

## Specifications

Sensor input	2-inputs (Std: CH1=strain gauge input; CH2=voltage input) (As option, CH1 can have voltage/current input and CH2 can have strain gauge/current input); CH1: fixed Y-axis; CH2: settable X-Y axes
<b>STRAIN GAUGE INPUT</b>	
Sensor excitation voltage	DC10V/2.5V ±5% interchangeable (according to setting)
Output current	120 mA or less (for 2 inputs total) 4-wire type (at 1 input: up to 4 units of 350 Ω load cells may be connected in parallel)
Signal input range	-3.0mV/V ~ +3.0mV/V
Zero / gain adjustment	Via digital processing
Equiv. input cal. range	+0.5 mV/V ~ +3.0mV/V, -3.0mV/V ~ -0.5mV/V
Equiv. input cal. range error	Within 0.2% F.S.
Accuracy	Non-linearity : within 0.02% F.S. ±1digit (at 3.0mV/V input) Zero drift : within 0.5 μV/°C RTI (input conversion value) Gain drift : within 0.01%/°C
Analog filter	Selectable at 10, 50, 200, 600 Hz
A/D converter	Speed: At 1 input - 4000 times/sec (max); At 2 inputs - 2000 times/sec (at max. speed, sensor 2 inputs); Depending on input waveform, changeable to 100, 200, 500, 1000, 2000 times/sec Resolution: app. 1/30000 at 3.0mV/V
<b>VOLTAGE INPUT</b>	
Signal input range	-5 V ~ +5 V
Input impedance	5k Ω or more
Zero / gain adjustment	Via digital processing
Equiv. input cal. range	+1V ~ +5V, -5V ~ -1V
Equiv. input cal. range error	Within 0.2% F.S.
Accuracy	Non-linearity : within 0.02% F.S. ±1 digit (at 5V input) Zero drift : within 50 μV/°C RTI (input conversion value) Gain drift : within 0.05%/°C
Analog filter	Selectable at 10, 50, 200, 600 Hz
A/D converter	Speed: At 1 input - 4000 times/sec (max); At 2 inputs - 2000 times/sec (at max. speed, sensor 2 inputs); Depending on input waveform, changeable to 100, 200, 500, 1000, 2000 times/sec Resolution: app. 1/27000 at 5V
<b>CURRENT INPUT</b>	
Signal input range	-20mA ~ +20mA
Input resistance	App. 100 Ω
Zero / gain adjustment	Via digital processing
Equiv. input cal. range	+8mA ~ +20mA, -20mA ~ -8mA
Equiv. input cal. range error	Within 0.2% F.S.
Accuracy	Non-linearity : within 0.02% F.S. ±1 digit (at 20mA input) Zero drift : within 2 μA/°C RTI (input conversion value) Gain drift : within 0.05%/°C
Analog filter	Selectable at 10, 50, 200, 600 Hz
A/D converter	Speed: At 1 input - 4000 times/sec (max); At 2 inputs - 2000 times/sec (at max. speed, sensor 2 inputs); Depending on input waveform, changeable to 100, 200, 500, 1000, 2000 times/sec Resolution: app. 1/26000 at 20mA
<b>PULSE INPUT (option)</b> If opted, analog input (strain gauge/current/voltage) will exclusively be of Y-axis measurement	
Max input frequency	50 kHz
Internal counting range	0 ~ 65535 1/4, 1/16, 1/64 divider function can be added via setting before the counter
External supply power	DC5V (150mA max)
Applicable rotary encoder	Option-compatible encoder specifications: Output: 2 phase output (A, B signal) - also suitable for 1 phase output (A phase input is available). All pulses are counted as plus direction Output stage circuit: ① Open collector type (NPN type, V <sub>ceo</sub> =10V or more, I <sub>ce</sub> =30mA or more) ② Line driver output (Based on RS-422)
CE mark requirement	EMC Directives EN61326-1 (CLASS A) Lower Voltage Directives EN61010-1 ※CC-Link option does not conform to EC Directives.

