

# 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 cascaded 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 cascaded 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,  $\pm 10$  V, LVDT, incremental, SSI
- Channel Y: Strain Gauge,  $\pm 10$  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
- Access 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/maxy mos](http://www.kistler.com/maxy mos)

5877A\_000-973e-04.13

**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*

<b>Sensor Type 1</b>		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
<b>Sensor Type 2</b>		Process signal ±10 V
Signal output	V	±10
Linearity error	%FS	0,01
Transmitter supply	VDC	24
	mA	200
<b>Sensor Type 3</b>		Incremental
Signal output	Sinus/Cos, RS422 (A+B)	
Reference marker		yes
Counting depth	bit	32
Counting frequency	MHz	10 (RS422)
	MHz	1 (sine/cos)
<b>Sensor Type 4</b>		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
<b>Sensor Type 5</b>		SSI
Signal output		RS422
Clock frequency max.	MHz	1

*Sensors channel Y*

<b>Sensor Type 1</b>		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
<b>Sensor Type 2</b>		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
<b>Sensor Type 3</b>		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	

5877A\_000-973e-04.13

**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)**

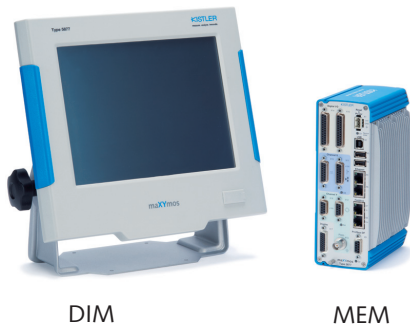
Size	Inches	10,4
Color		yes
Touchscreen		yes
Resolution	Pixels	600x800 (SVGA)
Technology		TFT-LCD
Backlighting		LED
Supply voltage (of MEM)	VDC	24
IP degree of protection (EN 60529)		
– Front	IP	65
– Rear	IP	53
Operating temperature range	°C	0 ... 45

5877A\_000-973e-04.13

**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).



**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.



**MEM with Display Module**

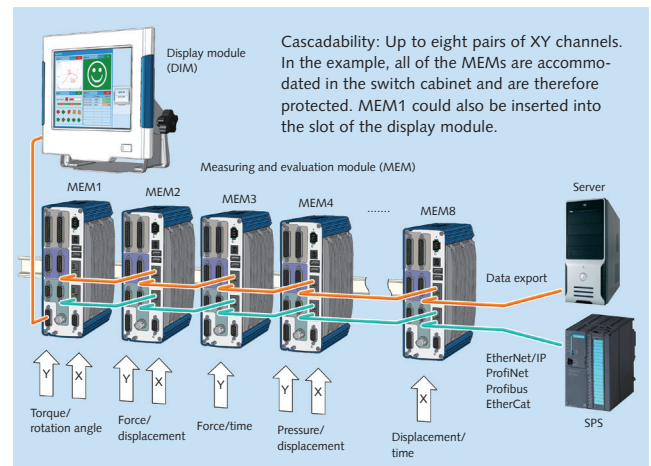
The MEM and DIM can either be installed separately from each other, in which case they are connected only via the optional connecting cable type 1200A161A2,5/5.



**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.

.... 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:

