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maXYmos TL

Type 5877A...

XY Monitor for Complex Evaluation of Curves

The maXYmos TL (Top Level) captures, analyzes and evaluates XY curves of two measurands that have to stand in a precisely defined relationship to each other. Such curves arise in applications such as

- Press fitting of bearings or valve seat rings
- Riveting and flanging of casing parts
- Turning and swiveling of joints
- Turning of key switches
- Movement of drawer slides
- Compression and extension of shock absorbers
- Pressing of snap-in elements

The measurement curves can be used to assess the quality of an individual stage of production, an assembly or the product as a whole.

Description

The functions of this XY monitor range from simple, single-channel force-displacement monitoring to complex multi-channel applications for use in assembly and product testing. The monitor, which can have up to eight cascadable channel pairs, is designed to satisfy the most demanding users who require maximum user-friendliness, user comfort and flexibility. With a wide range of powerful evaluation objects, even very complex XY curves can be evaluated. Building on the maXYmos BL (Type 5867B...), the maXYmos TL offers a whole range of additional evaluation possibilities. For example, the GETREF object is able to determine the coordinates of significant points on a curve, e.g., the position of a snap-in point, and pass them to a CALC object. This then calculates, e.g., the distance between two such snap-in points and evaluates it.

- Up to 8 XY channel pairs via cascadable measuring modules (MEM)
  The main features of each MEM:
- Curve capture according to Y=f(X), Y=f(X,t), Y=f(t), X=f(t)
- Curve evaluation with UNI-BOX, ENVELOPE, LINIE-X, LINIE-Y, NO PASS, HYST-Y, HYST-X, GRAD-Y, GRAD-X, TUNNELBOX-X, TUNNELBOX-Y, BREAK, CALC, AVERAGE, GETREF, SPEED, TIME
- Up to 10 evaluation objects (EOs) per curve
- Dynamic referencing of evaluation objects in X and Y directions

- 128 measurement programs for 128 part types
- Measurement curve with up to 8 000 XY value pairs
- Short evaluation time, up to 20 several parts
- Ethernet TCP/IP for measurement data, remote maintenance and channel cascading
- Choice of bus types available via menu: Profibus DP, EtherNet/IP,
- Dig-IO (24 V) for control and results
- 4 switching signals on X or Y threshold
- 3 x USB for notebook and USB stick
- Channel X: Pot, ±10 V, LVDT, incremental, SSI
- Channel Y: Strain Gauge, ±10 V or piezoelectric sensors
- Desktop, wall or front panel mounting; can be repositioned in a few easy steps
- Informative NOK cause diagnosis, process value trend patterns, etc.
- Process value table with free choice of contents
- Selected process values for the curve graph
- Warning and alarm messages, e.g., NOK in series
- Acces protection with various levels of access
- Display module (DIM) with 10,4" color touch screen and front-mounted USB slot

For more information visit www.kistler.com/maxymos

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Technical Data

Measuring and Evaluation Module (MEM)

Degree of protection	IP	40
Operating temperature	°C	0 ... 45

Measuring Channels

Number		1 X-channel, 1 Y-channel
Sampling rate X/Y max.	kHz	20
Resolution per (analog) channel	bit	24
Accuracy class	%	0,3
Cut-off frequency per channel	Hz	5 000
Low-pass filter per channel	Hz	in stages 0,1 ... 2 000

Sensors channel X

Sensor Type 1		Potentiometer
Linearity error	%FS	0,01
Track resistance	kΩ	1 ... 5
Supply voltage	V	4 (4,16)
Connection system	3-wire	
Wiper current	µA	<0,1
Sensor Type 2		Process signal ±10 V
Signal output	V	±10
Linearity error	%FS	0,01
Transmitter supply	VDC	24
	mA	200
Sensor Type 3		Incremental
Signal output		Sinus/Cos, RS422 (A+B)
Reference marker		yes
Counting depth	bit	32
Counting frequency	MHz	10 (RS422)
	MHz	1 (sine/cos)
Sensor Type 4		Inductive
Principle		LVDT, half-, full-bridge
Sensor supply	Veff	1,8 ± 5 %
	kHz	5,2 ± 0,5 %
Linearity error	%FS	0,1
Frequency range (–3 dB)	kHz	0 ... 1
Sensor Type 5		SSI
Signal output		RS422
Clock frequency max.	MHz	1