<b>DISPLAY SECTION</b>	
Display	STN color LCD
Display size	118.2 (W) x 89.4 (H) [mm]
Dot structure	320 x 240 [dot]
Dot pitch	0.12W x 0.36H [mm]
Backlight	Brightness: App. 300 [cd/m <sup>2</sup> ] Typical Life: App. 40,000 [Hour] (25°C)
Measured value display	Y-axis: 4 digits, X-axis: 5 digits Sign: Display minus sign only on most significant digit of measured indicated value
Display count	0.1 ~ 9.9 sec/display update selectable
Increment	Setting in the range of 1 ~ 100

<b>SETTING SECTION</b>	
Setting method	Via touch screen panel
Setting value protection	Setting operation can be locked to prevent unauthorized modifications of initial settings and calibrations

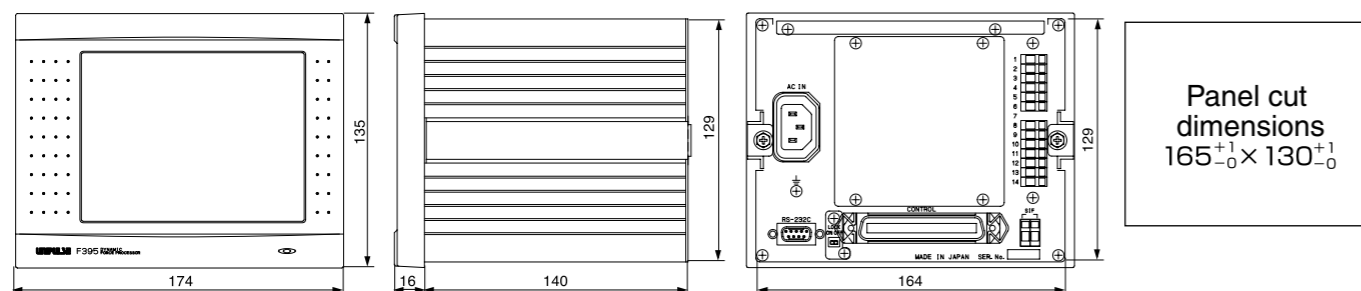
<b>FORCE MEASUREMENT FUNCTIONS</b>	
Multi hold mode	32 ch; 20 types of hold modes Sample, peak, valley, P-P (peak to peak), period specified (Peak, valley, P-P), time specified (Peak, valley, P-P), time specified auto (Peak, valley, P-P), minimum value, maximum value, inflection point (A, B, C, D), external pulse
Waveform comparison mode and waveform & displacement mode	16 ch; Stores up to 2048 data patterns at 1 ch and judges if the data are within the pattern range (in/out of range comparison)
Hysteresis / Hysteresis 2 mode	Displacement input is set as X-axis and forward/return waveform is done for each hold.
Other functions	Interchangeable for digital zero/ digital filter/calibration values and set values LOCK/ weighing mode (Multi holding: 32 ch memory; waveform comparison and waveform & displacement mode: 16 ch memory (pattern)/ displacement sensor input continuous judgment/NG waveform 4 times storing for checking (up to 2 times for hysteresis mode)

<b>INPUT / OUTPUT SECTION</b>	
Input signal (24 points)	ON when shorted to COM terminal through contact (relay, switch) or non-contact (transistor, open collector)
Output signal (16 points)	Transistor's open collector output (Emitter=COM terminal); Output is LO when transistor is ON.
Analog monitor output	App. 2V for 1mV/V strain gauge input (load resistance more than 5k Ω); App. 5.6V for 5V voltage input; App. 5.7V for 20mA current input
Interface	<b>SIF:</b> 2-wire type serial interface (SI/F) Interface for link with Unipulse printer or other peripherals. <b>232:</b> RS-232 communication interface Read/write setting values via commands from host computer. <b>PUI:</b> Pulse input interface (Option) Interface for link with open collector type/ line driver output type pulse transmitter. <b>ODN:</b> DeviceNet interface (Option) Interface to link F395 to DeviceNet such as OMRON CompoBus/D. <b>CCL:</b> CC-Link interface (Option) Interface to link F395 to CC-Link such as Mitsubishi sequencer to set-up a network.
Interface option	Up to 2 options allowable; Serial communication interface (ODN, CCL) is only 1.