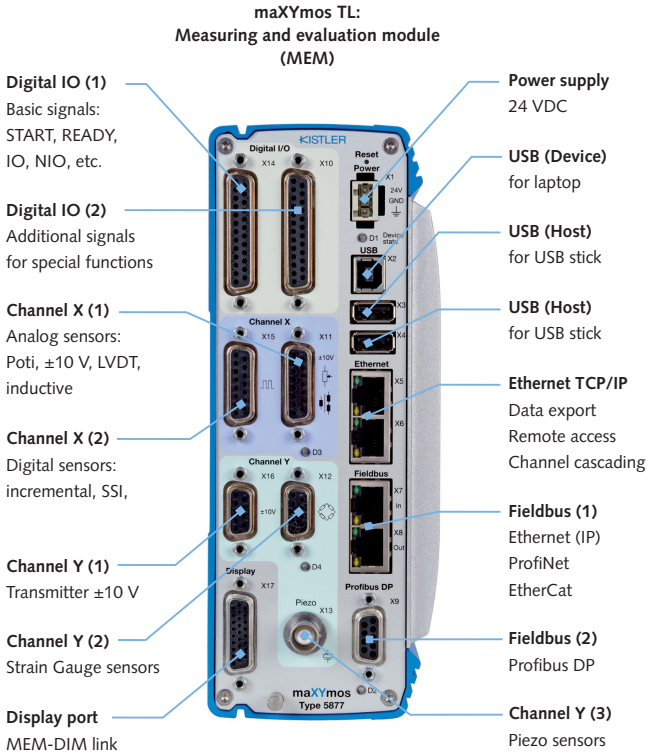


5877A\_000-973e-04.13

**Measuring and Evaluation Module (MEM)**

**Interfaces**

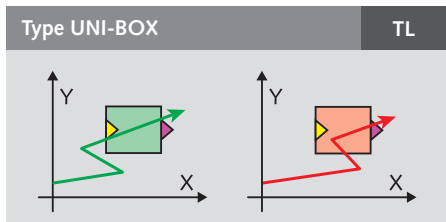
The module, which features an XY channel pair and all data and control interfaces, forms the heart of the XY monitor.



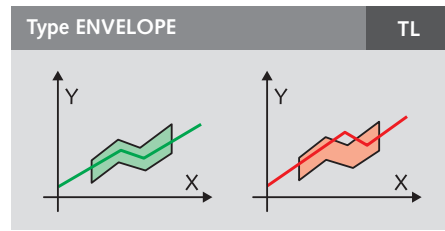
**Evaluation Process**

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

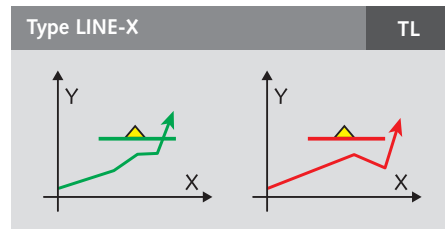
Examples:



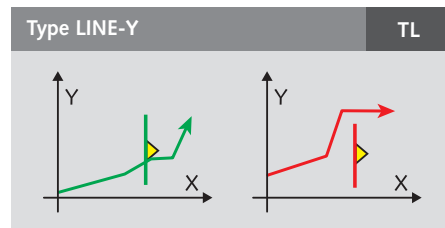
Entry and exit as specified. No crossing of "closed" sides allowed. Each side can be defined as entry or exit.



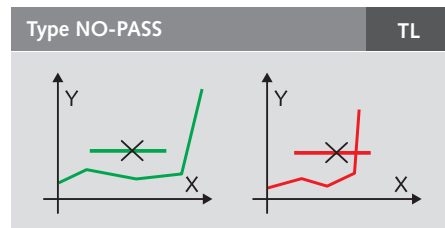
The measurement curve must not cross the upper or lower line of the envelope. This evaluation object is easy to master.



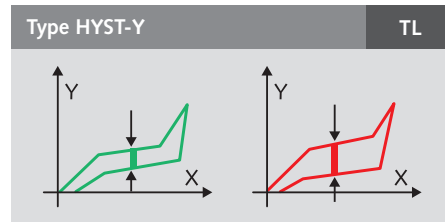
The line must be crossed once. An X-value at the point of intersection is monitored.



The line must be crossed once. A Y-value at the point of intersection is monitored.

