DATA-ACQUISITION
AUTOLOG 3000

• **Universal design for a wide variety of sensors**

• **Synchronous acquisition at 1 kHz / channel**

• **Small mobile versions or stationary multi-channel systems**

PEEKEL INSTRUMENTS

Data-acquisition system overview

Different types of sensors and measuring principles have to be applied with regularity, not only for different test jobs but also within one particular application. With this in mind, AUTOLOG 3000 has been designed to be an universal input device to be used in research and development, long term monitoring applications, on-site testing and service, etc.

A full range of input boards based on both DC and carrier frequency technology as well as digital and analog I/O modules, make the AUTOLOG 3000 suited for almost every measurement task. Full-bridge straingauges, thermocouples (of all types), resistance thermo-meters (Pt 100), potentiometric transducers, current and a variety of DC input ranges can easily be connected to and measured with the AUTOLOG 3000. Future use of TEDS (Transducer Electronic Data Sheet) is also prepared.

Four different types of housings are available:
- Housing with 1 slot for an input card. Only CAN-bus communication is possible.
- Tabletop housing with 3 slots for input cards. Standard communication is CAN-bus but USB and Ethernet are available as option.
- Half-19" with 8 slots. Standard communi-cation is USB. Ethernet communication is available as option at the expense of 1 slot.
- Full-19" with 15 slots and standard Ethernet communication.

AUTOLOG 3003
– with 3 slots
– as option with central USB interface
– as option with Ethernet controller

AUTOLOG 3008 with 8 slots

AUTOLOG 3016 with 16 slots

AUTOLOG 3001 with 1 slot

Convincing arguments

There are a number of very good reasons to choose for Autolog 3000 from Peekel Instruments, e.g.:
- Over 35 years of experience in data-acquisition
- A choice of a wide range of modules for an optimal price / performance ratio
- Synchronous data collection with 1 kHz / channel
- Delivery includes ActiveX-controls to communicate with third-party programs
- Autosoft 3000 data-acquisition software by Peekel

Connecting all types of sensors

For the **AUTOLOG 3000**, measuring cards based on DC and Carrier Frequency excitation are available. To allow the most optimum configuration for the measurement job at hand, digital and analog I/O modules complete the program.

To measure **DC signals**, the choice can be made between the **CA3460** 6-channel measuring card with a measurement speed of 1 kHz per channel and the **CM3410** multiplexer card which allows the configuration of cost-effective larger systems if scanning speed is of lesser importance.
Both amplifiers are of a highly universal concept, enabling the direct connection of nearly all popular sensors.

When noise might influence the measurement, the use of **Carrier Frequency** excitation is the solution. The **CA3540** is a 4-channel carrier frequency input card for the measurement of straingauges in full-, half- and quarter-bridge configurations and bridge based sensors like LVDT's. The board is controlled by a DSP which makes selectable carrier frequency and on-board filtering possible.
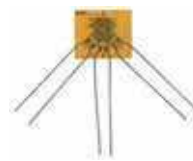
To expand the functionality of the AUTOLOG 3000 system from a data-acquisition system to a complete control system, the **CD3733** multi-channel digital I/O card has been added to the program.
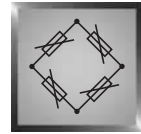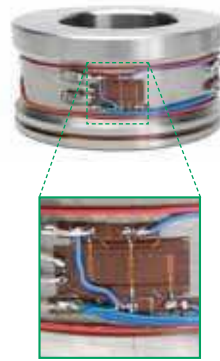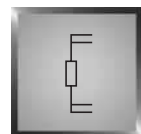
Full bridge straingauges
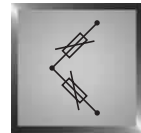
1/2 bridge straingauges

1/4 bridge straingauges
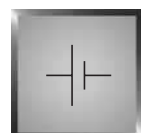
Inductive transducer

Resistance, PT100, PT1000

Thermocouples

Potentiometric transducer

DC input ranges

Set-up of the input modules

In order to connect the field wiring to the input boards, several connection tools are available:

- The **PP-xx-DST** is a connector with screw terminals which fits on the input connector of the measurement module. This connection tool is available for all input boards.
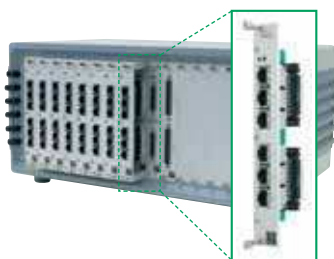
- The **CJC11-xx** is a connection panel for 11 (CA3460) or 34 (CM3410) thermocouples with Pt100 for cold junction compensation.

