

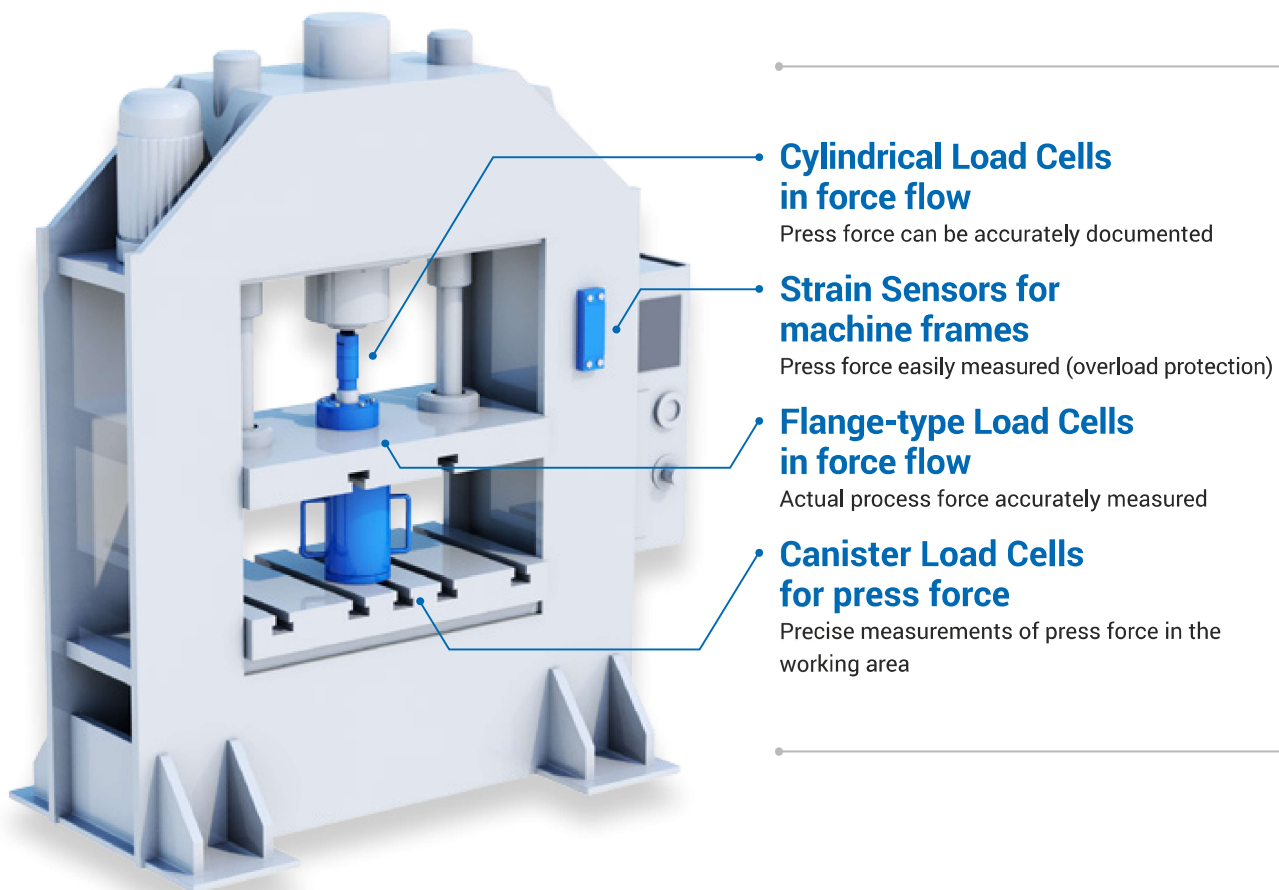
## **X** Force measurement taken securely in hand

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Forces in the widest possible range of press tools can be measured with particular reliability using flexible solutions from **X-SENSORS**.

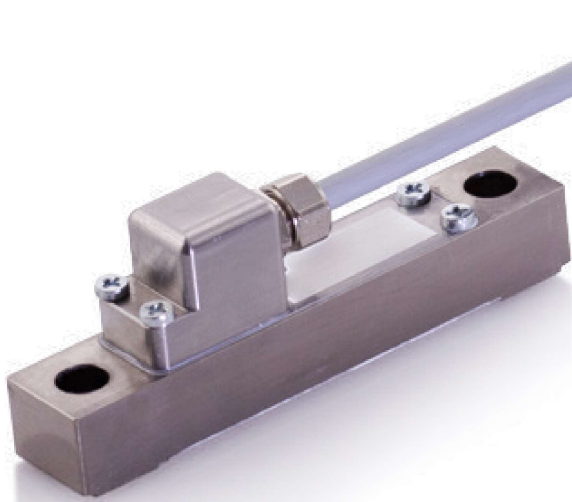
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Assembling, riveting, punching, bending, welding, etc. Press machines and Press tools, which already have innumerable uses in assembly, drawing, and forming technologies, are constantly finding new applications. Sensor technology from **X-SENSORS** allows forces to be measured reliably, whether using conventional load-cells in line with the stroke or strain-gages on the die or the machine frame. Miniature sensors permit working forces up to 200kN to be measured directly at the tool. Obviously, all the necessary measuring amplifiers, cable assemblies, and accessories are also available. High-force cylinders, precision measuring packages, and digital displays from **X-SENSORS** make it easy to test and calibrate press machines.



