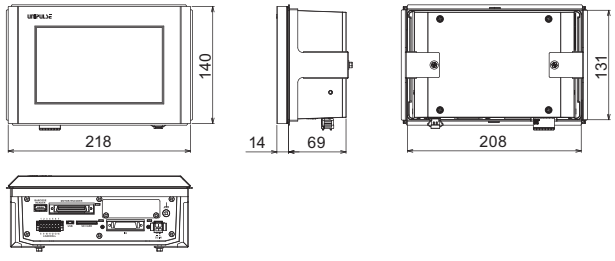
③

Sign	Length of cable
1	1 m
3	3 m
5	5 m
10	10 m

Ex) CAPF-SER-W5M
5 m PFA-Dedicated terminal block cable with connectors at both ends

External dimension

Unit: mm





Optional: Supporting stand