<b>GENERAL PERFORMANCE</b>	
Power supply voltage	AC100 ~ 240V (+10% -15%); 50/60 Hz
Power consumption	25W (50VA) Max (at constant AC240V)
Inrush current	20A; 5msec: AC100V max. load (cold start at room temperature) 40A; 5msec: AC200V max. load (cold start at room temperature)
Operating conditions	Temperature: Working temperature range 0~+40°C; Storage temperature range -20~+60°C; Humidity: 85% RH or less (non-condensing)
External dimensions	174 (W) x 135 (H) x 156 (D) mm (protruding parts not included)
Weight	App. 2.3 kg

## External Dimensions

UNIT:mm



Please note that specifications or designs shown in this catalog may vary due to our continuous product improvement activities.

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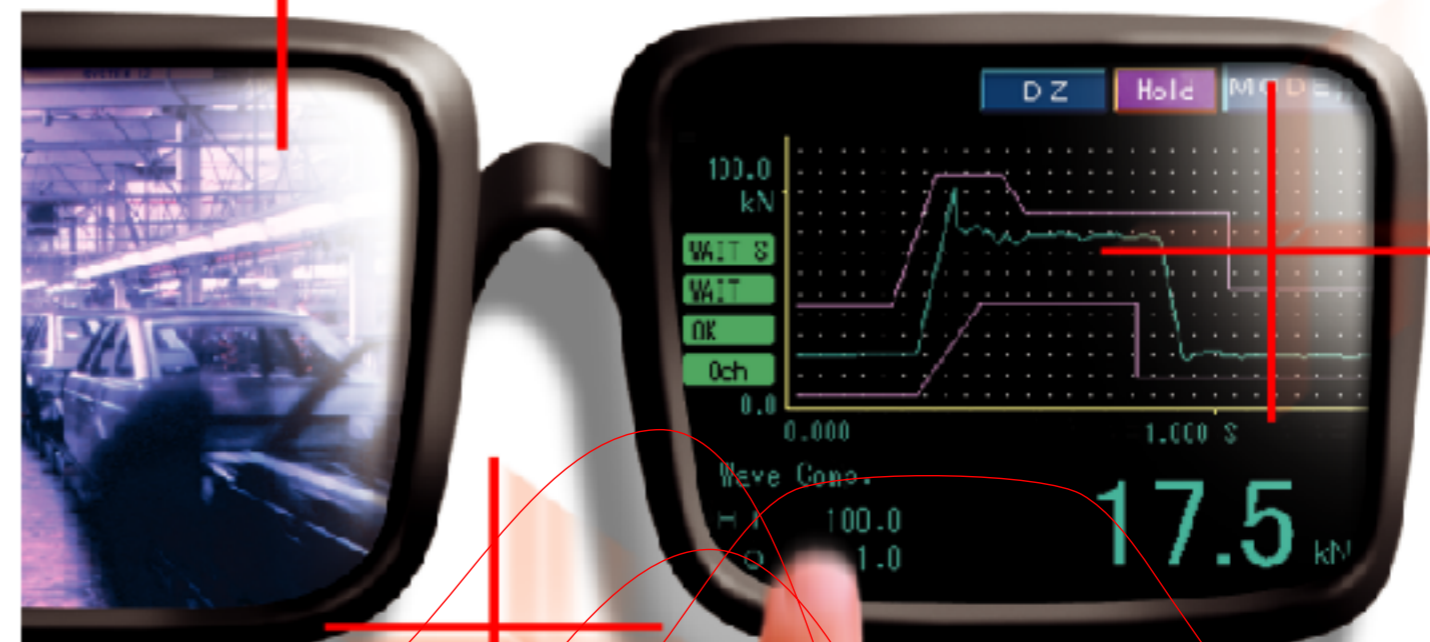
# UNIPULSE

# F395

Dynamic Force Processor



**Visible Waveform**  
**Reliable Force Measurement**  
**Traceable Product Quality**



# The full-spec unit with superb operability and speed for force variation analysis and judgment using real-time waveform.

Digitalizes load / pressure / torque strain gauge sensor input, voltage input, current input and pulse input via a 4000 times/sec high-speed sampling to display waveform. Automated machine's comparator built-in with good visibility color LCD that allows analysis, judgment and control to be done while viewing the displayed waveform.

