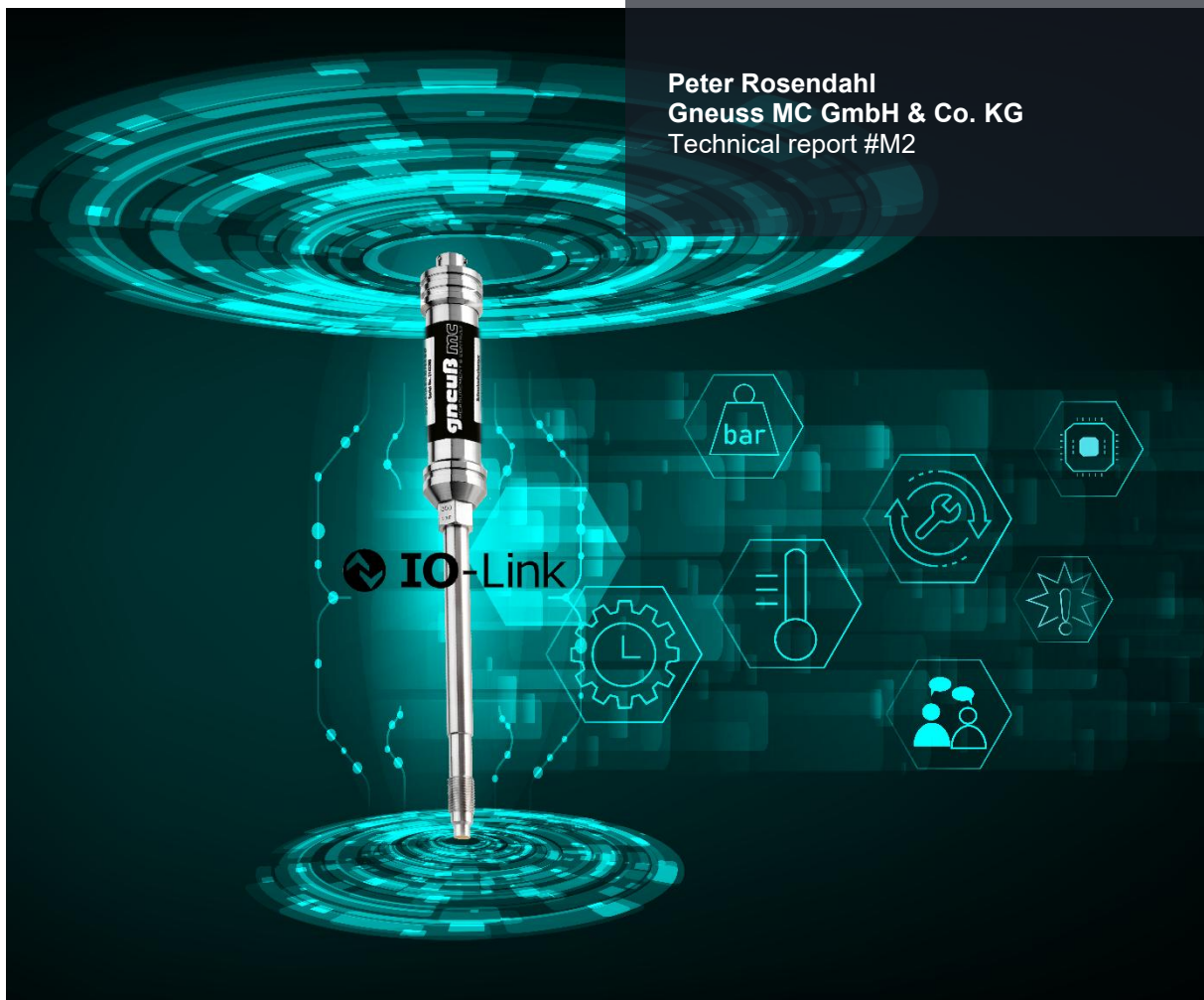


# Melt pressure sensors with IO-Link technology

Digital communication, standardised  
worldwide and manufacturer-  
independent

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Technical report #M2



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For many years now, Gneuss has been successfully developing, manufacturing and marketing pressure and temperature sensors for the polymer processing industry. With the new series of IO-Link melt pressure sensors, Gneuss is setting new standards in process monitoring.

Whereas automation technology in polymer processing is becoming ever more efficient and production processes are increasingly being networked digitally, the established sensors mostly continue to communicate in analogue mode. Some considerable potential for process safety, system availability and flexibility is being lost due to the “bottleneck” of analogue signal transmission. There is now a pan-manufacturer standard available in the form of IO-Link, which seeks to close this gap in digitisation.

In short: traditional measurement pressure sensors can already do a lot. But unfortunately, they don't speak to us enough. That's going to change now.

## 1. Industry 4.0 and sensors

Industry 4.0 and the Internet of Things are changing automation technology to a considerable extent. New communications technologies are allowing the exchange of large quantities of data in near-real-time. This is giving birth to a huge potential for optimising processes and increasing system availability. But Big Data at the control level also requires the collection of data from the process. This is where the analogue sensor technology reaches its limits, because apart from the process value, no other data are transferred, even though in many cases, there is definitely intelligence present in the sensor itself in the form of processor capacity. Many sensors use a powerful processor for converting the physical quantity into electrical values, which could throw up numerous other possibilities. However, the analogue interface reduces the communication ability to such an extent that only one process value is transmitted in one direction.

