

FS2000

DIGITAL INDICATOR WITH GRAPHIC DISPLAY/TOUCH PANEL
(SD CARD SLOT & HIGH SAMPLING RATE)



The best solution for OK/NOK judgment of press fitting and caulking application !!
High responsiveness of 5kHz to fully utilize the performance of Super Cell !!
A fluctuation of force is shown as a waveform!!

- Two-dimensional OK/NOK judgement can be performed with a load cell and displacement sensor.
- 25000 times/sec high-speed processing
- Analog monitor output
Voltage output is proportionate to the input signal making the recording on recorder convenient. Approx. 2V per 1mV/V strain gauge input
- Variety of interfaces
USB / DeviceNet / CC-Link / EtherNet/IP
- 4.3-inch color LCD module & touch panel
Operation can be effortlessly performed by a direct touch on the touch panel.
- I/O Input: Plus common / Minus common selectable.
I/O Output: Sink type / Source type selectable.
- RoHS-compliant product

Visualize high-speed force fluctuation

High responsiveness of analogue bandwidth 5kHz (sampling 25kHz)

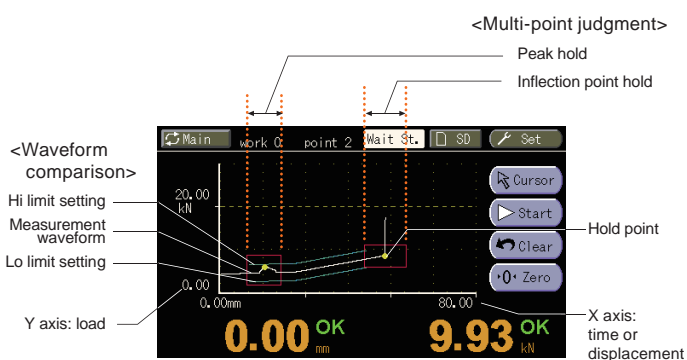
Comparison & hold function by waveform display

■ Waveform comparison

This function compares the actual measurement waveform against the setup High/Low limit waveforms and will give out an NOK judgment when any of the point exceeded the preset High/Low limit waveforms.

■ Multi-point judgment

OK/NOK judgment can be performed on multi points in one process. (e.g. The start point and end point of press fitting can be judged respectively.) (Max. 5 points)



Improved usability

4.3 inch wide display provides excellent visibility.
Main display configuration can be selected to keep it as simple as possible by eliminating unnecessary information.



Saved measured data (waveform) on the SD card can be displayed afterwards

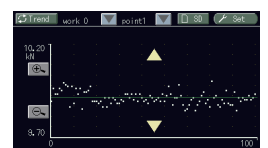
Measured data and set values can be saved in the SD card. Data can be converted to CSV format easily for editing with Microsoft Excel.



Trend display is helpful for preventive maintenance

Trend of the zero-point shift and hold values can be monitored to find any irregularities for preventing breakdown of machines.

In addition, the master settings can be registered so that operator can compare with the current settings to see if there are any differences.



Trend display

Changed setting items are highlighted!

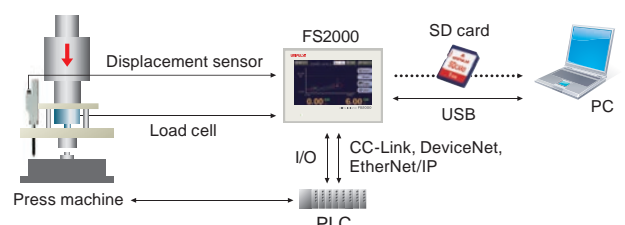
Master and current set values are listed up for checking the changed setting items easily.

