PFAE

BUILT-IN PRESS FORCE ANALYZER



CC-Link
EtherNet/IP
RoHS2

A built-in type press force analyzer including programmable press controller and OK/NOK judgments

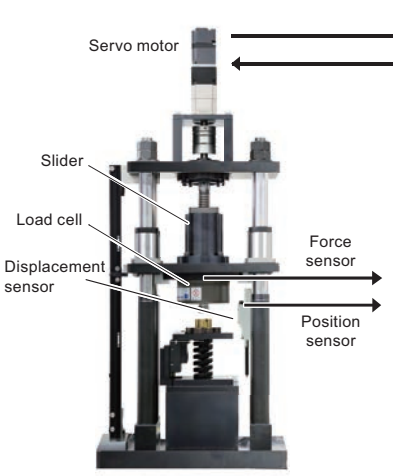
- DIN rail mount type; perfect for embedding onto a control panel
- Easy setup on PC
- Just leave process monitoring & control of press machines, screw tightening machines, testing machines and such to this 1 device!
- Ultimate solution for motor control! Anyone can setup sequences easily!
- All-purpose type press force analyzer variety of judgment functions
- 5000 times/sec. high-speed processing

Sample application

Press fitting
Measure fall-off load without missing

Caulking
Force & displacement judgment prevents caulking failure

Welding
Pressing control enables firm jointing



■ **Network**
PLC

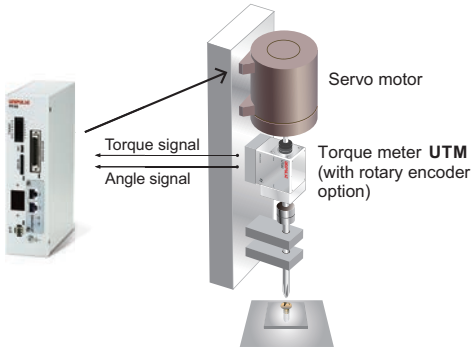
■ **USB**
PC

■ **General-purpose output**
Turns ON its ourput at any time
Starts operations of peripheral devices

■ **General-purpose input**
Receives signals and branches off sequences
- Area sensor
- Proximity switch etc.

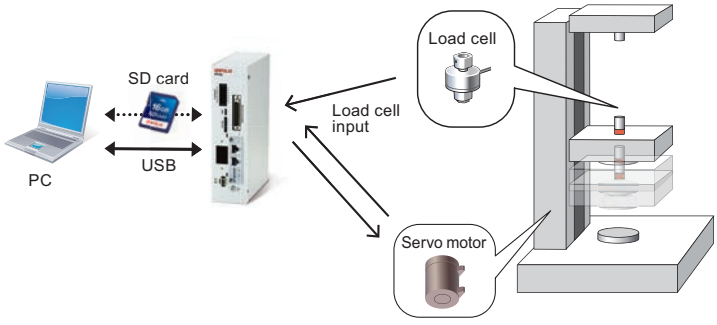
■ For screw tightening management

Can be used as a controller for torque generator by monitoring torque & angle constantly.



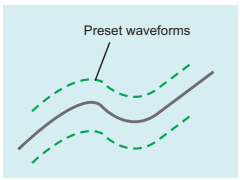
■ For tension & compression test machine

Combination of sequences and cooperation with external devices can be carried out.
All-purpose type test machine can be built at ease even without a PLC.



Abundant judgment functions

Constantly compare a preset waveform and a measured waveform.
When any of the point exceeds a preset waveform, it will be judged as NOK.



Within range, OK

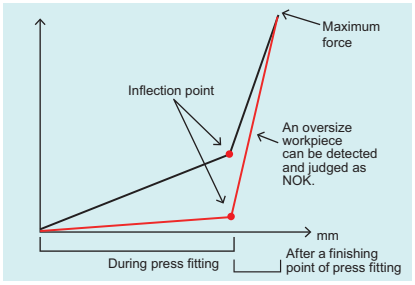


Exceeded, NOK

A preset waveform can be set as desired.