- The multifunctional connection panel **PP-25-AP3** is for direct and universal sensor connection.

- The **RJ45-DST** is a RJ45 adapter which fits on 1 CA3460 input board.

- In close cooperation with our engineering department, customer specific connection solutions can be developed.

The **CA3460** is a highly universal DC input module based on a powerful microprocessor. The on-board CAN-Bus interface and 9…36 VDC power supply transforms each module into an autonomous unit. Features are:

- 6 separate measuring-amplifiers
- 6 A/D converters (working in parallel) each 1 kHz @ 24 bits
- Resolution of 0,1 µV/V
- Direct connection of nearly all popular sensors
- 8-wire interface for each channel (incl. 2 for TEDS)

For the CA3460 two options are available:

- **Option 1 for strain gauge measurements:**
  High-precision complementary resistors for:
  ½ bridges
  ¼ bridges (120, 350 and 1000 Ohm)
  Bridge supply adjustable between 0,5 and 5,0 Volts
  Shunt measurement to check the sensor cables
  Resolution of 0,2 µm/m
- **Option 2 CF for inductive transducers:**
  5 kHz carrier frequency
  4 Veff. supply voltage
  Bandwidth: 200 Hz (-3 dB)

PROCESSOR DSP

Powerful signal conditioning

The **CM3410** multiplexer is based on the CA3460 technology. The multiplexer enables connection up to 36, 2-wire, channels which are measured in sequence (and not in parallel as the CA3460). The CM3410 has an overall scanning speed of 200Hz and the options for strain gauge measurements and inductive transducers are standard. Other features are:

- 1 common measuring amplifier
- 1 analog-to-digital converter (24 bits @ 1 kHz)
- 1 multiplexer with 72 input lines, for:
  9 x 8-wire channels (incl. 2 for TEDS)
  12 x 6-wire (i.e. load cells)
  18 x 4-wire (i.e. Pt100, straingauges ¼-bridge, …)
  36 x 2-wire (i.e. thermocouples, DC signals)

The **CA3540** is a 4-channel carrier frequency input board controlled by a 32 bit DSP. Like the other cards, the power supply unit is suited for 9…36 VDC. The main features are:

- 4 separate measuring-amplifiers
- Sensor excitation supply: 1 - 9 Vrms (in steps of 0.5V)
- Full bridge, $\frac{1}{1}$
- Half bridge, $\frac{1}{2}$
- Quarter bridge ¼, 120 Ω, 350 Ω or 1000 Ω
- Sense technology (6-wire)
- LVDT input for full and half bridge sensors

- Typical overall accuracy: 0,1%
- On board filtering on input signal with selectable low pass filter 10Hz, 20Hz, 100Hz, 400Hz, 1kHz
- Selectable carrier frequency 500Hz and 5kHz, the frequency is synchronized with other CA3540 cards.
- Each input has a corresponding output, output voltage +/- 10V, range and scaling are adjustable.
- DC input ranges, +/- 10V, +/- 1V, +/- 0.5V, +/- 0.2V, +/- 50mV, +/- 20mV, +/- 5mV, +/- 2mV

Depending on the requirements, a choice between DC and Carrier Frequency excitation has to be made. Each principle has its advantages as shown in the following table:

