

**Zumbach**

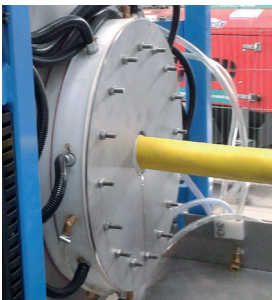
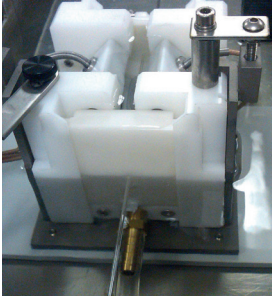
SWISS PRIME MEASURING SINCE 1957

# UMAC<sup>®</sup> – WALLMASTER



**Ultrasonic Measurement & Control Systems  
for Wall Thickness & Concentricity**

## UMAC® WALLMASTER SYSTEMS: INCREASE THE EFFICIENCY



UMAC WALLMASTER systems from ZUMBACH allow in-line measurements, data acquisition and control during the extrusion of a wide range of products, like tubing, pipe, hoses and cables. Cutting edge digital technology (DSP) opens up measuring solutions for each process and product:

- Ultra thin walls
- Smallest and largest diameters
- Multi-layer products
- Cable isolations and jackets

Special products requiring an off-line QC measurement can now be measured in-line and relevant parameters monitored continuously. The diameter can also be measured in a combination with the ultrasonic measurement with certain transducer holder. In addition, UMAC WALLMASTER systems provide for real-time QC data, process monitoring, trending, SPC data, statistical charts etc.

### Economic Advantages

- Reduced set-up time
- Raw material savings
- Scrap reduction
- Continuous process monitoring and control
- Fully automated QC, data collection and reporting
- ROI within few months

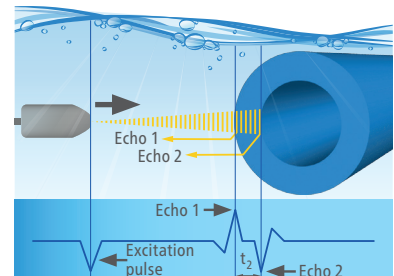
### Technical Advantages

- Easy operating
- Automatic calibration
- Digital Signal Processing (DSP)
- Multi-layer measurement (up to 5 layers simultaneously)
- Measurement of thin walls down to 0.08 mm (.003 in.)
- Thick walls up to 99.95 mm (4 in.)
- Product diameters from 0.2 to 350 mm (.008 to 13.8 in.)
- Complete process transparency and control

### Ultrasonic Measurement Principle

It is based on the time difference ( $t_2$ ) of the sound echoes from the surface and the inner side of the product. A piezoelectric crystal is excited by a short electrical pulse. The crystal converts electrical energy into mechanical energy, i.e. sound waves. When the sound waves encounter a difference in the propagation medium (for instance when passing from water to a synthetic material), a part of them is reflected back to the crystal (echo).

$$\text{Wall thickness} = \text{Sound velocity of material} \cdot t_2 \cdot 0.5$$



### ZUMBACH SmartWall®

Zumbach ultrasonic wall thickness measurement utilizes the intelligent SmartWall® algorithm to dynamically analyse, configure and optimise all signal parameters during the set-up of each production run taking the guess work away from the operator.