Sensors channel Y

Sensor Type 1		Piezo
Measuring range	Number	4
Measuring range 1	pC	±100 ... ±1 000
Measuring range 2	pC	±1 000 ... ±10 000
Measuring range 3	pC	±10 000 ... ±100 000
Measuring range 4	pC	±100 000 ... ±1 000 000

Range selection		automatic
Drift	pC/s	0,05
Linearity error	%FS	0,01
TKE	ppm/K	<±100
Frequency range (–3 dB)	kHz	0 ... 5
Low-pass filter (in stages)	%FS	5, 10, ... 2 000
Sensor Type 2		DMS
Measuring range	mV/V	0 ... ±5
Supply voltage	VDC	5
Connection system		4-wire, 6-wire
Bridge resistance	Ω	>300
Linearity error	%FS	0,05
Frequency range (–3 dB)	kHz	0 ... 5
Sensor Type 3		Process signal ±10 V
Signal output	V	±10
Linearity error	%FS	0,01
Transmitter supply	VDC	24
	mA	200

Cycle Control

Start – Stopp	Dig-Input / Fieldbus / Threshold X / Threshold Y / Time

Measuring Functions

Measurement curve according to	Y=f(X), Y=f(t), Y=f(X,t), X=f(t)

Curve Memory

Current curve	XY-pairs	max. 8 000
Historic curves (for NOK diagnosis)		the last 500

Evaluation Objects (EOs)

EO types	UNI-BOX, ENVELOPE, LINE-X, LINE-Y, NO PASS, HYST-Y, HYST-X, GRAD-Y, GRAD-X, TUNNELBOX-X, TUNNELBOX-Y, BREAK, CALC, AVERAGE, GETREF, SPEED, TIME
Reference points	Absolute X, Dynamic: Block point X, Dynamic: X on trigger Y, Referencing in X and Y directions possible
Editing	Remote, via touchpanel
Evaluation time	ms	<20 (bei 4 EOs)

Data Export

Format	QDAS, XML, CSV
Destination	USB, Server
Medium	USB, Ethernet

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Serielle Interfaces

Ethernet	TCP/IP 100 Base TX with 2 Port Switch
USB	3 x USB (Device + Host)
BUS	Profibus DP
	ProfiNet, EtherCat, EtherNet/IP
	2 Port Switch

Dig-In/Out

Norm		DIN EN61131
Level state "0"	V	0 ... 5
Level state "1"	V	15 ... 30
Number of inputs		22
Input current max.	mA	8 (at 24 V)
Number of outputs		24
Output current max.	mA	100 (at 24 V)

Measurement Programs

Number		128
Switchover via		Menu/Dig.-In/BUS
Switchover time	ms	<7

Switching Signals

Number	2
Channel assignment	X or Y (selectable)
Switching point	Threshold X reached
	Threshold Y reached
Output	Dig.-Out or Fieldbus
Mode	Free-running or latch
Influence on evaluation	No

Real-time Reactions

Switching signals	ms	<1
EO type "NO-PASS"	ms	<1

Power Supply

Voltage	VDC	24 (18 ... 30)
Power consumption	VA	15

Screw-type/plug-in connector, 1 supplied with device

Wago, order no. 734-103/037-000

Housing: order no. 734-603

Environment

Working temperature	°C	0 ... 45
Storage temperature	°C	0 ... 50
IP degree of protection (EN 60529)		
– Connector and cable running downwards	IP	53
– Standard rail version	IP	20

Display Module (DIM)

Size	Inches	10,4
Color		yes
Touchscreen		yes
Resolution	Pixels	600x800 (SVGA)
Technology		TFT-LCD
Backlighting		LED
Supply voltage (of MEM)	VDC	24
IP degree of protection (EN 60529)		
– Front	IP	65
– Rear	IP	53
Operating temperature range	°C	0 ... 45

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The System Concept

Basic Components
The maXYmos TL consists of two basic components: the measuring and evaluation module (MEM), which works entirely autonomously and supports one XY channel pair each, and the display module (DIM).