Set values can be edited directly on the list without going into each setting menu.
*Except for waveform comparison settings

Loadcell	Master Setting	Present
Sensing	Use (B=wire)	Use (B=wire)
Excitation Volt.	10V	10V
Unit	N	kN
Zero Cal	0.00mV/V	0.00mV/V
Exciv. Imp. Cal.	1.00mV/V	0.25mV/V

List display

Example of use



Specifications

SENSOR INPUT	Sensor input for load (Fixed as strain gauge input) (6-wire)	
	Excitation voltage	DC 2.5, 5, 10V±10% (depending on settings) Output current: Within 30mA
	Signal input range	−2.0 to +2.0mV/V
	Accuracy	Non-linearity: Within 0.02%/FS ±1 digit (at 2.0mV/V input) Zero drift: Within 0.1μV/°C RTI Gain drift: Within 15ppm/°C
	Low-pass filter	Selectable from 10 to 10kHz (at A/D converter speed 25000 times/sec) Selectable from 2 to 2kHz (at A/D converter speed 5000 times/sec)
	A/D converter	Speed: Selectable from 25000 times/sec, 5000 times/sec Resolution: 24bit Effective Resolution: Approx. 1/30000 against 5V
	Sensor input for displacement (Standard: Pulse input (Line driver) Option: Pulse input (Open collector) [MLT])	
	Max. input frequency	1MHz
	Internal count range	Approx. 1,000,000
	Adaptable rotary encoder	Output: Incremental type 2-phase output (A/B signal output) Also capable of single-phase output (A-phase input used. All pulses are counted as in the plus direction.) Output stage circuit specification: Line driver (Based on RS-422) Output stage circuit specification: Open collector [MLT] (built in pull-up resistor)
	Sensor input for load or displacement (Option: Voltage input [MLT])	
	Signal input range	−10 to +10V
	Input impedance	App. 1M
	Accuracy	Non-linearity: Within 0.02%/FS ±1 digit (at 10V input) Zero drift: Within 0.2mV/°C RTI Gain drift: Within 0.01%/°C
	Low-pass filter	Selectable from 10 to 10kHz (at A/D converter speed 25000 times/sec) Selectable from 2 to 2kHz (at A/D converter speed 5000 times/sec)
	A/D converter	Speed: Selectable from 25000 times/sec, 5000 times/sec Resolution: 24bit Effective Resolution: Approx. 1/20000 against 10V
	Analog voltage output	Output level Approx. 2V per 1.0mV/V input Load resistance 2k or more
DISPLAY	Display	4.3 inch TFT color LCD module Display area: 95.0 (W) × 53.9 (H) mm Dot configuration: 480 × 272 dot
	Display frequency	Fixed at 3 times/sec
COMP. & JUDGE. FUNCTION	Multi point comparison mode: 16 presets (set values)	Capable of judging up to 5 hold points at the same time. Sample, Peak, Bottom, P-P, Relative Maximum, Relative Minimum, Inflection Point, Average, End
	Waveform comparison mode 16 ch (setting values can be stored)	Compares the actually measured waveform against the preset Hi / Lo waveforms. The overall measured waveform will be compared against the preset Hi / Lo and if any of its points exceeds the preset waveform, then the measured waveform will be NOK.
PREVENTIVE MAINTENANCE SUPPORT	Trend display	Showing the trend of measurement data to help finding irregularities at early stage.
	Statistics	Using the latest 10000 measured data Displaying number of measurement, OK, NOK
	Screen capture	Saves screen capture data as bmp data.
	Work name edit	Work name can be edited and displayed for each Work No..
	Setting list display	Changed setting items comparing to master set values are highlighted.
	User management	Login ID and Password
INPUT /OUTPUT	Output signal (16)	Hold judgment (load, displacement) / Load overload / Measurement complete / Waveform comparison judgment / Load & displacement OK / CPU OK / SD card OK / Timing output 1,2 Output Type: Sink type/source type selectable. (Source Type is option: [ISC]) Output transistor ON at signal ON. To connect an input unit like a PLC, connect plus common for sink type, and minus common for source type. Rated voltage 30V Rated current 30mA