- Via up to 2 inputs from strain gauge sensor, displacement sensor and time.
- Improved visibility and operability by the application of color LCD and touch screen panel.
- Communication function to edit and control sampled waveform in commercial spreadsheet software such as Microsoft Excel.
- Direct pulse input from rotary encoder or its like is available. (optional)
- Strage function for defective waveforms up to 4 times (up to 2 times for Hysteresis/Hysteresis 2 mode).
- Installed with high-speed A/D conversion and high-speed digital processing (Max. 2000 times/sec during 2 sensor inputs measurement) that processes sensor signal input at 4000 times/sec (Max).
- Direct connection to PLCs such as DeviceNet and CC-Link (Option).
- Connected to 2 external loadcells, that can be switched by external signal (optional)

## Waveform Comparison Mode

**Overview:** This mode samples time-varying waveform (or sensor input) and uses this waveform sample as a reference to perform upper/lower limit comparison. Continuous comparison for dynamically varying waveform is available. Up to 16 combinations of sampled waveforms can be stored and switched by external signals.

Waveform & time comparison

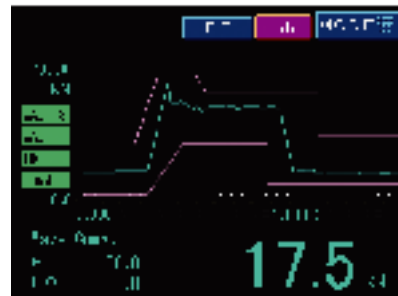
...X-axis = time

Sampling speed = up to 4 KHz

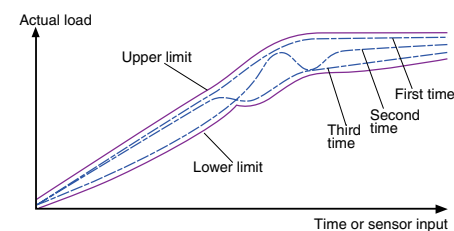
Waveform & displacement comparison

...X-axis = sensor input

Sampling speed = up to 2 KHz

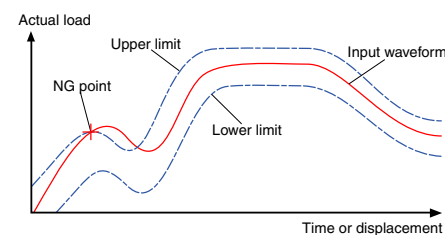


**Waveform Edit:** Upper/ lower limit waveform can be easily created by sampling actual load waveforms or by editing waveforms.



Ex) When sampling was done 3 times

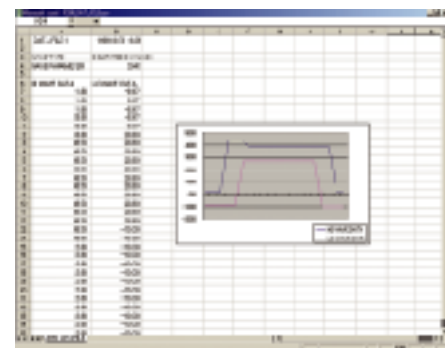
If input waveform is between the upper and lower limit range, this will be "acceptable". If not, the upper or lower limit alarm will be activated and the first point out of the upper or lower limit range will be displayed as "+" symbol on the graph.



**Waveform Read:** Available to read measurement values at each sampling point on NG and the latest sampling waveform.

**Data Transfer to/from PC:**

Waveforms and setting data for 32ch can be transferred to/from PC via RS-232C. Useful function for data strage and management.

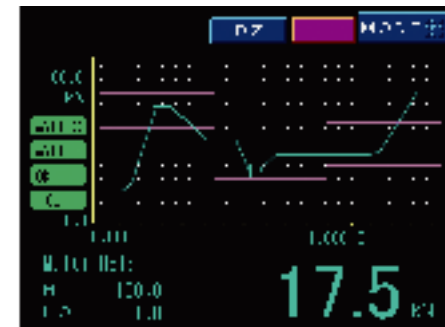


Ex) Waveform data on Microsoft Excel

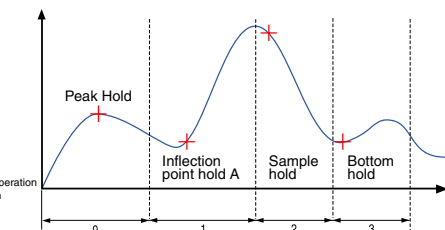
## Multi Hold Mode

This mode detects required points on the displayed waveform and judges it according to upper/lower limit comparison or its like. Each hold function and upper/lower limit value can be stored in up to 32 ch. These channels can be switched by external signal.