DIM   MEM
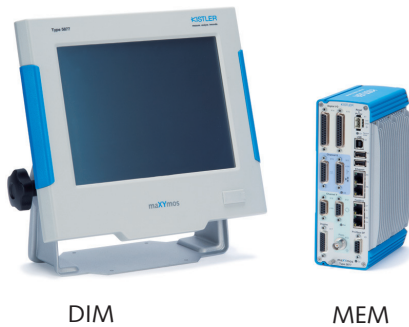
MEM with Display Module
The MEM and DIM can either be installed separately from each other, in which case they are connected only via the optional connecting cable type 1200A161A2,5/5.

…. or they can be used as a compact unit. In this case the MEM is inserted into the rear slot of the DIM, forming a secure mechanical and electrical connection:

MEM as Black Box Module
Since the measuring and evaluation module (MEM) works entirely autonomously, it can also be operated without the DIM. In this case, setup and process visualization are carried out via the graphical user interface (GUI), which can be transferred onto a PC. Access is by VNC via the Ethernet interface or USB.

Expandable for up to Eight XY Channel Pairs
For this purpose, the MEMs are connected to the Ethernet interface via patch cables. External switches are not required. The Ethernet is simply looped through the MEMs via the In-Out sockets.

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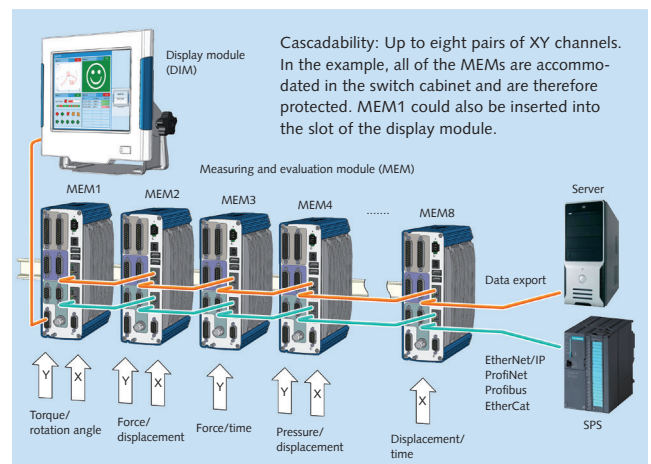
Measuring and Evaluation Module (MEM)

Interfaces
The module, which features an XY channel pair and all data and control interfaces, forms the heart of the XY monitor.

**maXYmos TL:
Measuring and evaluation module
(MEM)**

Digital IO (1)
Basic signals:
START, READY,
IO, NIO, etc.

Digital IO (2)
Additional signals
for special functions

Channel X (1)
Analog sensors:
Poti, ±10 V, LVDT,
inductive

Channel X (2)
Digital sensors:
incremental, SSI,

Channel Y (1)
Transmitter ±10 V

Channel Y (2)
Strain Gauge sensors

Display port
MEM-DIM link

Power supply
24 VDC

USB (Device)
for laptop

USB (Host)
for USB stick

USB (Host)
for USB stick

Ethernet TCP/IP
Data export
Remote access
Channel cascading

Fieldbus (1)
Ethernet (IP)
ProfiNet
EtherCat

Fieldbus (2)
Profibus DP

Channel Y (3)
Piezo sensors

Evaluation Process
A wide range of evaluation objects (EOs) are available to choose from in order to evaluate the curve profile:

Examples:

Type UNI-BOX — **TL**
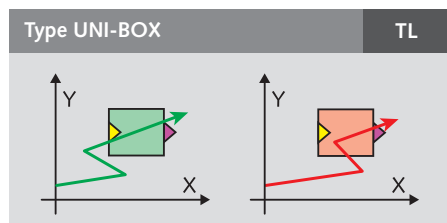
Entry and exit as specified. No crossing of "closed" sides allowed. Each side can be defined as entry or exit.
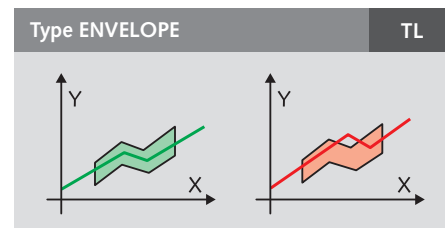
Type ENVELOPE — **TL**

The measurement curve must not cross the upper or lower line of the envelope. This evaluation object is easy to master.