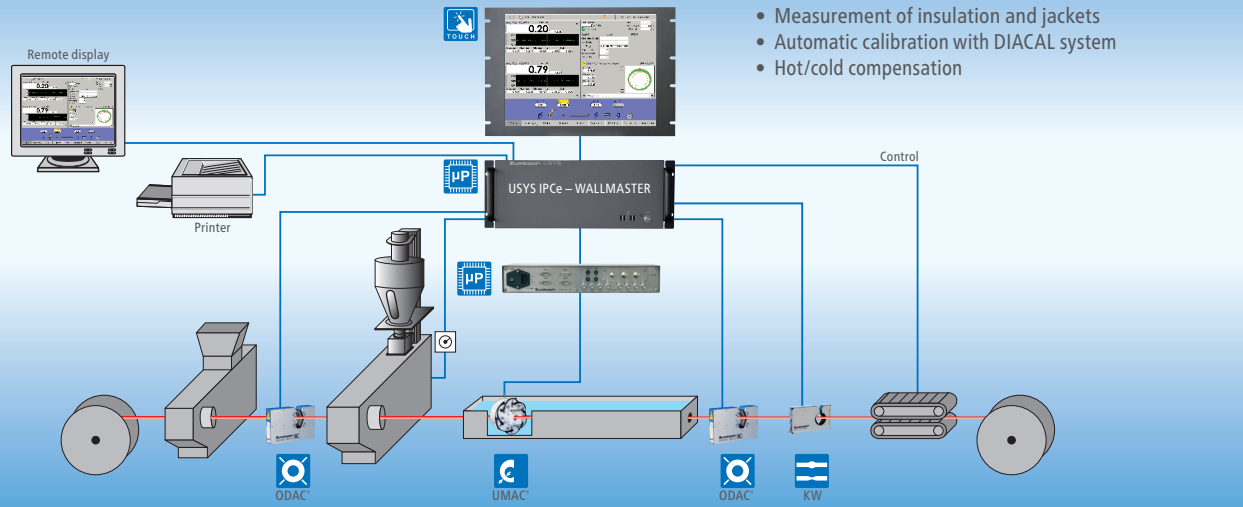
### Advantages

- Fully automatic signal optimization setting of all key parameters
- True echo wave signal processing minimizes the effect of echo shape on accuracy
- Dynamic signal analysis continuously monitors the quality of the signals being processed

## TYPICAL APPLICATIONS

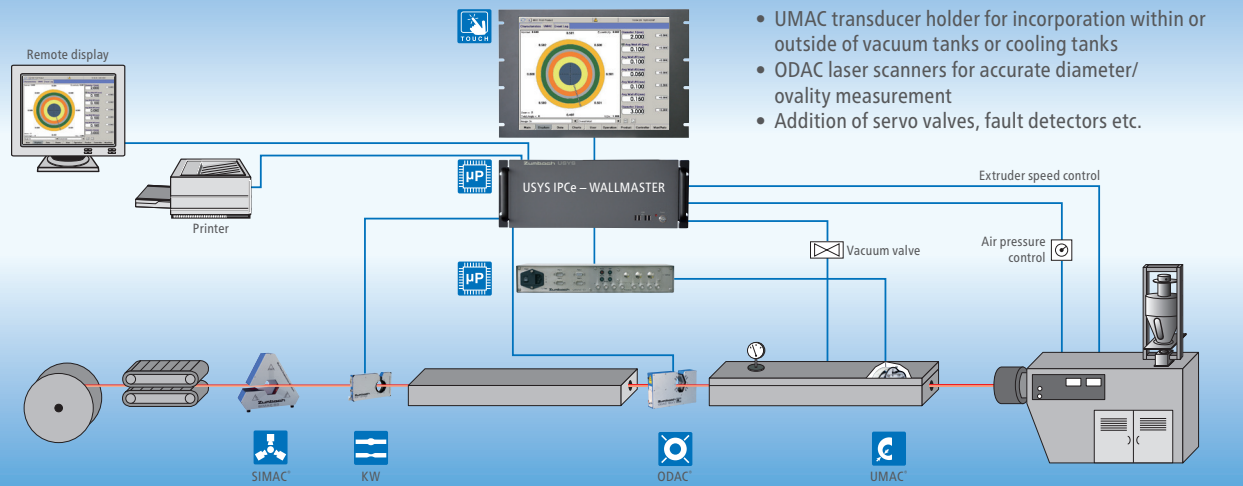
### Measurement of Insulations or Jackets on Cables

In the cable sheath extrusion, the WALLMASTER system offers many solutions thanks to its flexibility and ease of use. Parameters such as wall thickness, concentricity, diameter and ovality can be measured and controlled.