Not only the detected holding point but also the timing for the control signal input are displayed on the graph. There are 20 types of hold modes.

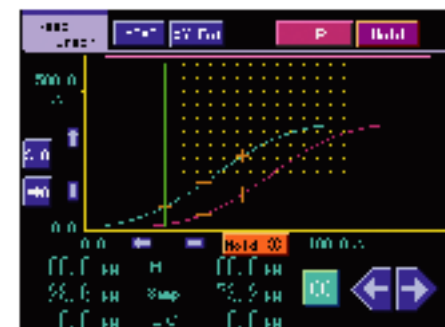


"+" symbol: Hold point Pink line on top: T/H signal is ON Green line on top: H/M signal is ON



## Hysteresis / Hysteresis 2 Mode

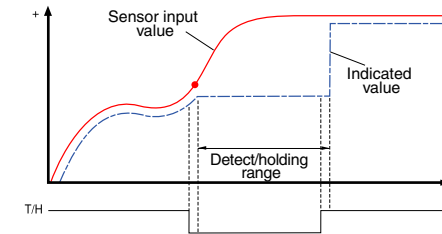
In waveform & displacement comparison mode, the waveform can only be drawn to increased displacement direction. However, in hysteresis mode, waveform can be drawn to decreased displacement direction. Similarly to multi hold mode, any type of hold mode can be switched by external signal on hysteresis mode. On hysteresis mode 2, the upper/lower limit judgement for forward and forward-return difference (absolute value) is made at the pulse input point. In addition to respective hold points, the timing of the control signal output is also displayed.



## Hold Modes

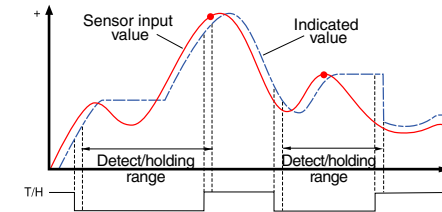
### Sample Hold

Holds any point upon receiving holding signal.



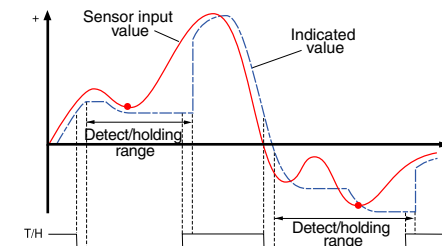
### Peak Hold

Holds maximum value (peak value) at plus direction.



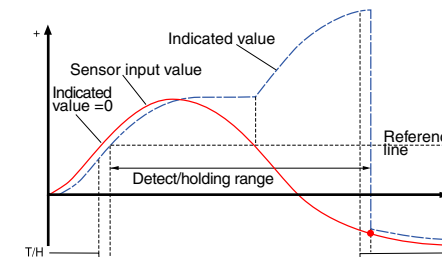
### Valley Hold

Holds maximum value (valley value) at minus direction.



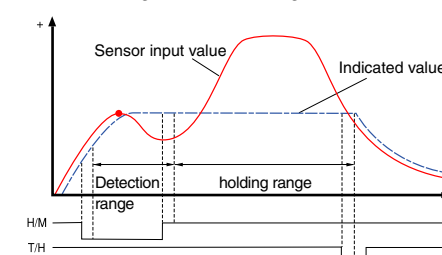
### P-P (Peak-to-Peak) Hold

Holds maximum difference upon trigger onset.



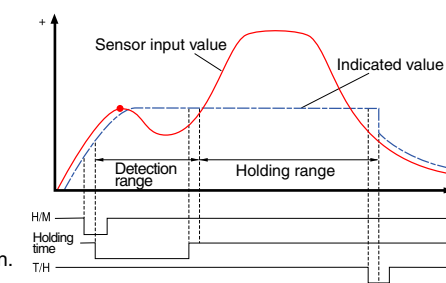
### Period Specified Hold (Peak, Valley, P-P)

A method that specifies the holding detection range via external signal.