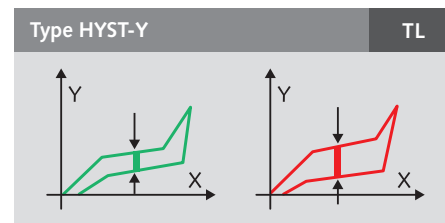**Type LINE-X** — **TL**
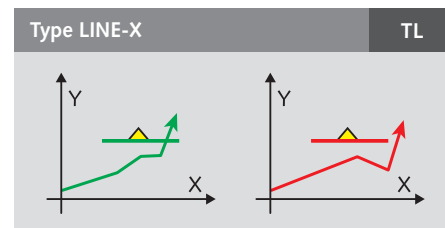
The line must be crossed once. An X-value at the point of intersection is monitored.

Type LINE-Y — **TL**
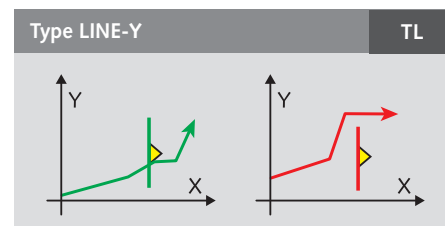
The line must be crossed once. A Y-value at the point of intersection is monitored.

Type NO-PASS — **TL**
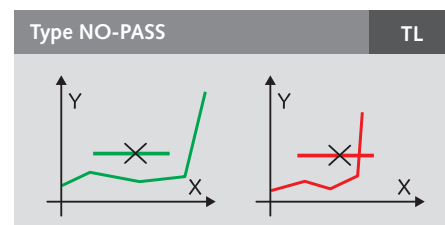
The line may not be crossed. Otherwise, NOK and "NO-PASS" real-time signal

Type HYST-Y — **TL**

Evaluates the Y-hysteresis between forward and reverse curves on a vertical line

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Type HYST-X	TL
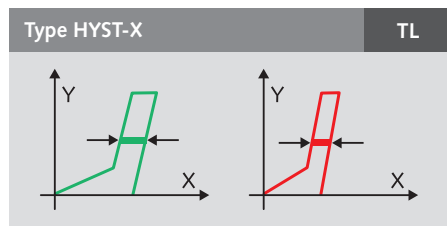
Evaluates the X-hysteresis between forward and reverse curves on a horizontal line

Type GRAD-Y	TL
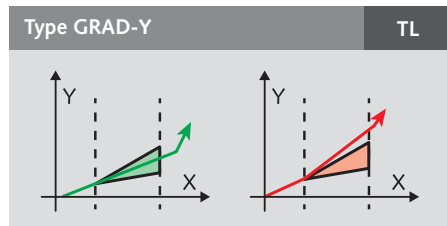
Evaluates the gradient dY/dX between two vertical lines

Type GRAD-X	TL
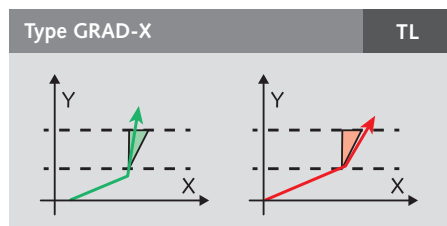
Evaluates the gradient dX/dY between two horizontal lines

Type TUNNELBOX-X	TL

Type TUNNELBOX-Y	TL
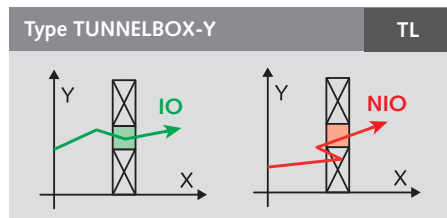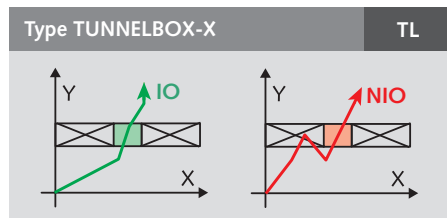
Entry and exit as specified. No crossing of closed sides allowed. Crossing of the "closed" sides generates a real-time signal.