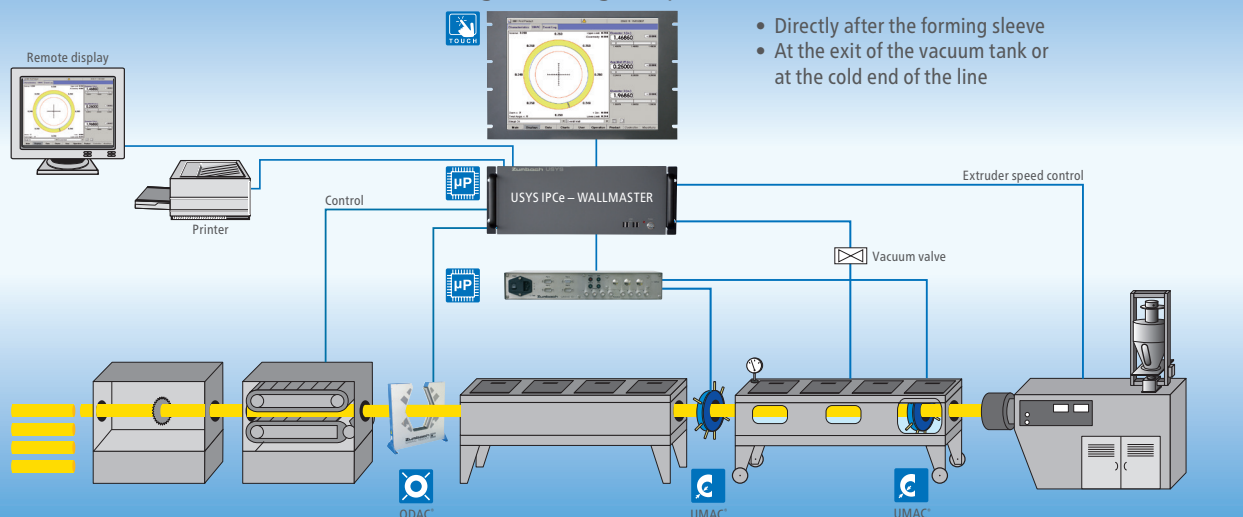
### Wall Thickness and Diameter Control on Tubing and Hoses

Measurement of wall thickness, concentricity, outer/inner diameter, and ovality. The integration of existing gravimetric dosing systems for the calibration of the wall thickness measurement is also possible.



### Wall Thickness Measurement and Control During the Extrusion of Pipe up to $\varnothing$ 620mm (24.41 in.)

Transducer holders are available for measurement at the hot end or the cold end of the line. Optionally, also with integrated diameter measurement. At the hot end, the highest savings are possible:

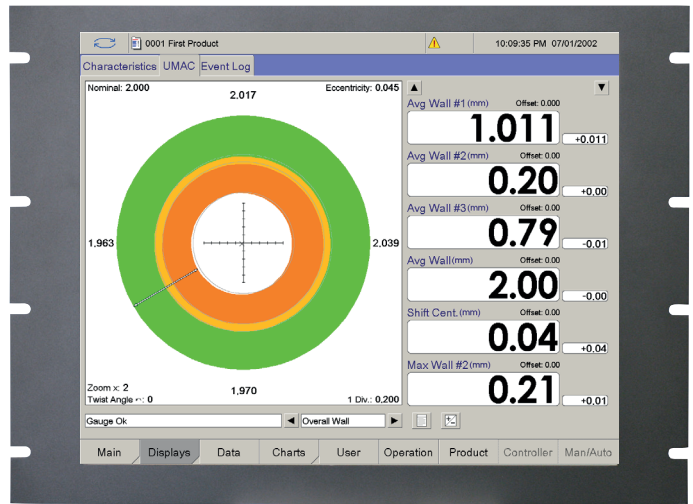


# DATA ACQUISITION, PROCESSING AND DISPLAY SYSTEMS

## Display

Rack mountable touch screen for convenient installation into existing 19" rack (8 HU\*) or extruder panel.

As an alternative, a desktop touch screen or screen with keyboard and mouse are available.



## Multi Sensor Data Acquisition and Process Control Systems

The USYS IPC hardware provides a modular alternative to the other processor and display units of the USYS family. It offers the flexibility to mount the processor in a convenient location while mounting the flat panel touch screen at an optimum location for the operator.



### USYS IPC 1e WALLMASTER

- Inputs: Up to 3 ODAC or MSD, detector, Start/Stop, Pause
- Up to 4 extension ports (digital & analogue inputs & outputs, relays, ODAC, MSD, etc.
- 4 HU\* box design

### USYS IPC 2e WALLMASTER

- Inputs: Up to 6 ODAC or MSD, detector, Start/Stop, Pause
- Up to 7 extension ports (digital & analogue inputs & outputs, relays, ODAC, MSD, etc.
- 4 RS-422 ports as standard, extendable to 8
- 19" rack 4 HU\*

## High-Tech Measured Value Processors for Ultrasonic Wall Thickness Measurement

Industrial processor with DSP (Digital Signal Processor) technology for connection to a higher level system (PC, PLC or USYS, resp. WALLMASTER systems). For display and process control, the UMAC CI provides serial RS or a Profibus DP interfaces.