	Input signal (16)	Load digital zero / Displacement adjustment / Measurement start / Measurement end / HOLD1 to 5 / Reset / Forcibly light up the backlight / Touch panel lock / Work change Input type: Plus common/Minus common selectable. (Minus common is option: [ISC]) To connect a transistor, connect NPN output type (sink type) for plus common and PNP output type (source type) for minus common.
INTERFACE	USB:	USB interface
	ODN:	DeviceNet interface (option)
	CCL:	CC-Link interface (option)
	EIP:	EtherNet/IP interface (option) (Only one option can be installed)
OPTION	ISC:	I/O Source Board
GENERAL	Power supply voltage	DC24V (±15%)
SPECIFICATION	Power consumption	6W typ
	Operation condition	Temperature: Operation: −10 to +40°C Storage: −20 to +60°C Humidity: 85% RH or less (non-condensing)
	Dimension	132 (W) × 98 (H) × 110 (D) mm (not including projections)
	Weight	Approx. 1.0 kg
ATTACHMENTS	I/O connector (with cover) ...1	DeviceNet connector
	Analog connector ...1	(when DeviceNet option is selected) ...1
	Operating tool ...1	CC-Link connector
	SD card ...1	(when CC-Link option is selected) ...1
OPTIONAL ACCESSORIES	Operation Manual ...1	
	CN36:	I/O connector (with cover)
	CN71:	CC-Link connector
	CN72:	Double row connector for CC-Link
	CN77:	Analog connector
	CND01:	DeviceNet connector
	SD1G:	1 GByte card
	SD2G:	2 GByte card
	CA81-USB:	USB cable (A-miniB type) 1.8m

Structure of product code

FS2000 □ □ □

① ② ③ ④

① Standard unit

② I/O output

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

③ Sensor input

Sign	Output type
Standard	Strain gauge, Line driver
MLT	Strain gauge, Open collector, Voltage (Load or displacement)

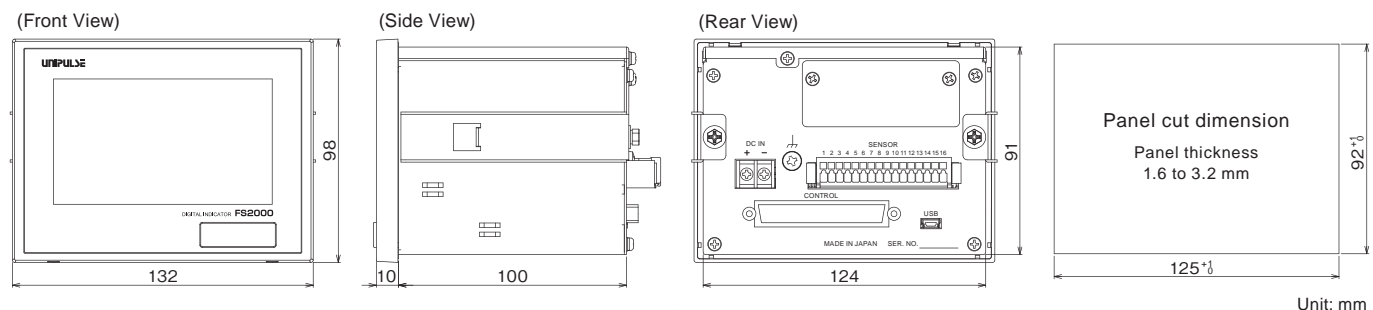
④ Interface

Sign	Interface
Standard	USB
One optional interface can be added in addition the standard interface.	
ODN	DeviceNet
CCL	CC-Link
EIP	EtherNet/IP

Combination table

X axis	Y axis	Standard	MLT
Time	Strain gauge		
Line driver	Strain gauge		×
Time	Voltage (Load)	×	
Open collector	Strain gauge	×	
Open collector	Voltage (Load)	×	
Voltage (Displacement)	Strain gauge	×	

External dimension



Digital contact sensor ULE-50

Digital contact sensor

ULE-50

A digital contact sensor designed for FS2000 and F381A-LDI. You can perform OK/NOK judgment with a Force vs Displacement curve.



● Wide measuring range & high-accuracy

Measuring range: 50mm

Resolution: 2.5μm