DISPLAY AND CONTROL SYSTEMS

High-performance processor systems
Reliable display and control units
Three ECOCONTROL processor systems form the SIKORA premium segment of display and control devices. Intelligent software technology, clear arrangements and easy usability are their convincing characteristics.

Choose the extremely innovative and powerful ECOCONTROL 6000, the unique ECOCONTROL 1000 or the smart ECOCONTROL 600. Each of these display and control systems exceed all expectations in their class.

The innovative display of the line with pictograms of the connected devices provides a unique overview, while the numeric and graphic display of the measuring values, trend diagrams and statistics fulfill every demand regarding the process visualization.

The 22", 15" and 8.4" TFT monitors and the intuitive touch screen control of the ECOCONTROL 6000, 1000 and 600 processor systems represent an intelligent and cutting-edge technology.

All ECOCONTROL processor systems contain a time and length related trend diagram for all values, combined with a graph of the distribution of the single values (statistical distribution curve), and a comprehensive statistic with the minimum, maximum and mean value, standard deviation, Cp and Cpk values. The operation is intuitive with the menu-driven touch screen.
Advanced software (optional)

Automatic diameter/wall thickness control
In combination with the control module SET POINT, the ECOCONTROL systems deliver quality assurance and cost reduction. They ensure a continuous, automatic control of the diameter or wall thickness to the nominal value by controlling either the line speed or the extruder rpm.

Hot/Cold Module HC 2000 (ECOCONTROL 6000/1000)
With the Hot/Cold Module HC 2000, the material shrinkage is continually calculated and considered automatically for the control of the diameter and/or wall thickness.

FFT analysis/Structural Return Loss (SRL)
Optionally, the ECOCONTROL 6000 visualizes periodical variations of the product parameter from an FFT analysis of the measuring values as well as the Structural Return Loss (SRL) data, that is specifically tailored to the requirements of the production of data and RF cables. This software package was developed with the support of competent partners of the industry and detects weak points of the production in time.

Data storage
The data storage on a hard disk is a standard for the ECOCONTROL 6000. For the ECOCONTROL 1000, this feature is optionally available. For the ECOCONTROL 600, an external media storage (USB, LAN) is available upon request. Time, length or reel related production reports are available for each of the three ECOCONTROL devices (6000, 1000, and 600).

Technical Data ECOCONTROL

<table>
<thead>
<tr>
<th>Display</th>
<th>6000</th>
<th>1000</th>
<th>600</th>
</tr>
</thead>
<tbody>
<tr>
<td>TFT color monitor</td>
<td>22&quot; (vertical)</td>
<td>15&quot;</td>
<td>8.4&quot;</td>
</tr>
<tr>
<td></td>
<td>(alternatively 15&quot;, horizontal)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inputs/Outputs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serial interface RS485 for the connection to measuring devices</td>
<td>8*</td>
<td>4*</td>
<td>1</td>
</tr>
<tr>
<td>Electrically isolated digital inputs for the connection to testing devices</td>
<td>8*</td>
<td>4*</td>
<td>4*</td>
</tr>
<tr>
<td>Analog inputs 16 Bit, ± 10 V (bipolar)</td>
<td>8*</td>
<td>4*</td>
<td>-</td>
</tr>
<tr>
<td>Analog outputs 16 Bit, ± 10 V (bipolar)</td>
<td>8*</td>
<td>4*</td>
<td>-</td>
</tr>
<tr>
<td>Contact outputs for tolerance and status messages (max. 30 V, max. 0.5 A)</td>
<td>8*</td>
<td>4*</td>
<td>4*</td>
</tr>
<tr>
<td>Communication interface via RS232 or LAN</td>
<td>1*</td>
<td>1*</td>
<td>1*</td>
</tr>
<tr>
<td>Interface for printer</td>
<td>1*</td>
<td>1*</td>
<td>1*</td>
</tr>
<tr>
<td>Electrically isolated input for rotary pulse generators (0/15 V)</td>
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<td>1*</td>
<td>1*</td>
</tr>
<tr>
<td>Electrically isolated interface module for control of the diameter (HC 2000)</td>
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<td>1*</td>
<td>-</td>
</tr>
<tr>
<td>USB customer interface</td>
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<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Industrial fieldbus (e.g. Profinet IO, EtherNet/IP, Proibus-DP, CANopen, DeviceNet)</td>
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<td>No</td>
<td>No</td>
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<tr>
<td>LAN interface (selectable OPC DA/UA/SuiteLink)</td>
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<td>1*</td>
<td>1*</td>
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<tr>
<td>WiFi</td>
<td>1*</td>
<td>-</td>
<td>-</td>
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<tr>
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<td>Hard disk</td>
<td>External media</td>
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<tr>
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<td>(optional)</td>
<td>(optional)</td>
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<tr>
<td>Power Supply</td>
<td>100 - 240 V AC ± 10 %, 50/60 Hz</td>
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</table>