### UMAC CI

For single and multi-layer cables and tubes

- Multi-layer measurement (up to 5 layers)
- Wall thickness down to 0.05 mm (.002 in.)

### UMAC CI B

For single layer tubes

- Automatic single layer measurement
- Wall thickness down to 0.5 mm (.02 in.)

\* HU = Height Unit; 1 HU = 44.45 mm (1.75 in.)

► For detailed specifications of the individual components, please ask for specific data sheets.

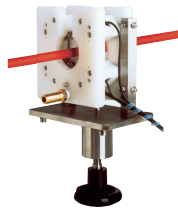
## Accessories / Peripherals

19" cases / cabinets, keyboard, mouse, printers, remote displays, vacuum and pressure control valves.

# UMAC® TRANSDUCER HOLDER

## UMAC A5 / A10 / A20

Open, compact and available in two versions:  
 – K version: for standard water trough installation (height adjustment from the top)  
 – V version: for vacuum tank installation (height adjustment from the bottom)



Model	Meas. points	Diameter range	
		mm	inch
UMAC A5CF-4K	4	0.2 ... 5	.008 ... .2
UMAC A10CF-4K	4	1.0 ... 10	.04 ... .4
UMAC A20CF-4K	4	6.4 ... 20	.25 ... .8

## UMAC RZ35 / RZ65

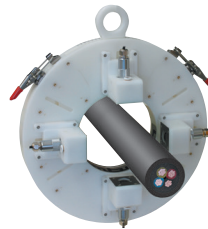
Ring-shaped measuring chamber with two pairs of sliding guides, opening up automatically; each diameter requires 1 set of guides. Simple adjustments to suit the new product diameter in just a few seconds. All transducers are symmetrically positioned with a central adjustment.



Model	Meas. points	Diameter range	
		mm	inch
UMAC RZ35-4K	4	0 ... 35	0 ... 1.38
UMAC RZ35-6K	6	0 ... 35	0 ... 1.38
UMAC RZ65-4K	4	0 ... 65	0 ... 2.56
UMAC RZ65-6K	6	0 ... 65	0 ... 2.56

## UMAC Z50 / Z100 / Z180

Two quick hand adjustments to suit the new product diameter take just a few seconds. All transducers are symmetrically positioned with a central adjustment and a large measuring range.



Model	Meas. points	Diameter range	
		mm	inch
UMAC Z50-4K	4	5 ... 50	.19 ... 1.97
UMAC Z50-6K	6	5 ... 50	.19 ... 1.97
UMAC Z100-4K	4	10 ... 100	.39 ... 3.94
UMAC Z100-6K	6	10 ... 100	.39 ... 3.94
UMAC Z180-6K	6	25 ... 180	.98 ... 7.08

## UMAC R

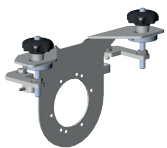
Fixed transducer holder for 4, 6 or 8 measuring points. Ring shaped transducer mounting fixture custom configured for installation into existing vacuum tank. This UMAC® R scanner is installed inside the vacuum tank on to the bulk head separating the first and second vacuum chamber.



Model	Meas. points	Diameter range	
		mm	inch
UMAC R110-8K	4...8	20 ... 110	.80 ... 4.30
UMAC R180-8K	4...8	20 ... 180	.80 ... 7.09
UMAC R250-8K	4...8	20 ... 250	.80 ... 9.84
UMAC R350-8K	4...8	30 ... 350	1.18 ... 13.78

► Transducer holders for other diameter ranges upon request.

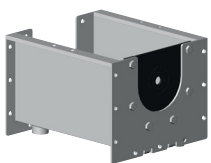
## Accessories for UMAC transducer holders



**Holders (H versions)**  
 Holding platform for direct mounting into existing cooling trough or water basin of the F versions.