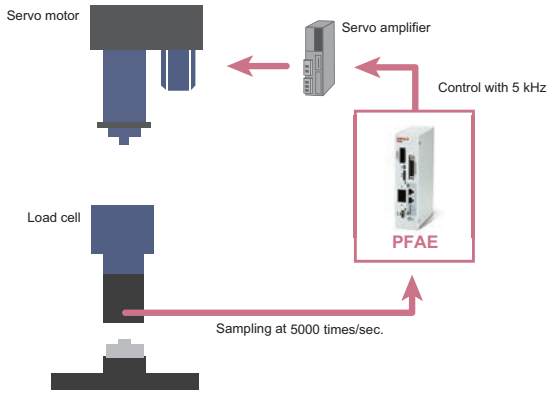
■ Inflection point hold

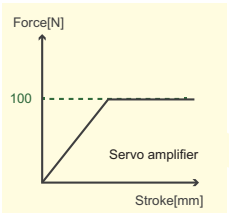
A hold function ideal for judgment of press fitting.
Automatically detect a force change point just before finishing press fitting.



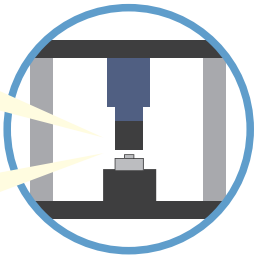
High accuracy & high responsive press control

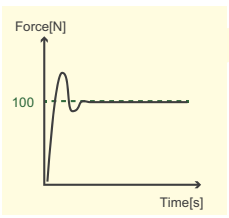
Retrieves measured value from a load cell with the sampling speed of 5000 times/sec. and performs feedback control with 5 kHz responsiveness.
Compared with conventional press systems, PFAE can achieve higher-accuracy & higher-responsive press control.





Even against a soft workpiece or a deformed workpiece due to welding, it keeps pressing at a constant pressure.

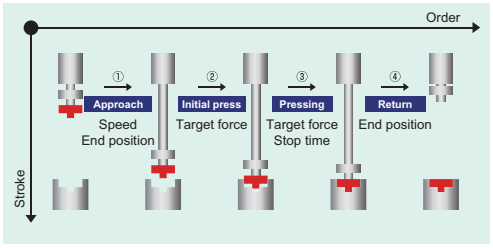




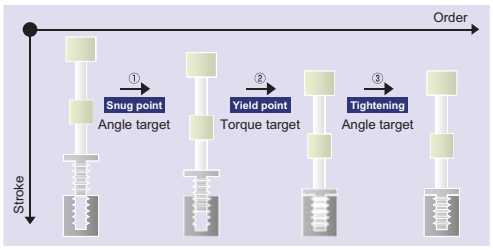
Even at against a hard workpiece, it achieves a press control with less overshooting as well as no hunting!

Setup sequence at ease

Templates for frequently-used sequences are prepared.
Just enter position, force & speed and the setting is done!



Press sequence



Screw tightening sequence

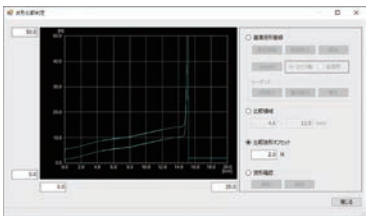
Easy setup on PC

Finds setting items quickly

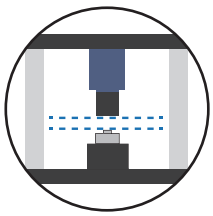


All setting values are configurable on PC.
Being categorized by types, settings can be found intuitively.

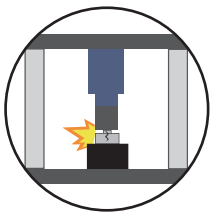
Configures setting while monitoring a waveform



A judgment can be configured while displaying a waveform.
It is possible to monitor a whole waveform or perform a point judgment.