* Depending on the equipment
**VIRTUAL 2000 – Intelligent software concept**

The virtual gauge technology is suitable for all applications, which require a fast wall thickness control, but due to line configuration or the product structure, a diameter or wall thickness measurement directly after the extruder is not possible. Only after the cooling section, that is to say in greater distance from the cross head, the real measurement is done by this technology.

**Production report**

<table>
<thead>
<tr>
<th>Customers Name</th>
<th>Start At : 09.02.2015 07:58</th>
<th>Recipe : Product 1</th>
<th>Operator : Miller</th>
</tr>
</thead>
</table>

**Settings:**

**HOT DIAMETER:**
- Nominal Value (mm) : 12.950
- Tolerance (+ mm) : 0.100
- Tolerance (- mm) : -0.100

**OVALITY HOT DIAMETER:**
- Tolerance (mm) : 0.000

**COLD DIAMETER:**
- Nominal Value (mm) : 12.300
- Tolerance (+ mm) : 0.100
- Tolerance (- mm) : -0.100

**OVALITY COLD DIAMETER:**
- Tolerance (mm) : 0.100

**Length Speed DIAMETER OVALITY DIAMETER OVALITY Comment**

<table>
<thead>
<tr>
<th>m/min</th>
<th>DIAMETER</th>
<th>OVALITY</th>
<th>DIAMETER</th>
<th>OVALITY</th>
<th>Comment</th>
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<td>0</td>
<td>121.2</td>
<td>12.954</td>
<td>0.002</td>
<td>12.304</td>
<td>0.001</td>
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<tr>
<td>100</td>
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<td>12.955</td>
<td>0.000</td>
<td>12.305</td>
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<tr>
<td>200</td>
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<td>12.957</td>
<td>0.003</td>
<td>12.306</td>
<td>0.002</td>
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<td>300</td>
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<tr>
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<td>0.002</td>
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<tr>
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<td>0.004</td>
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<tr>
<td>1800</td>
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<td>12.307</td>
<td>0.003</td>
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<tr>
<td>1900</td>
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<td>12.954</td>
<td>0.005</td>
<td>12.305</td>
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<td>12.953</td>
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<td>12.304</td>
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**Statistic:**

<table>
<thead>
<tr>
<th>Start At : 09.02.2015 07:58</th>
<th>End At : 09.02.2015 08:14</th>
</tr>
</thead>
</table>

**End Length** (m) : 1916

**OUTER DIAMETER**:
- Max. Value (mm) : 13.075
- Min. Value (mm) : 12.953
- Mean Value (mm) : 12.954
- STD Deviation (mm) : 0.0002
- CP : 877.51
- CPK : 843.03
- Above USL (%) : 0.2
- Below LSL (%) : 0.0
- EXCEED + TOL : 1
- EXCEED - TOL : 0

**OVALITY OUTER DIAMETER**:
- Max. Value (mm) : 0.052
- Min. Value (mm) : 0.000
- Mean Value (mm) : 0.003
- STD Deviation (mm) : 0.0002
- CP : 458.68
- CPK : 0.54
- Above USL (%) : 0.0
- Below LSL (%) : 0.0
- EXCEED + TOL : 0
- EXCEED - TOL : 0

**COLD DIAMETER**:
- Max. Value (mm) : 12.432
- Min. Value (mm) : 12.303
- Mean Value (mm) : 12.304
- STD Deviation (mm) : 0.0002
- CP : 3298.78
- CPK : 3171.39
- Above USL (%) : 0.0
- Below LSL (%) : 0.0
- EXCEED + TOL : 0
- EXCEED - TOL : 0

