XY-Monitoring with Maximum Value for Money

**maXYmos BL**, the latest XY monitor from Kistler, monitors and evaluates XY curves of two measurands that stand in relation to each other. These curves arise in applications such as:
- Press fitting ball bearings,
- pivoting and adjusting rake of backrests,
- riveting and clinching of casing body parts,
- tactile manipulation of rotary switches, etc.,
- testing of spring forces and
- all other XY applications.

**Important Features of the maXYmos BL at a Glance**
- Curve evaluation using envelope curves, boxes and thresholds
- 4 evaluation objects per curve and measurement program
- Monitoring of up to 10 parts a second
- 16 measurement programs for 16 different types of part
- Up to 8,000 pairs of X/Y-values per curve
- 3 real-time outputs for X- and Y-thresholds
- Dig-IO (24 V), Profi bus DP, Ethernet (TCP/IP) and USB
- Storage of curve data for historical NOK diagnosis
- Warning messages and alarms for fast countermeasures
- Serial numbers from PLC or internal SN generator
- Access protection for different user groups
- Channel X: potentiometer and ±10 V,
  channel Y: piezoelectric or strain gage and ±10 V
- Bright, high-contrast 3.5” color touch screen display
- Clearly structured user interface
- Case for panel-, wall- and desktopmounting
- PC software "maXYmos PC" as support tool
- Extremely good value for money
Monitoring XY Curves in Many Applications

Press fitting

Turning

Tactile manipulation

Calking

Snapping into place

Engaging

Riveting

Closing
Evaluation Objects Decide Whether GOOD or BAD

**UNI-BOX type**
Entry and exit as specified. No breaching of "closed" sides allowed.

**LINE-X type**
Line must be crossed once. A X-value at the point of intersection is monitored.

**LINE-Y type**
Line must be crossed once. An Y-value at the point of intersection is monitored.

**ENVELOPE CURVE type**
The measurement curve must not breach the upper and lower line of the envelope. This is an evaluation object that can be taught quickly.

**NO-PASS type**
Line must not be crossed. Otherwise NOK and "NO-PASS" real-time signal.
Evaluation objects (EOs) are drawn over the measurement curve with a stylus. Numerical coordinate fields correspond to the particular corner touched. Fine numerical adjustments can be entered directly on the keypad.

Depending on part and machine tolerances, the following can be chosen as reference points for evaluation objects in the X-direction:

- ABSOLUTE
- BLOCK (dynamic relative to XMAX)
- TRIGGER-Y (dynamic relative to Y-threshold)
Specifying Start Condition for Measurement

Either the PLC specifies when a measuring cycle starts and when it ends, …

Selectable conditions:
START: Dig-In, threshold X and threshold Y
STOP: Dig-In, threshold X, threshold Y, return % and time

… or the measurands themselves control this process. This means the maXYmos BL can also be operated without PLC. This has advantages in terms of the design of manual workstations.
Specifying Measuring Function

\[ Y = f(X) \]
A measurand \( Y \) is recorded against a measurand \( X \). A selectable \( X \)-raster controls the reading in of the pairs of \( Y/X \)-values. They are only read in when the curve has passed through the following delta \( X \). This allows the user to specify the density of the values with which the measurement curve is to be plotted.

\[ X = f(t) \]
A measurand \( X \) is recorded against time. A selectable time raster (\( t \) sampling raster) controls the reading in of the pairs of \( X/t \)-values.

\[ Y = f(X, t) \]
A selectable time raster controls the reading in of the pairs of \( XY \) values.
Quick Overview Provided by Clear Menu Structure

Main menu of process level: starting point for process information and other menu levels

Evaluation result
Current (last) measurement curve
Quick scrolling through process information
Button for accessing Service level

Piece counter for GOOD parts (OK), BAD parts (NOK), TOTAL, click field for more information
Clicking opens warning and alarm table
Button shows current measurement program (MP). Button for accessing switching to manual MP
Button for accessing Setup level
Fast Scrolling to Different Process Informations

Current measurement curve

Results and process values

Good/Bad Light

OK/NOK breakdown: what is causing the NOKs?

Process: Value Table

Piece counter

NOK diagnosis: memory for "Last Measurement Curves"
Process with Actual Values and Setpoints at a Glance

Table of values with the process (actual) values and the associated limits of the setpoints of the particular evaluation objects (EOs). If a process value lies within these limits it is displayed in green, otherwise it is red.

<table>
<thead>
<tr>
<th>EO</th>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EXIT</td>
<td>78.2 N</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>ENTRY</td>
<td>84.5 N</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>ENTRY</td>
<td>95.5 N</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>EXIT</td>
<td>4.4 mm</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>YMAX-Y</td>
<td>225.6 N</td>
<td></td>
</tr>
</tbody>
</table>

Relevant process values for the Process View can be chosen from a Pickup List in the Setup routine. All of the process values can be communicated via the serial interfaces, for example to quality assurance systems or host computers.
Analysis of Measurement Curves to Clarify Causes of NOKs

NOK measurement curves are revealed by scrolling through the curve memory (left) or displaying an entire batch of curves (right).