## 2. What is IO-Link?

IO-Link is a worldwide standardised technology for digital linking of sensors and actuators. Communication takes place over a point-to-point connection and is thus not a field bus. IO-Link is manufacturer-independent and is becoming more and more widespread in industrial automation engineering. Most renowned controller manufacturers offer IO-Link masters, which are either directly fitted as an assembly in the controller or installed in the field and connected via a bus system. The number of available sensors and actuators is also increasing continuously. The high degree of spread and the multiplicity of participants makes it possible to realise almost every automation task via IO-Link. Every device has its own individual description file (IODD) which makes integration in the controller safe and simple. The connecting cables from the master to the sensor or actuator are also standardised and exchangeable.

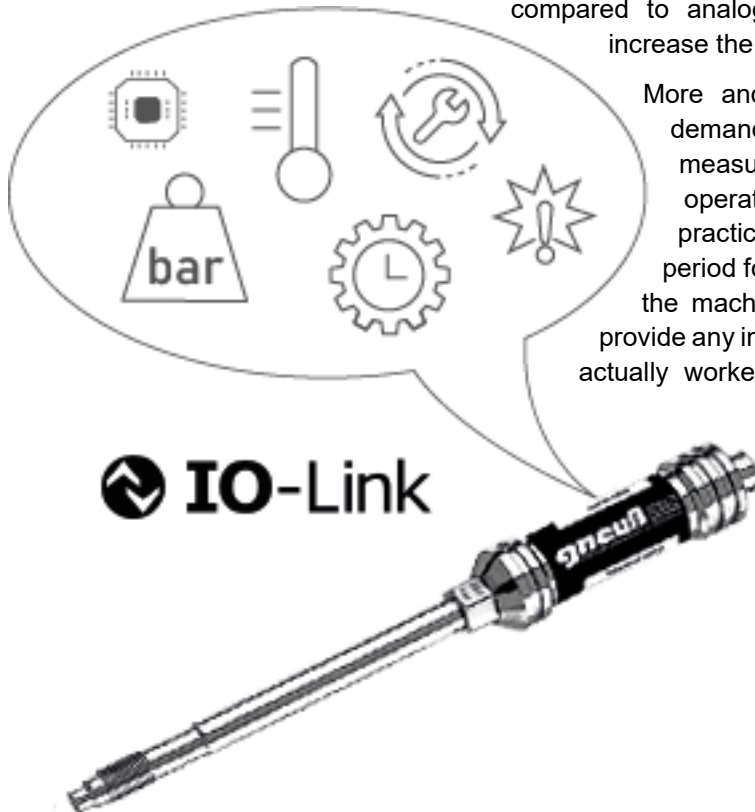
### 3. Melt pressure sensors with IO-Link

The traditional melt pressure sensor with an analogue output knows significantly more than just the process pressure. The signal preparation on its inside has been digitised long ago, and as a result, it is in a position to provide valuable information that simplifies maintenance, increases safety and improves availability. Preventive maintenance and condition monitoring can minimise downtimes and optimise process safety.

The melt pressure sensor could make a substantial contribution in this regard, if it could divulge its knowledge. But unfortunately, its communications facilities are limited to one direction and one measurement value.

In the past, there were attempts to overcome the limited communication through bus systems. Sensors with a CAN interface are a good example. However, applications in polymer machines hide a special danger – the hot surfaces. If the bus line gets damaged here, it brings about the failure of the entire bus. Consequently, not even the relevant participant can be identified, which makes troubleshooting enormously difficult. Of course, IO-Link wires are not indestructible either, but due to the star-formation architecture of the system, even if there is a failure of the connecting cable, it is possible to detect which measurement point is affected.

The life of melt pressure sensors is often limited by the fact that the instrument works close to the limits of its operating parameters and as a result, is subject to high wear. The Gneuss MC IO-Link sensor not only offers monitoring of the electronics temperature, but also records the operating hours in different load ranges. Thus, the user can make out, during ongoing operation, when the electronics head is subject to high heat radiation due to its installation location, or the sensor is continuously working at the upper limit of its measurement range. With the traditional, analogue sensors, such design errors can only be recognised after tedious analyses after the failure. Therefore, the advantages of the IO-Link as compared to analogue measurement technology help to increase the availability of your production system.



More and more stringent quality requirements demand constant, cyclical monitoring of the measuring instruments. But the actual operation duration of analogue sensors is practically impossible to determine. Neither the period for which the sensor has been installed to the machine, nor the machines operating hours provide any information about how long the sensor has actually worked. The intelligent Gneuss MC IO-Link sensors record the operating hours put in under load, and independently report when defined test intervals are reached. As a result, monitoring of the measuring instruments becomes more precise, more efficient and more cost-effective.

## 4. Safety through digital type plate

Does the fitted sensor have the measurement range that is scaled in the controller? Does the switching point of the installed safety sensor meet the requirements of the machine? In analogue technology, these questions need a high level of attention from the maintenance personnel. This is because selecting the wrong sensor can have serious consequences for the safety of the process, the machine and the workers. IO-Link sensors can be identified unambiguously through their “digital type plates” and can thus be recognised as being correct or wrong by the controller. Replacement by an unsuitable sensor type thus becomes impossible. The safety of the machine is guaranteed.

## 5. Summary

The days of analogue measurement value transmission in polymer technology are numbered. With the requirements for flexibility, availability and safety of the machines and systems becoming more and more stringent, there is a need for new, digital solutions. In the area of melt pressure sensors, the IO-Link sensor from the Gneuss MC company is setting new standards. Its proven sensor technology, in combination with intelligent, digital communication makes your machine fit for the future.

## Imprint

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