**OVALITY COLD DIAMETER**:
- Max. Value (mm) : 0.026
- Min. Value (mm) : 0.000
- Mean Value (mm) : 0.002
- STD Deviation (mm) : 0.0001
- CP : 364.02
- CPK : 0.55
- Above USL (%) : 0.0
- Below LSL (%) : 0.0
- EXCEED + TOL : 0
- EXCEED - TOL : 0

The basis of the design is the simple, but sophisticated idea that an extrusion model knows the volume output of the extruder in its different operating conditions to predict with the highest accuracy the value of the produced cold wall thickness of a cable. The volume output is recorded once in a user friendly way by the ECOCONTROL 6000 in combination with the measuring device.
In addition to the premium processor systems, SIKORA offers reliable display and control devices that put basic functionality into focus.

Standard display and control device REMOTE 2000
The REMOTE 2000 is the standard display and control device, universally applicable for all SIKORA diameter measuring devices (LASER Series 2000/6000) and spark testers. The measuring values are displayed on a five-digit, 25 mm high, clear LED display. It is suitable for panel mounting or for assembly on the gauge head.

LASER Series 2000/6000 with the REMOTE 2000
The REMOTE 2000 can be combined with a diameter gauge head of the LASER Series 2000/6000. The average diameter value of the connected measuring device is clearly shown on the LED display. Via a control key, the average diameter of the measuring axis x, y or the ovality is selectable on the display.

The REMOTE 2000 includes a product library for up to 50 cable recipes. Nominal values and tolerances can easily be recalled.

Automatic Control – Cost Savings
In combination with the control module SET POINT, an automatic control of the line speed or extruder rpm assures optimum process control and cost savings.

Interfaces
A serial interface for the connection to an external computer is standard for the collection of data or the PLC line control.

LUMP 2000 with the REMOTE 2000
In combination with a LUMP 2000, the REMOTE 2000 shows the number as well as the type of faults. Clear symbols inform the operator if the fault is a lump or neckdown. Lump or neckdown information, such as the height, depth and length of the fault are stored, giving the operator the possibility to view previous faults.

Basic display device DISPLAY 2000
Interesting is the DISPLAY 2000, a display device for the combination with the SIKORA diameter measuring devices of the LASER Series 2000/6000 or the CAPACITANCE 2000 that shows the diameter and ovality of the measured product. It is suitable for the installation into a control cabinet as well as for the direct mounting at the gauge head.

Especially for applications that require a connection of the measuring system to the line control via a Profibus interface or whenever a clearly visible second display is requested, the DISPLAY 2000 is a reasonable and inexpensive supplement.
Typical features REMOTE 2000
- Large, clearly arranged display and keypad
- Automatic control module SET POINT (optional)
- Easy installation at any distance to the measuring head
- Serial interface for the connection to a measuring head or a PC (optional)

Typical features DISPLAY 2000
- Digital display
- Selectable monitoring parameter (diameter, ovality, capacitance)
- Installation at any distance to the gauge head
- Serial interface for the connection to a gauge head

Technical Data REMOTE 2000

Measuring Value Display
Digital, 5-digit e.g. 00.000 ... 99.999 mm
000.00 ... 500.00 mm

Display Update
Programmable, factory setting 1/sec

Nominal Value/Tolerance Selection
Via keypad (operation guided via a 4-digit LED display)

Product Storage
Up to 50 product types, comfortable programming via the diagnosis software

Tolerance Message/Control Action
a) In clear text on LED display
b) 4 potential-free contact outputs

Interfaces
RS485 (gauge head), RS232

Analog Output (Optional)
0 to 10 V, deviation output if not used for control
(0 to 10 V according to the deviation output +5=0)

Power Supply
100 - 240 V AC ± 10 %, 50/60 Hz

Technical Data DISPLAY 2000

5-Digit Display
Digit height of 25 mm
The bright, big figures are easy to read even from a distance of 12 m

Interfaces
(Bi-directional serial interface) RS485

Power Supply
100 - 240 V AC ± 10 %, 50/60 Hz

Technical data is subject to change.