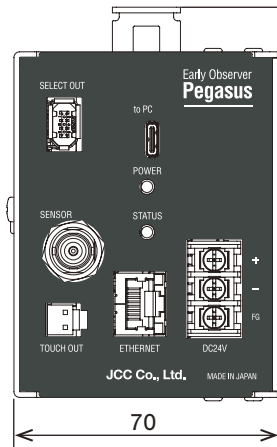
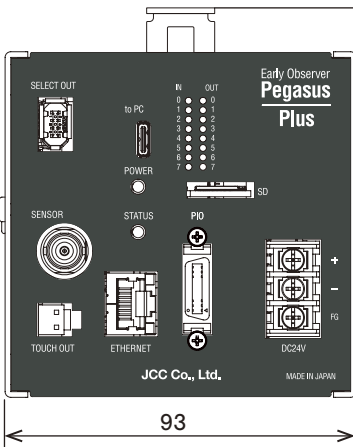


■ External dimensions

Early Observer Pegasus



Early Observer Pegasus Plus



Unit: mm

D=110mm  
DIN rail mounted

■ Pegasus Plus input/output signals

Input		Output	
0	AE measurement	0	AE measurement answerback
1	Logging	1	Logging answerback
2	Type 1	2	Type answerback 1
3	Type 2	3	Type answerback 2
4	Type 3	4	Type answerback 3
5	Type change	5	Threshold alarm 1
6	Spare	6	Threshold alarm 2
7	Threshold alarm reset	7	Device normally working

■ General/performance specifications

Item	Pegasus		Pegasus Plus
Sampling frequency	10MHz		
Frequency filter	HPF	20, 30, 50, 80, 100, 150, 200, 240 [kHz] (-12dB/oct)	
	LPF	80, 100, 180, 200, 360, 400, 600, 1,000 [kHz] (-12dB/oct)	
Amplification factor	(0 dB), 10, 20, 30, 40, 50 [dB] (within ±3 dB). When 0 dB is selected, the maximum value of Amplitude is 1,000 (measured data is for reference only).		
Applicable AE sensor	FAEN-S60(W)I, FAEN-S150(W)I, FAEN-S300(W)I		
AE sensor connector	BNC		
Edge processing time	1, 10, 20, 50, 100, 500, 1,000, 2,000, 5,000, 10,000, 20,000 [ms]		
Logging time	1 to 20 s (logging timer can be set in 0.1 s increments) / Continuous		
PIO (input/output)	-		Input: 8 points, output: 8 points (compatible with sink and source logics)
Communication method	Ethernet 100BASE-TX (UDP or TCP/IP switchable)		
Communication format	Binary data		
USB communication	USB 2.0 compliant, Full Speed (12 Mbps), virtual COM port		
Internal storage device	eMMC for storing various setting data (IP address, gain, etc.)		
External storage device	-		microSD card (for storing measurement data)
Operating environmental conditions	Temperature	-10 to +55℃	
	Humidity	20 to 80% (condensation conditions should be avoided.)	
Storage environmental conditions	Temperature	-20 to +75℃	
	Humidity	20 to 80% (condensation conditions should be avoided.)	
Applicable standards	CE mark obtained schedule		
Power voltage	12 to 24 VDC (5 W max.)		
Measurements	Amplitude-MAX	[mV]: the maximum amplitude value during edge processing time	
	Energy	[dBs]: an energy value during edge processing time	
	RMS	[mV]: a rms value during edge processing time	
	COUNT	[points]: the number of 0V occurrence or threshold intersections during edge processing time	
Mass	Approx. 500 g		Approx. 600 g
Dimensions (D x W x H)	110 x 70 x 91 [mm], excluding protruding parts		110 x 93 x 91 [mm], excluding protrusion
Ambient conditions	Conforming to RoHS Directive		

\*This product is a sensing system adopting the AE sensor as a key technology, which does not guarantee machine failure sign diagnosis result or quality control.

# Early Observer Pegasus

## Tool wear & breakage monitoring

- Micro tool breakage detection (minimum tool diameter φ 0.05)
- Tool breakage detection
- Tool wear monitoring
- Honing stone condition monitoring



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\* As of January 2025 The specifications may be changed without notice.

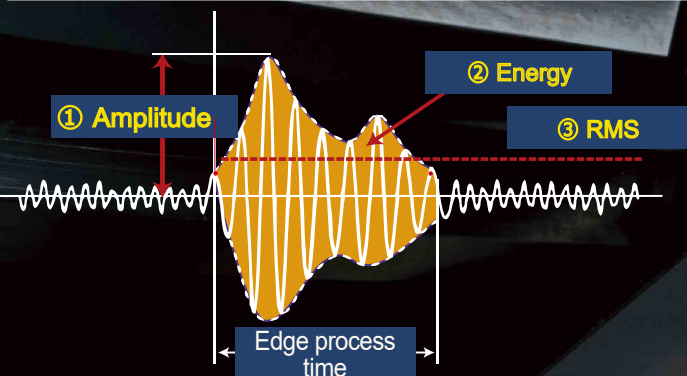
# Measuring the energy generated by workpiece-tool contact

Visualization of workpiece-tool contact condition made possible by monitoring high frequencies above the human audible range.  
System that does not require FFT analysis constructed from our original AE sensor and parameterization technology.  
Unprecedented sensing performance and usability realized.