The shape and congruence of the curves allow the user to deduce the cause of the NOK and the problem.
Warning Messages and Alarms Allowing Early Response

Warning Messages and Alarms

Warning messages and alarms can be signaled visually and acoustically. Their complete history, which includes the person who acknowledged or cleared them, is listed in a table.

**Warning**
Warning message only. Equipment remains READY.

**Alarm**
Actual alarm. Equipment is no longer READY. Intervention necessary.
Good/Bad Light: an Advantage on Manual Workstations

The display provides a full-screen red/green light function to avoid any need for an additional external light.

The good/bad display can be chosen from five different symbols.
Protection against Damage Caused by Tampering

User authorization protects the maXYmos BL against unauthorised access.
In addition
• outputs can be set manually and
• measuring channels can be tared manually

Various types of status information indicate:
• the status of the control signals
• the current measurement signals and measurands
• the status on the Profibus
A serial number (SN) can be used to subsequently trace the measurement results right down to the individual part. The SN is generated by either the PLC or the maXYmos BL itself. Its format can be assembled by the user.

Test reports are provided with this serial number and filed in selectable target folders. The data is preferably transferred via the Ethernet interface, but the USB port can also be used.
Setup, Backup, Analysis and QA Software for the PC

maXYmos PC – Basic*
Windows®-software for maXYmos BL supports
• Backup
• Firmware update

maXYmos PC – Plus (option)
Windows®-Software for maXYmos BL with functions as provided by maXYmos PC – Basic, but with addition of
• Test report manager
• Test report search function
• Curve measurement
• Generation of process value files
• Filtering of process values from record files
• Reading, display and saving of data
• Record printing
• Setup

*) Included in accessories of the maXYmos BL

Windows® is a registered trademark of the Microsoft Corporation
From Sensor via Measurement Curve to Control Signal

1) Scaling and cycle control specific to MP here. Can also be obtained from GLOBAL
2) Only the most important signals are shown
Measurement Results and Data Structure

Data related to measurement program

Current Curve Memory
- current measurement curve

CSV File
- one record file for each part (traceability)

Historical Curve Memory
- last 20 measurement curves (NOK cause diagnosis)

Serial No. Generator

Setup Parameters related to MP

maXYmos BL
Data and Access

Setup-Parameters
Global

USB

Access to record storage

PC-Software
maXYmos PC
Setup, Backup & Record Manager

Remote via browser or VNC

Data server

Serial number

e.g. Ethernet

Ethernet

Remote

Process values (without curve)

Fieldbus

Serial number

e.g. Ethernet

Remote

Process values

Current measurement curve

Current process values

Last 20 measurement curves

One record file for each part (traceability)

NOK cause diagnosis

Current process values

Serial number

e.g. Ethernet
The maXYmos BL is available in two versions – piezoelectric and strain gage. Potentiometric displacement and angle sensors, and sensors with \( \pm 10 \) V output for the X channel, are supported. Kistler supplies a wide range of force and torque sensors based on the piezoelectric or strain gage measuring principle for the maXYmos BL. Potentiometric displacement and angle sensors (see page 21) are also offered.
... and Matching Sensors – from a Single Source

**Piezoelectric Sensors**
- Tensile/compression force: 0 ... ±0,5 N to 0 ... ±300 kN
- Compression force: 0 ... 0,1 N to 0 ... 800 kN
- Strain (indirect force measurement): up to 800 µε
- Torque (static): 0 ... ±0,25 N·m to 0 ... ±200 N·m

**Strain Gage Sensors**
- Tensile/compression force: 0 ... ±20 N to 0 ... ±500 kN
- Compression force: 0 ... 20 N to 0 ... 500 kN
- Torque (rotating): 0 ... ±2 N·m to 0 ... ±1 000 N·m

**Potentiometric Sensors**
- Displacement: 0 ... 10 mm to 0 ... 750 mm
- Rotation angle: 0 ... 360 °

All of the specified numerical values relate to the available measuring ranges of the sensors.

Ask for the list of accessories or visit for information:

www.kistler.com/maxymos
Modular Case Concept for Flush and Surface Mounting

The basic level maxYmos BL is optimized for mounting in a front panel. An optional additional case allows mounting on a vertical panel of a machine or on a flat surface and continuous tilt adjustment. The operator can set the required viewing angle with the knobs of the adjusting screws on either side.
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measure. analyze. innovate.
Option of piezoelectric or strain gage