### **Are you wondering where the best location for these sensors might be?**

In a press tool sensors are tested to their limits. They have to deal with environmental issues such as oil, heat, and vibration. **X-SENSORS** supplies solutions which provide the most robust and reliable sensors for in-press use.



## ☒ Solutions for force measurement

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### Strain Sensors for machine frames

Strain gages measure the deformation or strain in the press frame. This is proportional to the working force. In this way the press force can be easily measured without any overload concerns. This method is cost-effective, and does not require any increase in the working height of the press. By being removed from the working area, the sensors are easy to work with and well protected.



### Canister Load Cells for press force

Load cells make it easy to measure the press force in the working area so it can be compared to its specified value. Despite their high force and weight capabilities, these portable measuring packages are easily placed by hand. They can be connected directly to the X315 readout device.



## ☒ Easily measure the smallest strains

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Press frames are being made stronger all the time – meaning they deflect less.

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X-SENSORS high-sensitivity sensors measure even the least strain with very high resolution and therefore deliver outstanding results of a quality which is unique in the marketplace. Our broad palette of robust sensors provides solutions for large and small, slow and fast presses using standard components.



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### Flange-type Load Cells in force flow

When it is necessary to record each individual stroke of the press accurately, this calls for the insertion of a calibrated sensor mounted directly in line with the stroke. Here the use of a measuring ring has the great advantage of needing only a minimal increase in the working height. It can be installed in close proximity to the working area with very little concern because it is inherently well protected against damage



### Cylindrical Load Cells in force flow

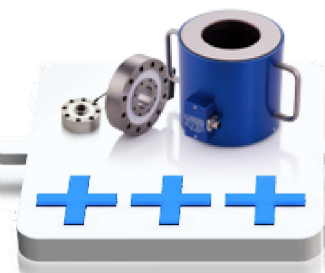
Do you have to measure and record the working pressure with a minimum self-deformation of the sensor? Here we recommend [X-SENSORS](#) high accuracy force measuring cylinder. It can be inserted directly into the force flow of the press and used to measure very high forces with very small self-deflection.



**ROBUSTNESS**



**HIGH RESOLUTION**



**PRODUCT VARIETY**



## Force sensors for Robot tongs

Sensors for measuring press force in stationary presses also lend themselves to measuring the forces applied by robots. This most often means checking whether the minimum clamping pressure has been achieved in a riveting operation. Because a mobile robot arm can often only lift a small amount of weight, strain-gage sensors provide an elegant and low-cost option.



## Electronic and Displays for calibration

All types of reference sensors can be connected to [X-SENSORS](#) universal readout device. The device displays the force and strain applied to each individual sensor as well as either the average or the sum of those values. Multiple machine types can be stored in the device, allowing measurements from different sensors to be read easily and reliably even by untrained operators.





	LOCATION	TYPE	RANGE	DIMENSIONS (mm)	NOTE
	At the frame	X-109-SK	0...800µε 0...1200µε	120x27x25	Measurements at the frame 1:2000
	At the frame	X-103-D22	0...250µε	90x26x7	High resolution
	At the frame	X-113	0...350µε -10...+10V 0...20mA 4...20mA	96x25x15	Very high output strain-gage with integrated amplifier
	At the frame (very low profile)	X-113-Hox	0...440µε	96x18x35	Easy installation, small size, 2xM8, with integrated amplifier
	Pancake Load Cell for reference measurements	X-134	10...1000kN	Ø 105x35 Ø 138x58	Low profile, high output signal
	Canister Load Cell for reference measurements (very high forces)	XC-171	100...3000kN	Ø 160x150	Heavy duty
	Measuring amplifier DIN rail	X-201-1-KA	Analog -10...+10V 0...20mA 4...20mA	75x45x35	Universally configurable DC amplifier
	Measuring amplifier Open Frame	X-201-1-OF	Analog -10...+10V 0...20mA 4...20mA	74x45x35	Universally configurable DC amplifier



LOCATION	TYPE	RANGE	DIMENSIONS (mm)	NOTE
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In force flow	X-134	Universal high sensitivity 10...450kN 4mV/V	Ø 105x35 Ø 138x58	Low profile, high output signal
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In force flow	XC-170	Small version integrated amplifier 20...1000kN	Ø 80x40 Ø 400x70	In the force flow, at the ram, and under the base plate
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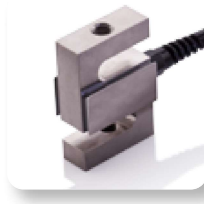
In force flow	OEM-Product	2...1000kN		Custom designs
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Robot tongs (at the frame)	X-103-D01	0...500µε 0...350µε	90x26x7 93x26x14	Flat version
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Robot tongs (behind the tool)	XC-171	10...1000kN	Ø 40x40 Ø 150x150	Hermetically sealed, robust, and overload-proof
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In the force flow (smallest forces)	XTC	25...5000kg 4mV/V	51x64x20	High accuracy 0.1%
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Measuring amplifier IP65	X-201-1-IP	Analog -10...+10V 0...20mA 4...20mA	115x65x40	Universal single-input
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Display devices	X-315	4x9999 digits 1x sum 99999 digits	150x150x50	Universal strain-gage, analog and USB outputs
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