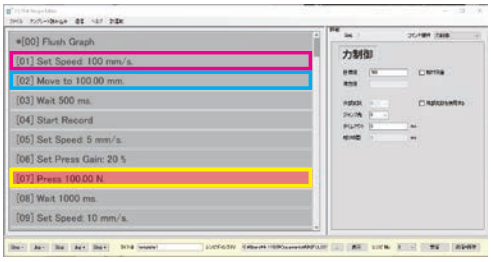


An approach was too far



Too much force was applied

Sequence display screen



(1) Changes the speed of an approach to 100 mm/s
(2) Changes the position of an approach to 100 mm
(3) Changes the pressing force to 100 N

Specifications

Sensor input	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/°C
	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/°C RTI Gain drift: Within 0.01%/°C
	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
	Adaptable encoder	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
Comparison judgment function	Multi point comparison mode	
	16 types*1 can be registered	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	
	16 types*1 can be registered	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).
External input / output (CC-Link, EtherNet/IP)	Output signal (16 points)	Point judgment (force, displacement)/ 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/ Sequence in progres/ POT/NOT/ Return origin complete/ None * Selectable from the above Output type: As a cyclic communication bit of PLC
	Input signal (16 points)	Force zero/ Stroke adjust/ Measurement start/ Measurement stop/ HOLD 1 to 5/ Reset/ 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−/ None * Selectable from the above Input type: As a cyclic communication bit of PLC
Motor control	Compatible servo amplifier	Servo amplifier capable of pulse train input
	Sequence function	- Up to 16 control recipe*2 can be registered according to types - Up to 100 steps of operations can be registered into 1 control recipe - Full-closed loop force & position control are possible
	Motor interface	Pulse train for position control (A/B phase) Line driver (Based on RS-422A) Max 500 kpulse/sec.
Motor I/O	Output	Pulse input prohibited/ Accumulated pulse cleared/ Servo on/ Gain selection/ Alarm clear/ POT/ NOT
	Input	Servo ready/ Motor alarm/ In position/ Brake off/ Torque limit/ Origin detection signal
Interface	CCL: CC-Link interface (Option) EIP: EtherNet/IP interface (Option) USB: USB interface * Only 1 option can be installed	
General Specification	Power supply voltage	DC 24 V (±15%) Power consumption 6 W typ.
	Operating conditions	Operation temperature: -10 to +40°C Storage temperature: -20 to +60°C Humidity: 85% RH or less (non-condensing)
	External Dimension	54(W) × 203(H) × 136(D) mm (Not including projection)
	Weight	Approx. 860 g
Attachments	Power connector ..... 1 Power connector lever ..... 1 Load cell connector ..... 1 SD card 16 GByte..... 1 Operation manual..... 1	Jumper wire ..... 2 Power cable with ferrule terminals 3 m ..... 2 USB cable (TypeA-Bmicro) 1.2 m .....1 CC-Link connector (When CC-Link option is installed)..... 1
Optional accessories	SD16G:	SD card 16 GByte (Same as the attachment)
	SD32G:	SD card 32 GByte
	CA10-USB:	USB cable (TypeA-Bmicro) 1.2 m (Same as the attachment)
	CN71:	CC-Link connector
	PAF-CONV-PAN-E:	Dedicated terminal block
	PFA-CONV-MIT-E:	Dedicated terminal block
	PFA-CONV-MIT-ABS-E:	Dedicated terminal block
	PFA-CONV-YAS-E:	Dedicated terminal block
	PFA-CONV-TAM-E:	Dedicated terminal block
	PFA-CONV-SIE-E:	Dedicated terminal block

*1 Comparison mode can be extended up to 256 types. Please ask us for more details.
*2 Control recipe can be extended up to 256 types. Please ask us for more details.

Structure of product code

PFAE − □ (①)

① Interface

Sign	Interface
CCL	CC-Link, USB
EIP	EtherNet/IP, USB

Structure of produce code for optional cable

CAPF − □ (①) − □ (②) □ (③) M

①

Sign	Type
SER	50p PCR cable
CON	50p MDR cable

②

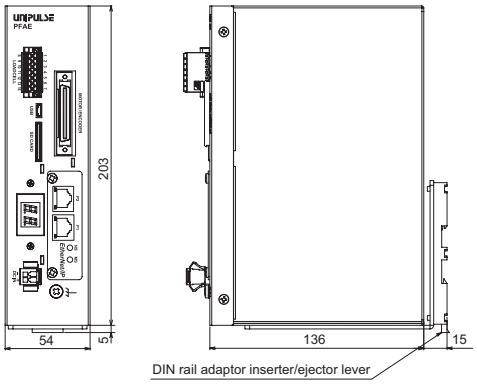
Sign	Connector
S	Bare wires on one side
W	Connectors at both ends

③

Sign	Cable length
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