Type BREAK	TL
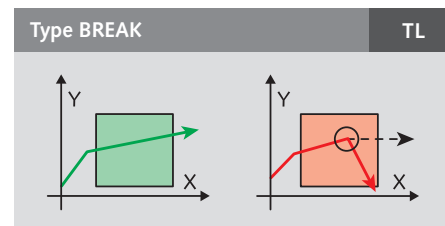
Provides NOK and online signal in case of sudden gradient change within an expectancy range (box), e.g. in case of tool breakage

Type CALC	TL

X2-X1=IO   X2-X1=NIO
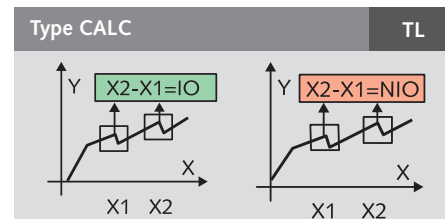
Object references two selectable process values and performs calculations, e.g. the X-difference between two ripples, and evaluates them

Type AVERAGE	TL
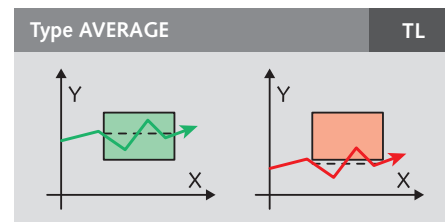
Evaluates the average of all Y-values in the box region

Type GETREF	TL
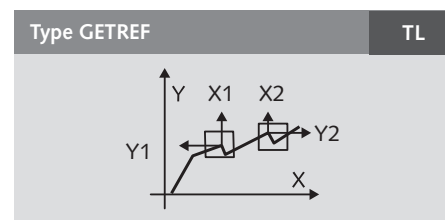
Box detects significant curve features and their XY coordinates in the expectancy range. This information can be used as reference points for other EOs or as an input for the CALC object.

Type SPEED	TL

Evaluation criterion is the speed between the entry and exit points in a special box

Type TIME	TL

Evaluation criterion is the time between the entry and exit points in a special box

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Product testing example: Distance check between two snap-in points of a latch. The two GETREF boxes supply the coordinates of the snap-in points to the CALC objects. These calculate and evaluate the distances in the X and Y directions.
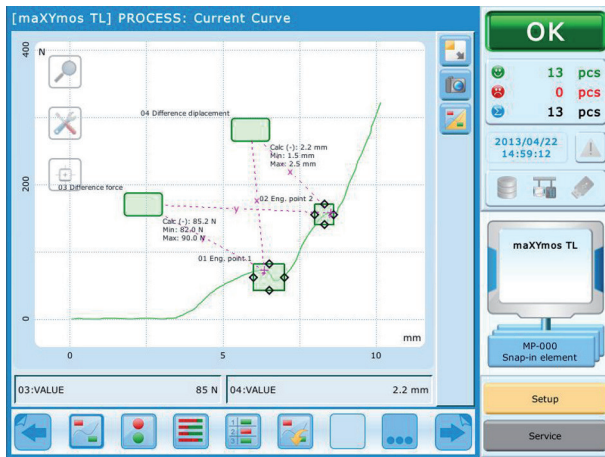
Housing Concept and Installation Variants
With the universal housing concept, different mounting configurations can be realized in a few easy steps. This allows the machine designer to change to a different mounting configuration at any time.