Early Observer monitors the plastic deformation of target by "AE sensor for each target substance".

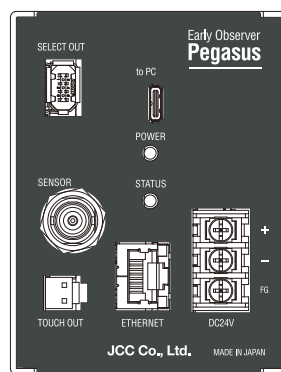
## The AE sensor signal parametrization technology



- ① Amplitude (= maximum amplitude)**  
The maximum amplitude value of AE waveform (voltage from 0V to maximum displacement) = having a correlation to crack propagation.
  - ② Energy**  
Integral value of AE waveform within duration = having a correlation to crack area.
  - ③ RMS (effective value)**  
Effective value of AE signal obtained for every Edge process time unit = having a correlation to friction coefficient
- \* Edge process time = Time unit for edge processing the sensor sensing 10MHz measurement data  
\* Response speed = 0.1μs → Amplitude parameter reflects 0.3μs signal.

## Machining process monitoring controllers/sensors

### Early Observer Pegasus



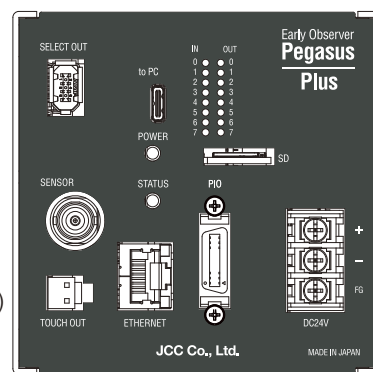
Machining process monitoring controllers

Simple data management without the need for FFT analysis made possible by our original object material-specific AE sensors and parameterization technology. Machining processes are visualized for workpiece-tool contact, friction condition, etc.

(Specification features)

- Touch sensor function (external contact output)
- Tool friction condition calculating function
- Simple measurement function on PC

### Early Observer Pegasus Plus



Machining process monitoring controllers (with PIO data recording function)

Broken tools/tool breakage can be detected/monitored by setting threshold values for each of the eight tool types. Machining data can be stored on microSD card.

(Specification features)

- Touch sensor function (external contact output)
- Tool friction condition calculating function
- Simple measurement function on PC
- Exceeding threshold alarm
- PIO IN/OUT 8 points each
- microSD card slot

### AE sensor

(standard sensor)



(waterproof sensor)



- (common specifications)
- Resonance frequency: 60kHz/150kHz/300kHz ±20%
  - Operating temperature: -20 to 80°C
- Φ20 x 26.5mm (excluding protruded part)
- BNC connector
  - Protective structure IP52F
- Φ22 x 30mm (excluding protruded part)
- Equipped with environmentally resistant robot cable (5m)
  - Waterproof and protective structure IP67

