

# The PRIAMUS Product Liability Paper

## Why 8 charge ranges are better than 2 !

Cavity pressures in injection molding could reach from very low (e.g. 50 bar or 700 psi) to very high (e.g. 5'000 bar or 70'000 psi) depending on the application.

Cavity pressure sensors however have one fix sensitivity which is measured in [pC/bar] or [pC/psi].

Depending on the Full Scale range (e.g. 500 bar or 1500 bar per 10 Volt output) a certain signal resolution will result.

The more ranges one charge amplifier provides the better is the signal resolution for each respective application. For small pressures a very low charge range should be used, and for high pressures a high charge range.

Many charge amplifiers only provide one or two charge ranges. The results are shown beside: because the full scale charge range cannot be adjusted according to the measuring range, the signal resolution is getting worse and worse.

**Caution:** this might lead to monitoring and control error readings!

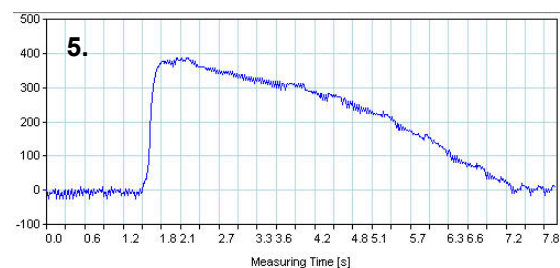
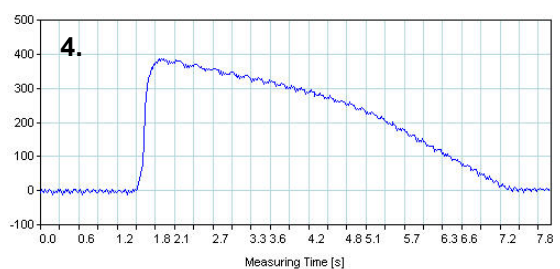
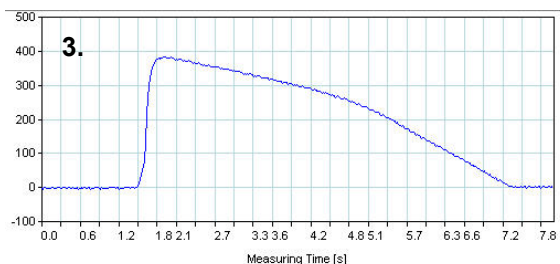
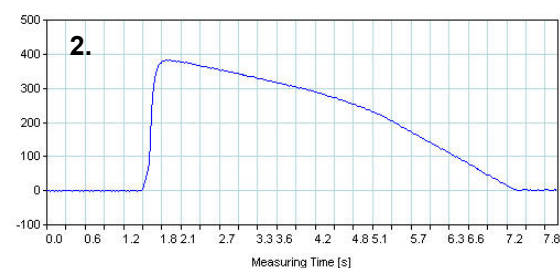
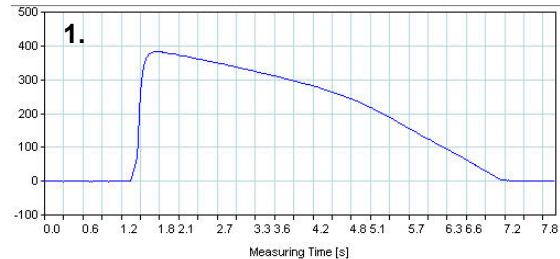
Example:

Sensor sensitivity: 2.5 pC/bar  
 Maximum cavity pressure: appr. 400 bar  
 Charge Ranges:

1. 1'000 pC
2. 2'000 pC
3. 5'000 pC
4. 10'000 pC
5. 20'000 pC

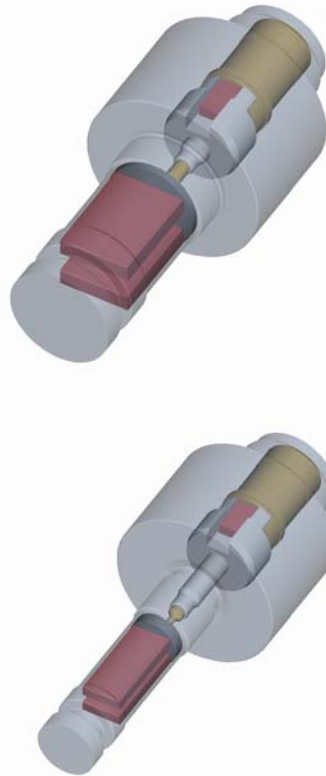
PRIAMUS SYSTEM TECHNOLOGIES is the only supplier worldwide providing industrial charge amplifiers with 8 different charge ranges!

**Conclusion:**  
 Charge amplifiers with 1 or 2 ranges only are not satisfactory for many applications, especially for monitoring and control!  
 Use PRAIMUS multi range amplifiers.



subject to technical amendments

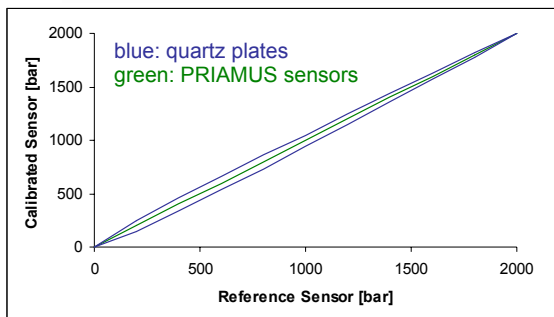
## The truth about quartz and crystal plates



Simple piezoelectric cavity pressure sensors are designed with quartz plates. These however have the disadvantage that they only provide low sensitivities and poor linearity.

Thanks to bar-shaped transverse-effect crystal measuring elements PRIAMUS cavity pressure sensors provide not only very high sensitivities with high signal/noise ratios, but also very high linearity.

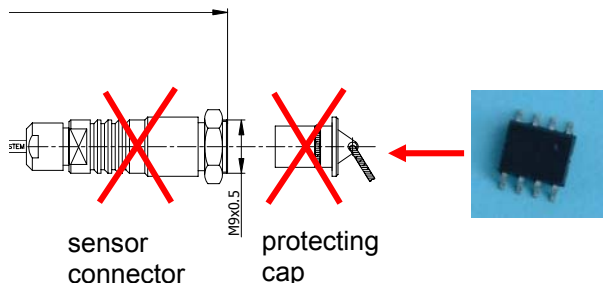
The graph beside shows the typical design of PRIAMUS cavity pressure sensors including bar-shaped transverse-effect crystal elements. Only based on this design it was possible to increase sensitivities significantly compared to other sensors with the same dimension.



In addition only PRIAMUS sensors contain a so called hardware code for automatic sensor & sensitivity detection (PRIASED™) which makes them industrial, easy to use and **product liability safe!**

All other data saving systems (e.g. TEDS: Transducer Electronic Data Sheets) are located outside of the sensor which could easily lead to misunderstandings e.g. when exchanging cables. Wrong sensitivity information however could cause a mold crash.

External data saving systems which might be mixed up are therefore **not product liability safe.**



**Conclusion:**  
Only hardware codes inside the sensor are product liability safe and guarantee proper functioning even after cable changes!