Desktop and Wall Mounting
A desktop unit can be changed into a wall-mounted version in a few easy steps.
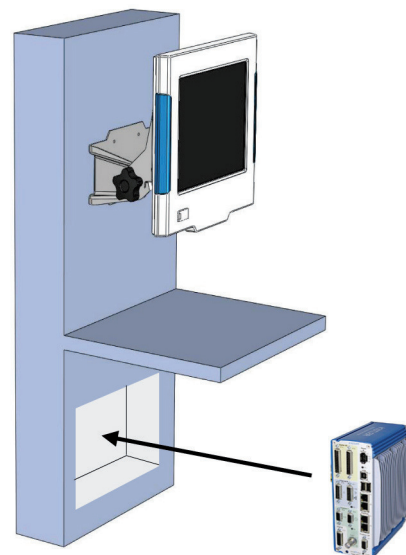
Front Panel Mounting
After removing the fixing bracket and rear frame, push the display through the front panel opening. Then screw the frame back on. The measuring module (MEM) can now be pushed into the slot of the display module if required.
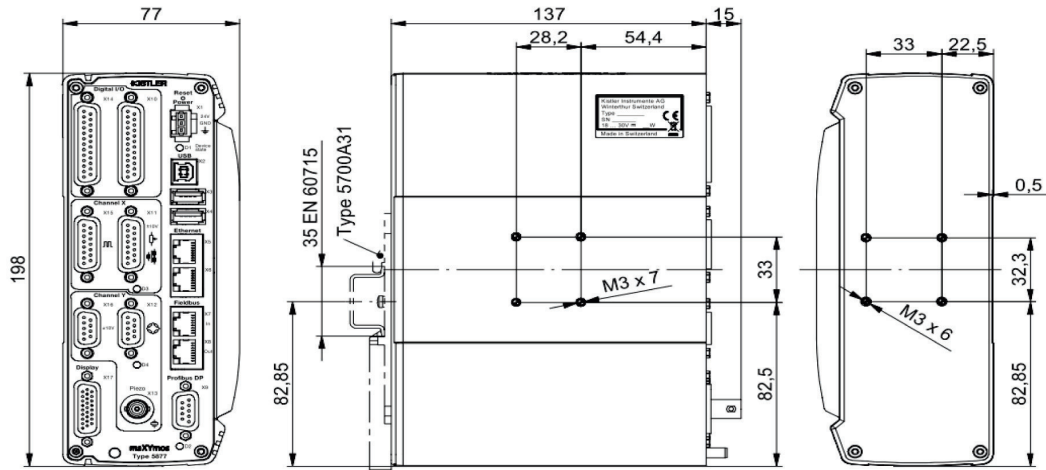

DIN Rail Mounting
The measuring module (MEM) can be mounted on a DIN rail with a optional fastening clip. This makes it possible to house the sensitive connection area of the MEM inside the control cabinet, where it is well protected, while placing the better protected display module (DIM) in the visible area.

Advantages: There is only a monitor cable leading to the display. At the same time, the degree of protection in the monitor area is increased to IP65.
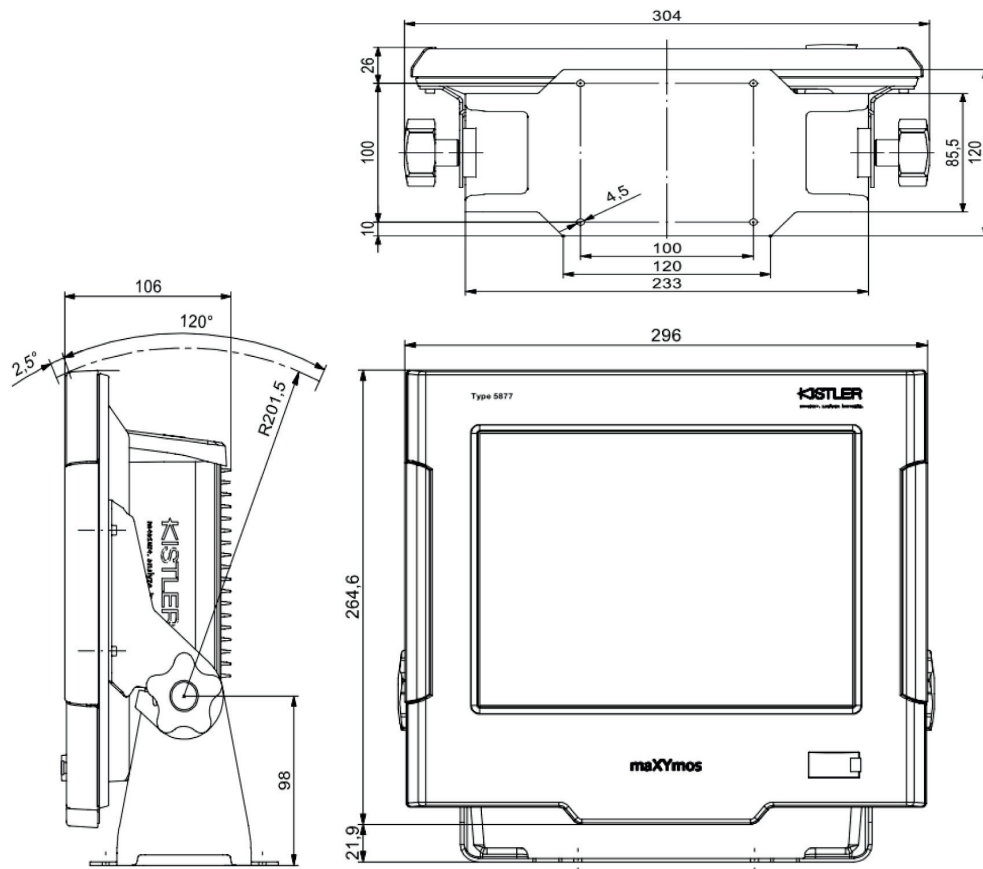
Dimensions