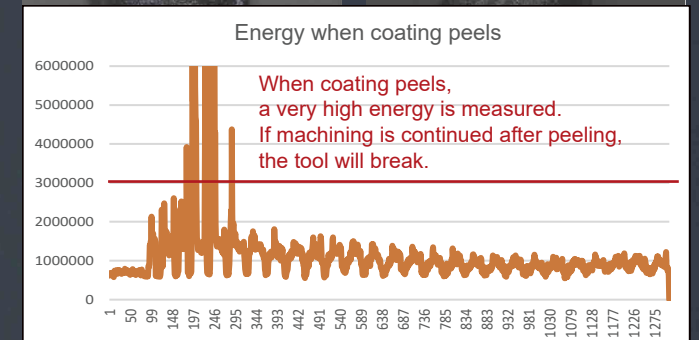
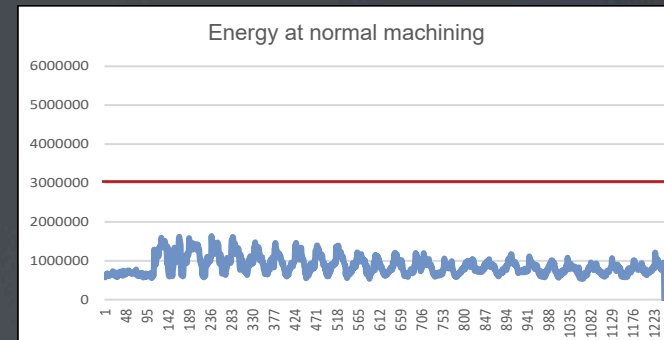
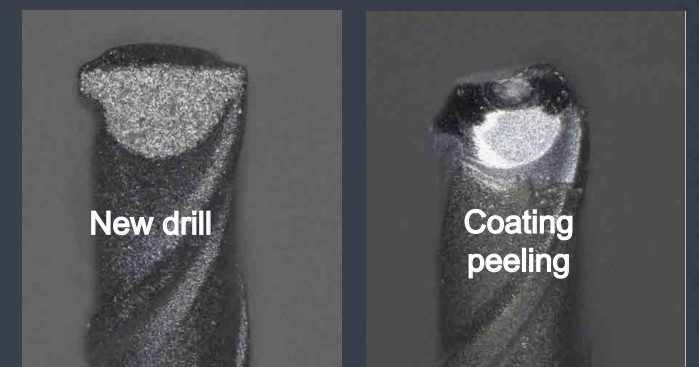
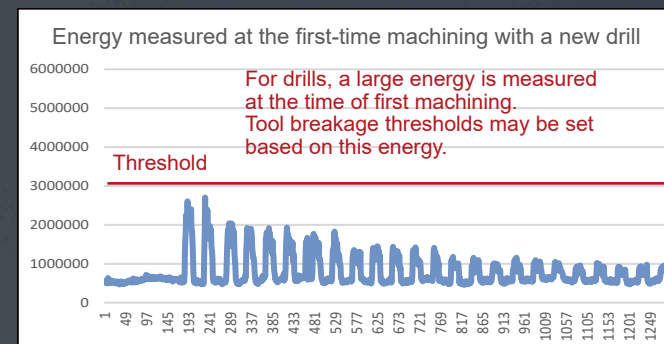
### Extension cable for AE sensor

Item	Standard cable	Environmentally resistant robot cable
External diameter	Φ5	Φ4
Ambient operating temperature	-20 to 60°C	-253 to 200°C
Flex resistance	Not available	Available
Acid resistance	Not available	Available
Alkali resistance	Not available	Available
Sheath	Vinyl chloride	Fluorinated ethylene propylene

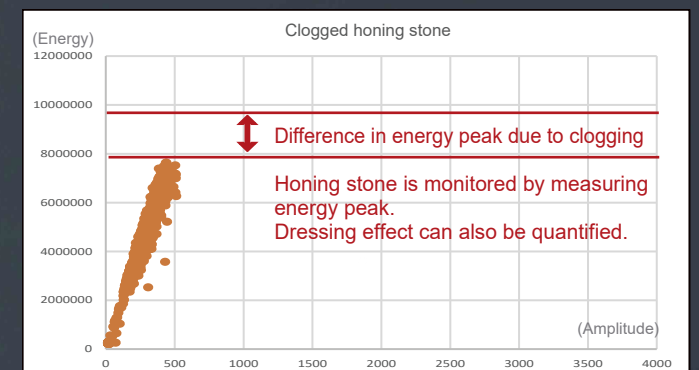
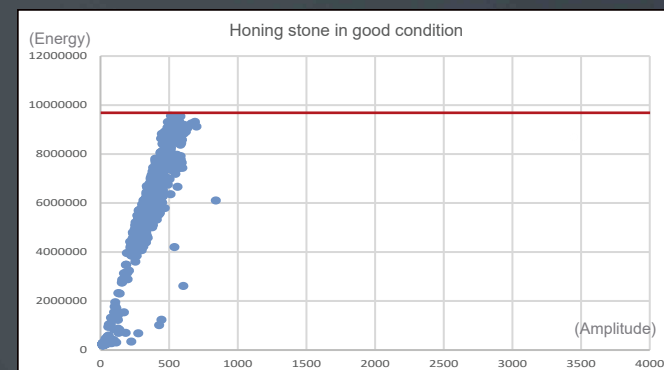
\* The maximum cable length of the system is 20m.  
\* To extend the cable, use the waterproof relay connector set (OP).

# Cases for visualization and real-time monitoring of machining condition

## Micro drill tip coating peeling detection (for φ0.2 diamond-coated drill)



## Honing stone condition monitoring



## Advanced features of Early Observer Pegasus

### Touch sensor function (minimum tool diameter φ 0.05)

This function detects workpiece-tool contact and outputs the result at a response time of 2 ms. Tool setter installation is unnecessary for finishing/additional machining. Significant reduction is realized in length measurement takt time.

### Measurement data calculation function

This function calculates and outputs data measured at 0.1 μs. Effective for visualization of machining process and tool condition monitoring.

- Amplitude = maximum value and average value.
- Energy/RMS = maximum value and summed value.

### Threshold alarm (Pegasus Plus)

You can set a threshold value arbitrarily to generate an alarm signal. Amplitude or energy can be set for each of two alarm thresholds.