Application	CF	DC
High Stability and Accuracy	x	x
Field disturbance expected	x	
Straingauges	x	x
Inductive transducers	x	
Resistance sensors (potentiometric)		x
DC-signals and thermocouples		x
Eliminating temperature influence on zero and amplification	x	
High dynamic behaviour required		x
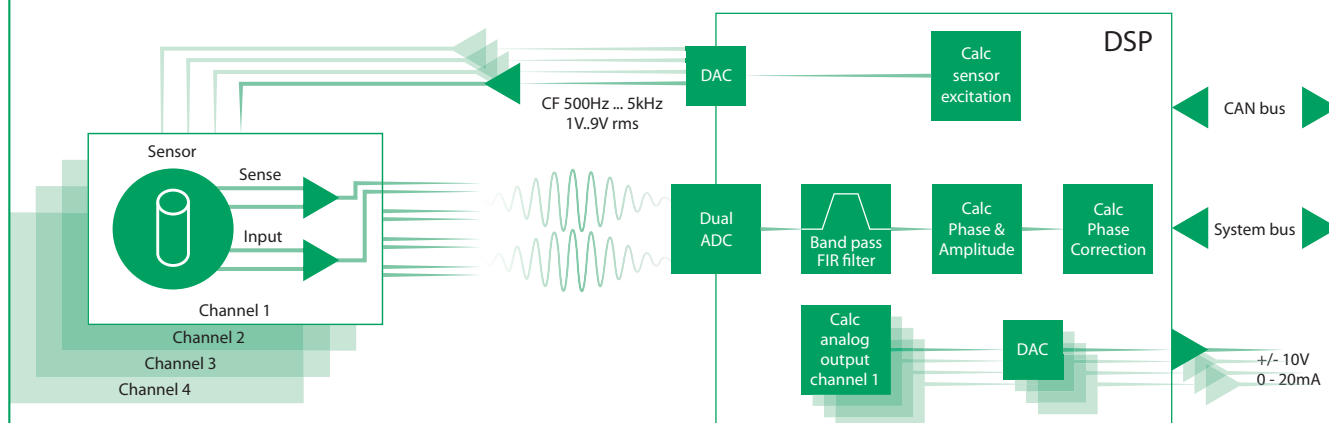
INTERFACE   PC   AUTOSOFT

Data-aquisition and presentation software

CAN, **USB** and **Ethernet** communication is available, where the user can choose the best possible communication method for the measurement task at hand.

Every AUTOLOG 3000 is delivered with **ActiveX drivers**, which enable communication with third-party programs that support this Windows standard, such as Microsoft Excel®, DIAdem®, LabVIEW®, DASYLab®, Matlab®, etc.

Ethernet communication requires a PB3000 module. This **PB3000** is an embedded PC (running Windows XP professional) which expands the possibilities of the AUTOLOG 3000 greatly. With the PB3000 it is possible to create a stand-alone system, with data storage on hard disk or flash disk, or make the measured data available through a webserver function over the internet. The clients of this webserver do not need special software; a webbrowser with internet access and the possibility to run Flash applications is enough. Access to the AUTOLOG 3000 can be established through a standard fixed or wireless (GPRS / UMTS / HSDPA) internet connection. The stand-alone Autolog 3000 runs the data acquisition software, Autosoft 3000. This application can be controlled from a remote location, by means of e.g. a laptop.

Autosoft 3000 is a modern, modular software concept which integrates specific tasks that allow the user to easily configure, control and evaluate the measurement application.
The main tasks are:

- **Configuration:** to create and modify the configuration (channel settings, measurement groups, data storage criteria, virtual channels). The configuration can be built on- or offline. Tools for import and export of channel configurations are available.
- **Measurement:** to communicate with the Autolog 3000, manage the measurement configuration of the connected systems, process the measured data (data-reduction, limit monitoring, on-line rosette calculations) and get system reports out of the Autolog 3000.
- **Presentation:** on-line presentation of measured values in numerical or graphical form, presentation of limits and alarms, graphical display of historical data and conversion of the data to the customer required export format.
- **Datasharing:** local archiving of measured data, communication between PC's and keeping the channel information up-to-date on the connected PC's.

Other standard features of Autosoft 3000 include trigger possibilities and additional digital signal filtering.