Measuring and evaluation module (MEM)

Display module (DIM)

5877A_000-973e-04.13

This information corresponds to the current state of knowledge. Kistler reserves the right to make technical changes. Liability for consequential damage resulting from the use of Kistler products is excluded.

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Accessories	Type
• Display module (DIM)	5877AZ000
• Set of connectors maXYmos TL for sensors, digital I/0 and supply	5877AZ010
• Connecting cable between MEM and DIM, length 2,5 m	1200A161A2,5
• Connecting cable between MEM and DIM, length 5 m	1200A161A5
• Ethernet connecting cable between MEM's, length 0,5 m	1200A49A3
• Ethernet connecting cable between MEM's, length 5 m	1200A49
• Power supply 220 VAC/24 VDC	5867AZ012
• DIN rail clip for MEM control cabinet mounting	5700A31
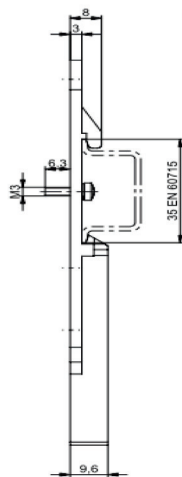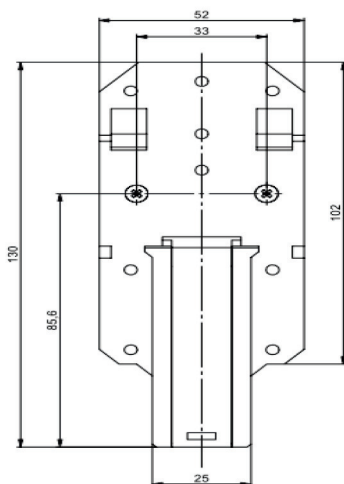
Windows®-Software maXYmos PC (Basic) 2830A1
- Organize firmware updates
- Save device settings in a backup file
- Restore settings to the device

(included in the scope of delivery of the measuring and evaluation module type 5877A)

Windows®-Software maXYmos PC (Plus) 2830B2*
Like Basic version, but in addition:
- All device settings applied on PC (Setup editor)
- Log explorer opens and interprets exported test records
- Generation of an Excel® statistical file with selected process values
- Cursor measurement, bundle presentation of curves, etc.
- Final Y(X) curves can also be presented as Y(t) or X(t)
- PDF print function for test records

*Product availability: July 2013

Ordering Key for
XY monitor maXYmos TL   **Type 5877AK** ☐

Measuring and evaluation module (MEM)	0
XY monitoring system for 1 XY channel pair consisting of 1 display module (DIM) Type 5877AZ000 and 1 measuring and and evaluation module Type 5877A	1

XY monitoring system for simultaneous measurement of multiple XY channel pairs

2 XY channel pairs	2
3 XY channel pairs	3
4 XY channel pairs	4
5 XY channel pairs	5
6 XY channel pairs	6
7 XY channel pairs	7
8 XY channel pairs	8

Included Accessories for Type 5877AK0	Type/Mat. No.
• Set of connectors maXYmos TL for sensors, digital I/0 and supply	5877AZ010
• Windows software maXYmos PC Basis	2830A1

Included Accessories for Type 5877AK1	Type/Mat. No.
• One display modul (DIM)	5877AZ000
• Set of connectors maXYmos TL for sensors, digital I/0 and supply	5877AZ010
• Windows software maXYmos PC Basic	2830A1

Included Accessories for Type 5877AK2-8	Type/Mat. No.
• One display modul (DIM)	5877AZ000
• n Set of connectors maXYmos TL for sensors, digital I/0 and supply	5877AZ010
• n-1 Ethernet connecting cable between MEM's, length 0,5 m	1200A49A3
• Windows software maXYmos PC Basic	2830A1

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