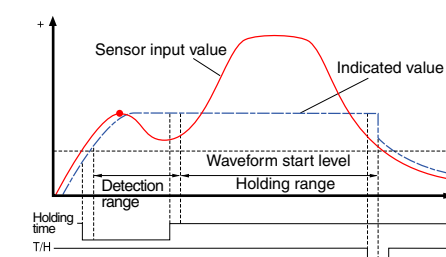
### Time Specified Hold (Peak, Valley, P-P)

A method that shifts holding to detection range within the preset timer (holding time) upon triggering of timer.



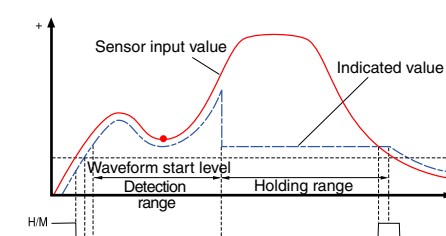
### Time Specified Automatic Hold (Peak, valley, P-P)

A method that shifts holding to detection range within the preset timer (holding time) when the indicated value exceeded the waveform start level.



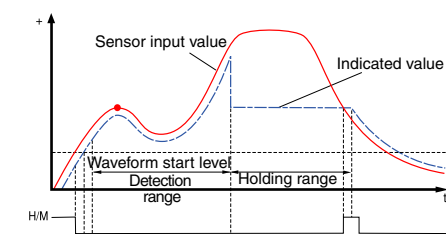
### Relative Minimum Value Hold

Detects minimum value and holds it when the indicated value exceeds the waveform start level.



### Relative Maximum Value Hold

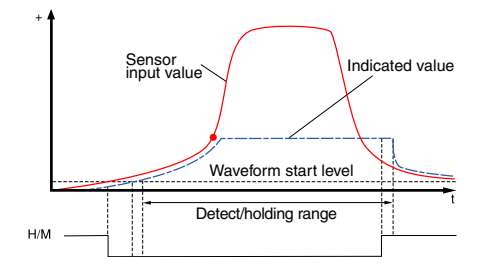
Detects maximum value and holds it when the indicated value exceeds the waveform start level.



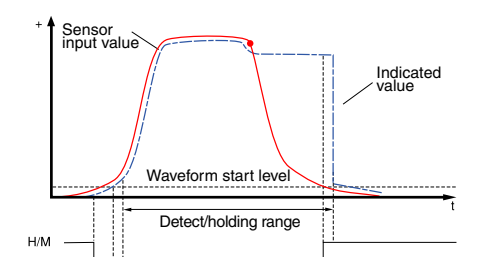
### 4 types of Inflection Point Hold

Detects and holds inflection point at the range where indicated value horizontally cuts on waveform start level and where H/M signal is input in.

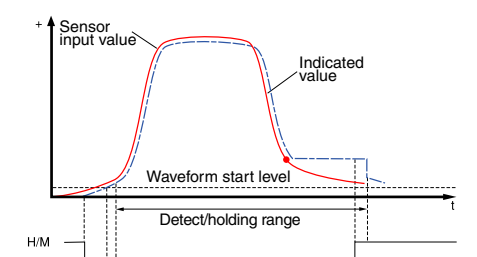
#### ● Inflection Point Hold A



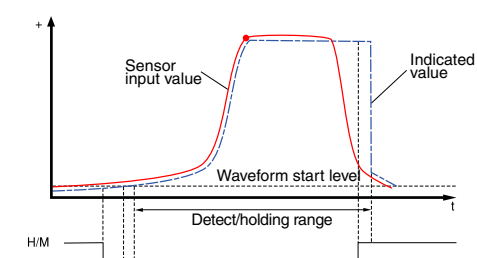
#### ● Inflection Point Hold B



#### ● Inflection Point Hold C



#### ● Inflection Point Hold D



### External Pulse Hold

Holds value during external pulse input. There are 3 inputs for pulse input but only 1 holding for each of pulse input.