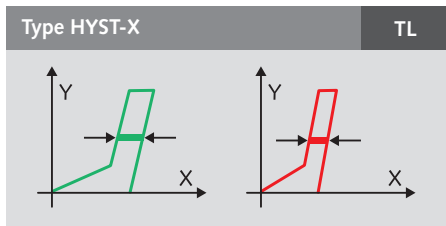


The line may not be crossed. Otherwise, NOK and "NO-PASS" real-time signal

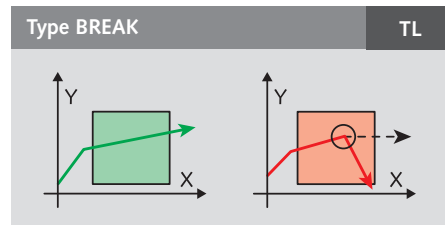


Evaluates the Y-hysteresis between forward and reverse curves on a vertical line

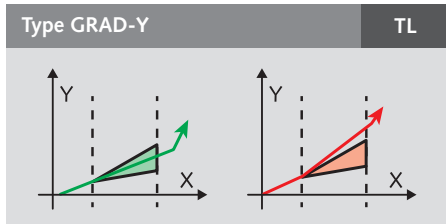
5877A\_000-973e-04.13



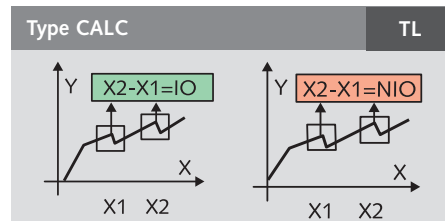
Evaluates the X-hysteresis between forward and reverse curves on a horizontal line



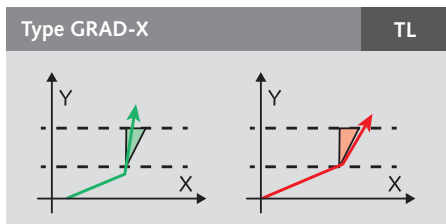
Provides NOK and online signal in case of sudden gradient change within an expectancy range (box), e.g. in case of tool breakage



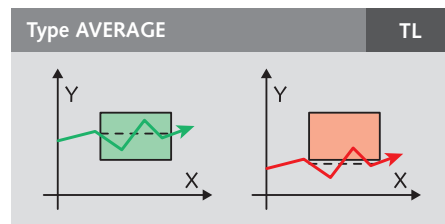
Evaluates the gradient  $dY/dX$  between two vertical lines



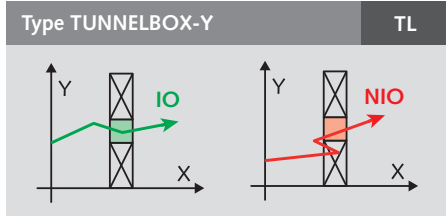
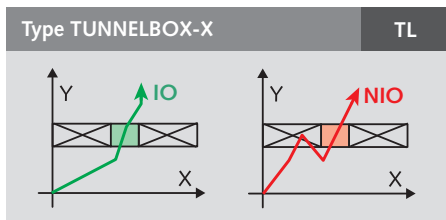
Object references two selectable process values and performs calculations, e.g. the X-difference between two ripples, and evaluates them



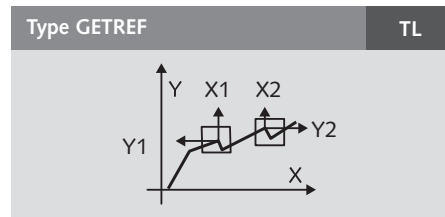
Evaluates the gradient  $dX/dY$  between two horizontal lines



Evaluates the average of all Y-values in the box region



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



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.



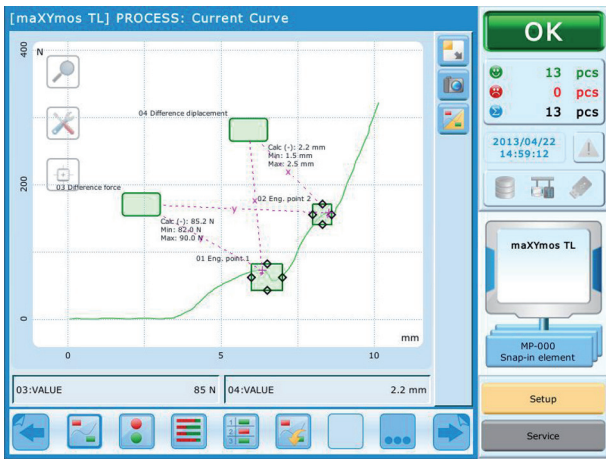
Evaluation criterion is the speed between the entry and exit points in a special box