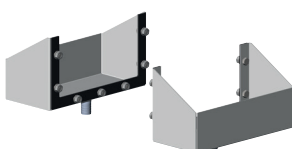
**Guiding blocks**  
 These blocks guarantees a proper guiding of the product.  
 (Available for the A and RZ version).



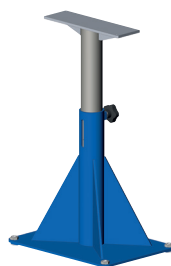
**Water basins (F versions)**  
 Additional water basin for the accommodation of the transducer holder (with or without H version).



Transducers of various frequencies (typically: 2.25 / 5 / 10 / 20 MHz).



**Overflow basins**  
 For mounting on the water basin (F version).



**Floor stands**  
 To accommodate the water basin (F version).

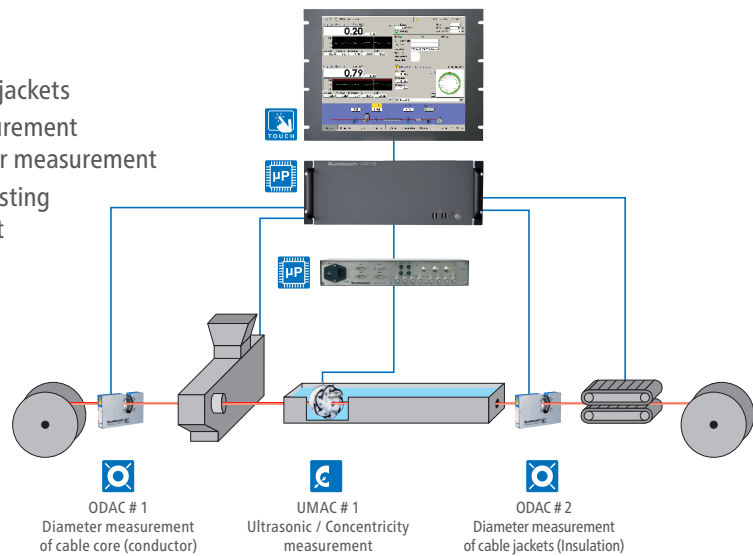
## IMPROVE AND SIMPLIFY PROCESSES

### DIACAL 8000

For Compensation and Automatic Calibration of the Wall Thickness. DIACAL 8000 is a smart method for the simplified calibration during the extrusion of cable jackets.

#### Benefits

- Precise wall thickness measurement of cable jackets
- Automatic calibration of the ultrasonic measurement through intelligent processing of the diameter measurement
- Economic solution because it employs the existing and essential diameter measuring instrument
- Optimised material consumption
- Generally improves the process



### SIGMA-EXPERT and CpK-Pilot

Sigma Expert – this sophisticated, self-tuning control algorithm automatically adapts to process and product conditions to ensure tightest control possible. CpK-Pilot statistically analyses the process capability and adjust the set-point for optimum material savings.

### USYS Report Manager / Report Viewer

Historical storage of all printed reports such as trend charts, package summaries and SPC charts locally or on the network (XML format). Reports can be retrieved by the USYS for display.

Report Viewer installed on the PC will provide access to the reports from previous production runs for viewing and printing (ISO 9000 traceability).

### USYS Data Log

For quick and easy data logging to a PC or network file server to a text delimited (CSV) file. USYS Data Log is a Windows™ based software for convenient configuration of the data to be provided by the USYS processor.

### OPC UA\*

Communication protocol for Windows. The OPC UA technology is a standard in the area of process control such as SCADA or HMI. It defines a common interface for accessing data of peripherals. The application "Zumbach OPC Server" provides the measured values and enables editing product recipes. The software operates with Windows™.

\* For USYS 200, USYS IPCe.  
(OPC version for USYS 20).

### USYS Web Server

For integration into local and wide area networks (LAN, WAN) the optional USYS Web Server software module allows for work stations configured with a standard Internet browser to access and view the USYS IPC WALLMASTER screens remotely. Providing insight information about the process and product being manufactured.

### Other products and measurement technologies

Further sensors for the measurement of other parameters such as diameter with laser technology, capacitance as well as lump and neckdown detectors (fault signal), surface inspection systems, conductor preheaters and temperature measurement, spark testers, scanners based on x-ray technology, lengths and speed measuring systems etc. complete the product range from ZUMBACH.

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• Technical specifications are subject to change without notice

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