



## □ Data Interface Applied in Mechanical Engineering

*Many machines and testing facilities are unique and tailored to the requirements of the respective manufacturing process. Developing a suitable Q-DAS data interface for each individual solution requires a lot of extra programming effort in the plant of the machine manufacturer. However, this article shows that standard software makes it easier to connect machines and facilities.*

In general, you integrate data with the objective of a high quality of data, reliability, quick and easy transfer, easy maintenance and enough flexibility for subsequent changes and extensions. It is of utmost importance to deliver high-quality data already while recording data since they are required for significant evaluations. The data recording software ADAM ProcessLink helps you to achieve this goal optimally – it allocates the raw data collected by the machine control system to the respective key fields of the Q-DAS data format and saves them in a well-structured way. It assigns all measured values and even any kind of additional data - such as events, serial numbers, order numbers and any test plan data, e.g. specification limits - to the suitable K-fields of the Q-DAS data format. Another major goal is reducing the data recording effort for a quick transfer of data. You can reach these goals by using standardized interfaces and data formats. The ADAM software tools provide a clear definition and link the entire data structure - from the machine control system to the Q-DAS data fields. Consistent design and transfer of data structures including clear descriptions, data types and plausibility rules for all tools and interfaces offer a huge benefit – they contribute to the expandability of the data recording system in the entire lifecycle of the machine and of the parts it produces.

It is often required that data can always be recorded, e.g. because data is very important in case of claims for damages. Depending on the respective hardware and software architecture, these requirements are fulfilled by means of handshaking procedures and redundant interpretation. If documentation is required, e.g. for safety-relevant parts, a stop of the entire production process will be compelled when the respective data set cannot be stored. In the past, you just put a simple office computer next to the machine to record data; however, nowadays, such computers are increasingly banished from the shop floor. Depending on the respective requirements, it is either replaced by a small and solid industrial computer positioned in the control cabinet of the testing facility or by a central server in the computer centre undertaking its task for several facilities. Since you can even use a virtual server to record data, this type of data recording benefits from the advantages of virtualization, i.e. little downtime when the server hardware fails.

In order to reduce the effort of implementing a data recording system to a minimum, even in case of machines, we use quite a simple interface. The machine control system (PLC) just has to provide a data block and a bit (trigger) indicates that these data are ready to be collected. The software ProcessLink manages all the rest on the computer. It allocates the data from the PLC to the single K-fields of the Q-DAS data format and stores them in a way that makes them easy to transfer to the database. The automated transfer of the PLC's data fields to the interface caters to quick data integration. After installing the PLC-specific driver (OPC) for communication, you only need a few mouse clicks to import all data fields from the PLC program to the interface. You spare the time-consuming and error-prone effort of typewriting addresses, data types and descriptions of the data fields. Even modifications or extensions, which are often added to a new facility in the nick of time, can be transferred to the interface with a minimum amount of additional effort. Since ProcessLink immediately shows current actual values, you are able to identify possible errors or misunderstandings early. ProcessLink now already applies all necessary data fields of the PLC and creates the necessary data fields based



on the Q-DAS data format (K-fields). You create all K-fields required for data recording by mouse click and link them to the PLC data. Figure 1 shows an example of a Siemens PLC. The controls of other manufacturers such as Beckhoff, Mitsubishi, Allen-Bradley, etc. are connected in a similar way. You may define K-fields whose contents never change (e.g. machine description, characteristic descriptions, etc.), so you do not have to load them from the PLC. Hence, the interface does not have to transfer too much data. Since the software even includes the respective information about the data types of K-fields (integer, float, text) and their length, conversions, if necessary, are carried out automatically. All these facts ensure that the software always creates a valid Q-DAS data format and helps to avoid errors while transferring data to the database. This is another advantage of standard software as compared to special development or programming. You just configure the transfer and conversion of data – without any programming effort. ProcessLink does not cause typical errors occurring when you apply codes “sewed in a great hurry”.

In addition to process data for statistical evaluations, the software also collects operating data (PDA) from controls; these data can then be transferred to and evaluated by e.g. MES solutions. This process saves costs. Additional modules complete the portfolio of software tools; they are useful in the machine environment but hard to realize in PLC. They display and log fault messages, lock batches, provide virtual media and synchronize data of several stations or machines.

Good planning of data recording projects does not only improve data quality – in case the connection is planned and works at an early stage, minimal effort is required to make standardized evaluations for gauge and machine capability analyses by using the Q-DAS software (see Figure 2). By developing standardized software for data recording, clear specifications and suitable consulting services, you support manufacturers of production facilities perfectly in implementing a data recording solution quickly. O-QIS already provides you with online evaluations in preliminary acceptance of production facilities in the hall of the machine manufacturer and you may establish the capability of gauges and machines by using Q-DAS software. Connecting a facility to the Q-DAS database after installing it in the production hall of the manufacturer is quite easy.

Since the engineering company Adam software is specialized in recording data from machine control systems in the Q-DAS data format, they are able to provide solutions that do not require any special development. Even visualization solutions (SCADA systems) that are well-established in the automotive industry still require considerable effort in project-specific developments and do not offer any statistical evaluations comparable to the ones in Q-DAS software tools.



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