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

5877A\_000-973e-04.13

**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.



**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.



**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**

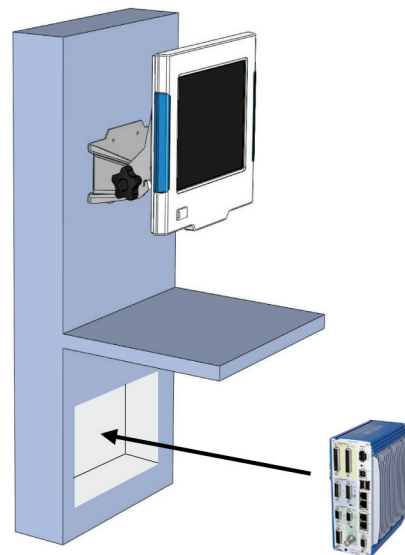
A desktop unit can be changed into a wall-mounted version in a few easy steps.



**DIN Rail Mounting**

The measuring module (MEM) can be mounted on a DIN rail with an 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.

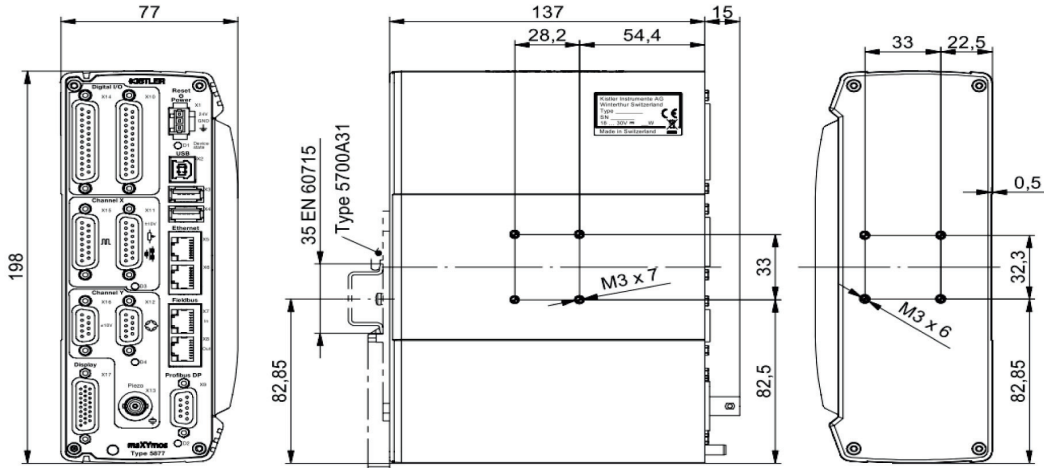
Advantages: There is only a monitor cable leading to the display. At the same time, the degree of protection in the monitor area is increased to IP65.