Specifications AUTOLOG 3000

CA 3540 'the uninterruptable'

4-channel Carrier Frequency measuring card with separate analog outputs

Accuracy:	0,1%
Bandpass:	selectable between 10 Hz to 100 Hz
Carrier frequency:	500 Hz or 5 kHz selectable
Input for DC signals:	± 2mV to ± 10 V
Strain Gauge input:	⅓, ½ and ¼ bridge
LVDT's:	Induction, full and half bridges
Microprocessor:	32 bits with DSP functions
Communication:	Local bus with 6 Mbit/s
	Can-bus with 1 Mbit/s
Overall supply voltage:	9…36 VDC / 10 W
TEDS:	under development

CM 3410 'the concentrated'

Multiplexed input card

Max input:	36 channels
Accuracy:	0,1% @ 200 Hz
Sample rate:	200 samples / second / card
A/D converter:	24 bits
Microprocessor:	16 bits with DSP functions
Input voltage:	± 40mV, ± 2V, ± 10V
Potentiometer:	0-100%
Thermocouples:	(B,E,J,K,N,R,S,T)
PT 100 sensors:	-200°C + 500°C
Resistor:	0 - 4000 Ω
Strain gauge input:	⅓, ½ and ¼ bridge
Communication:	Local bus with 6 Mbit/s
	Can-bus with 1 Mbit/s
Overall supply voltage:	9…36 VDC / 18 W

CA 3460 'the multi-versatile'

6 channel universal DC input module for every amplifier and A/D converter on each card

Accuracy:	< 0,1% @ 1kHz, 0,02% @ 10 Hz
Bandwidth (-3dB):	200 Hz
Sample rate:	1000 Hz
A/D converter:	24 bits
Microprocessor:	16 bits with DSP functions
Calibration of amplifiers:	by software and A/D converter
Communication:	Local bus with 6 Mbit/s
	Can-bus with 1 Mbit/s
Current:	± 50mA
Overall supply voltage:	9…36 VDC / 12 W
Bridge/sensor supply:	2,5 VDC
TEDS:	prepared

Option 1 (straingauge bridges)
3-channel-satellite module for CA3460

Sensor supply:	0,5…5 VDC
Sense technology:	6-wire
Maximum load at	> 200 ohm @ 5V
supply voltage:	> 60 ohm @ 2,5V
Strain gauge bridges:	⅓, ½ and ¼ (4-wire technology)
Shunt-resistance:	For testing the external sensor-cabling

Option 2 (Carrier-frequency (AC) bridges suply for inductive transducers (lvdt's)
3-channel-satellite module for CA3460

Supply:	2 VDC, 5 kHz
Bandwidth:	200 Hz (-3dB)

CD 3733 'the digital one'

Multichannel digital I/O card
Input: 16 opto isolated input channels
Current: 4mA   Voltage: 36 VDC   Threshold: > 6V

Output: 12 Solid state relay channels
Current: 0,5 A   Voltage: 48 VDC
Resistance 25 Ω active output

2 Contact Outputs with NO / NC relay settings
Current: 1 A   Voltage: 48 VDC
Overall supply voltage: 9…36 VDC / 8 W

PB 3000 'the intelligent'

Embedded PC	
Datalogger	Standalone or Webserver based
Data storage	Flashdisk or Harddisk
	Through webserver function
	via Intranet or Internet
Wireless connection	GPRS / UMTS / HSDPA
	Secure datatransmission
Overall supply voltage	9…36 VDC / 30 W

Housing dimensions:

Autolog 3001	217 x 245 x 45 mm (W x D x H)
Autolog 3003	250 x 330 x 110 mm (W x D x H)
Autolog 3008	271 x 326 x 224 mm (W x D x H)
Autolog 3016	500 x 326 x 224 mm (W x D x H)

Peekel is represented in:

Material research and testing departments,
Aircraft and aerospace industry,
Shipbuilding and offshore industry,
Powerstations,
Automotive and railway industry,
Universities and Colleges.

References

Akzo BV
Corus Staal
Electrabel
Eurocopter
Havenbedrijf Rotterdam
National Aerospace Laboratory NLR
IVECO
Saab Bofors
Siemens
Shell
SKF Engineering & Research
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