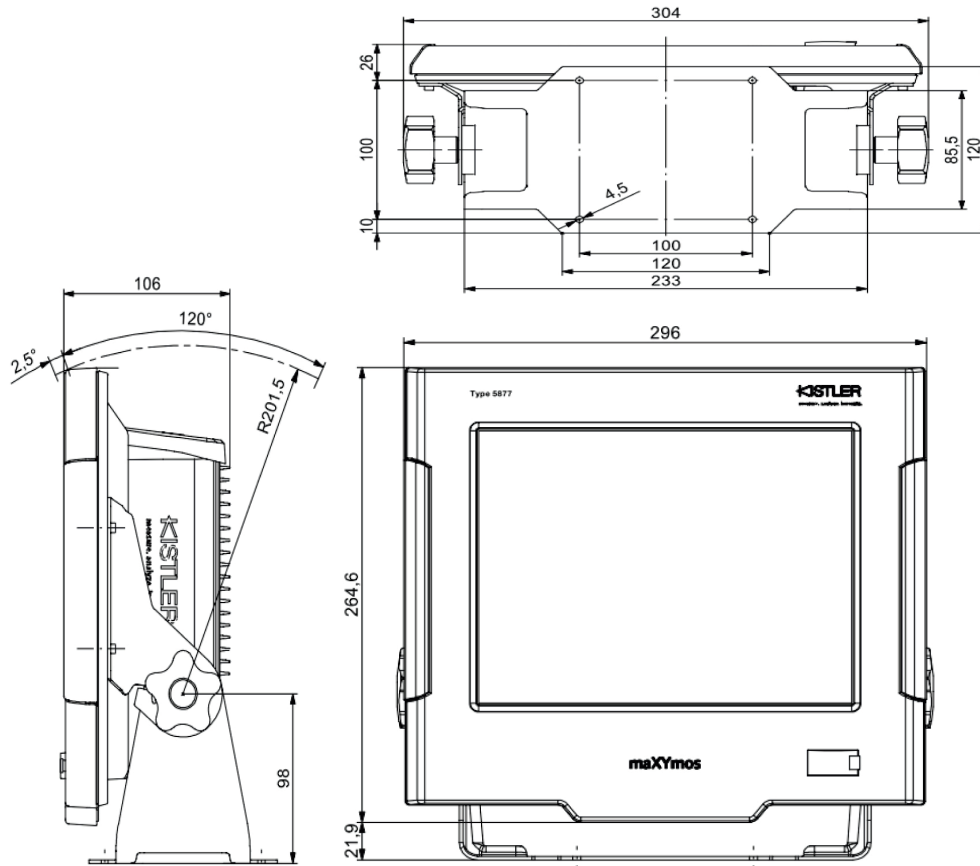
5877A\_000-973e-04.13

**Dimensions**

Measuring and evaluation module (MEM)



Display module (DIM)



5877A\_000-973e-04.13



### Accessories

- Display module (DIM)
- Set of connectors maXYmos TL for sensors, digital I/O and supply
- Connecting cable between MEM and DIM, length 2,5 m
- Connecting cable between MEM and DIM, length 5 m
- Ethernet connecting cable between MEM's, length 0,5 m
- Ethernet connecting cable between MEM's, length 5 m
- Power supply 220 VAC/24 VDC
- DIN rail clip for MEM control cabinet mounting

### Type

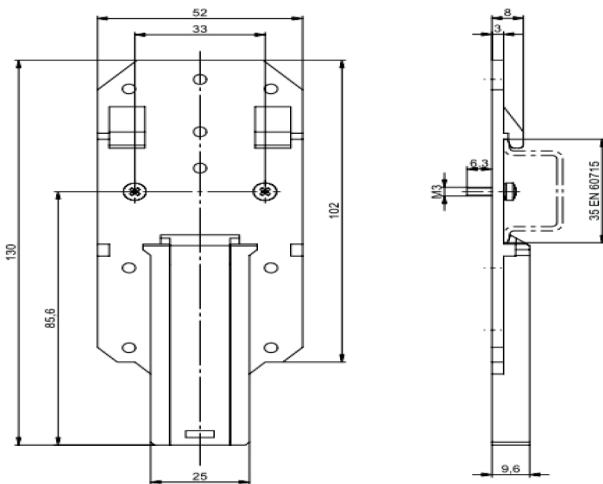
- 5877AZ000
- 5877AZ010
- 1200A161A2,5
- 1200A161A5
- 1200A49A3
- 1200A49
- 5867AZ012
- 5700A31

### 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



### 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

### Included Accessories for Type 5877AK0 Type/Mat. No.

- Set of connectors maXYmos TL for sensors, digital I/O 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/O 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/O and supply 5877AZ010
- n-1 Ethernet connecting cable between MEM's, length 0,5 m 1200A49A3
- Windows software maXYmos PC Basic 2830A1

5877A\_000-973e-04.13

Windows® and Microsoft Excel® are registered trademarks of the Microsoft Corporation.