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**MODULAR CHECKWEIGHER SYNUS 6 / 10 / 15
with integrated METAL DETECTOR MDP - S****DESCRIPTION OF THE EQUIPMENT**

The CoSYNUS system consists of a modular checkweigher SYNUS 6 / 10 / 15 in combination with an integrated MDP – S metal detector. A joint terminal operates the system.

Combi checkweigher:

The WS 1 / 2 / 5 / 7 kg weighing systems with built-in metal detection and outfeed belts, when used in conjunction with the SYNUS 6 / 10 / 15 evaluation electronics and with integrated MDP – S metal detector, combine to form a high-performance checkweigher for determining the weight or completeness of products, for regulating upstream filling systems and for metal detection.

These checkweighers are approved for use in legal metrology for average weight control of prepackaged products (AWC) in a number of countries.

They have been issued both national type-approval certificates as automatic checkweighers and an OIML R51 certificate. The optional trend controller can be added to regulate existing packaging or filling machines, which contributes significantly to improved efficiency of filling and helps to prevent costly overflow.

Furthermore, all CoSYNUS models offer a variety of COM ports, enabling smooth, centralized integration of SYNUS checkweighers in existing or new quality assurance systems, for 100% traceability in production monitoring. SYNUS checkweighers can also be connected over Ethernet TCP/IP to the "ProControl for Windows" network QA system from Sartorius, creating an all-inclusive bidirectional link to management functions.

An integrated printer module can be included for documentation of all relevant operating data.

The USBPrint option is a reliable, easy-to-use and – most importantly – broadly compatible option for electronic data transfer without a network.

Thanks to cantilever construction of the weighing and transport system, smooth surfaces (stainless steel version), hinged and removable transport systems, and a quick-release belt detensioning mechanism, the system is especially easy to clean thoroughly.

The evaluation electronics can take over both product classification and control of sorting and/or signaling devices.

A choice of blower or pusher can be installed at the outfeed side of the checkweigher and also on the metal detector belt for reject removal or sorting.

Depending on the product, separate sorting diverters or line dividers can also be used.

Metal detector

Sartorius metal detectors protect the consumer from damage to health, the final product against metal contamination and processing equipment against damage by undesirable metal pieces.

Metallic contaminants are displayed in all non or low-conductive materials.

The search coil of type MDP-S was also developed with the highest detection sensitivity.

The high sensitivity of the detector meets the special requirements of many different industries.

Alloy steels and non-ferrous metals (copper, brass, aluminium, lead, etc.) can be detected as well as ferrous magnetic materials.

Sartorius metal detectors work in accordance with the following measuring principle:

The search coil produces a normally balanced alternating magnetic field.

Metal contamination discovered by the metal detector alters the balance of the magnetic field.

This change in balance is processed digitally by the evaluation electronics and interpreted as proof of metal contamination.

**MODULAR CHECKWEIGHER SYNUS 6 / 10 / 15
with integrated METAL DETECTOR MDP - S****CHECKWEIGHER DESIGN**

The Combi system consists of the following components:

- Weigher frame /control cabinet
- Weigh cell
- Transport system
- Scanning unit
- Control electronics
- Search Coil MDP - S
- Touch guard (optional)
- Reject or sorting mechanism (optional)

Weigher frame / control cabinet

Sturdy base frame made of AISI 304 stainless steel (1.4301) with IP65 protection.

The weigher frame supports an adjustable-height traverse member which is attached to the weighing and transport system.

The traverse member is form-fitted and friction-locked to the sinusoidal housing side-face by means of a clamping device.

Thus the working height can be adjusted between 600 mm and 1100 mm in increments of 50 mm.

Threaded leveling feet are provided for fine adjustment of the height.

The display and control unit is built into the control cabinet.

Weigh cell

Monolithic EMC weigh cells developed specially for dynamic checkweighers from Sartorius, distinguished by the following features:

- Highest precision and extremely fast response times thanks to electromagnetic force compensation (EMC),
- Excellent stability, ruggedness and overload protection afforded by monolithic components,
- The latest electronics with digital signal processing for particularly effective filtering at a 2-kHz sampling rate,
- AISI 304 (1.4301) stainless steel housing.

Transport system

The product to be weighed is conveyed on metal detection, weighing and outfeed belts; the transport medium is a conveyor belt (weighing belt WS 1 kg also available with circular belts).

The conveyor belt frame consists of polished aluminum sections with a quick-release belt de-tensioning mechanism.

Belt pulleys and drive rollers are made of polished aluminum, Ø 30 mm (WS 1 kg weighing belt: Ø 22 mm).

The quick-release belt de-tensioning mechanism and hinged, removable transport system make it easy to replace belts and load platform. Metal detection, weighing and outfeed belts are driven by a 24V maintenance-free EC geared motor.

Power is transmitted to the weighing belt by the drive belt.

Scanning unit**„Weigher“**

The scanning unit consists of a reflex light barrier.

"Monitoring product spacing (optional)"

A second scanning unit can be installed for monitoring product spacing.

"Reject and sorting mechanisms" (optional)

Additional light barriers monitor the product flow in order to check for products that are contaminated with metal or which are the wrong weight during sorting.

**MODULAR CHECKWEIGHER SYNUS 6 / 10 / 15
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The computer-based display and control elements for the metal detection and weighing function are integrated in a free-standing stainless steel housing (control cabinet) which is accessible from the rear.

The terminals for the power supply, evaluation and display electronics components, and the AC adapters with motor control are also installed in this cabinet.

The main switch and the display and control elements are installed at eye-level and easy to access.

The SYNUS 6, SYNUS 10 and SYNUS 15 evaluation electronics are available with different arrays of features (see the SYNUS 6 / 10 / 15 Evaluation Electronics table).

The On/Off switches for the conveyor belts are on the front of the evaluation electronics housing

Search coils

All-welded stainless steel casing (material 1.4301) with rectangular tunnel-shape aperture available in different dimensions (see table, page 9).

Selection of Search coils**Aperture width**

The aperture width (see table, dimension "E") depends on the width of the conveyor belt (plus an allowance for lateral belt movement).

Aperture height

Sensitivity depends mainly on the aperture height (internal height) that is determined by the max. product height + belt + clearance.

Choose the minimum necessary height.

Designation of type

Its contains the aperture width (= search width) and aperture height in cm.

Example: Type MDP - S 27,5 x 9 - aperture width = 275 mm, aperture height = 90 mm.

The internal height (see table, dimension "LH") corresponds to the aperture height (see table, dimension "C"), minus 40 mm.

Touch guard (optional)

An optional polycarbonate touch guard is available to protect the weighing system from contact or drafts.

If the system is approved for use in legal metrology or if it requires a small zone of indecision, the addition of this optional touch guard is strongly recommended, as the required accuracy may not be attainable otherwise.

Reject and sorting mechanisms (optional)

A blower device (puff-away) or pusher can be mounted on the outfeed belt and on the metal detection belt to serve as an ejector.

Reject or sorting mechanisms can also be controlled on the successive transport devices supplied by the customer.

The choice of reject / sorting mechanism(s) depends on the product, the throughput rate and the particular application.

TECHNICAL DATA

	WS 1 kg	WS 2kg	WS 5kg	WS 7kg
Weighing capacity (max. cap.)	0 g ... 1 000 g	0 g ... 2 000 g	0 g ... 5 000 g	0 g ... 7 000 g
Working range	5 g ... 900 g	5 g ... 1 800 g	10 g ... 4 500 g	20 g ... 6 300 g
Smallest permissible verification scale interval	0,1 g	0,2 g	0,5 g	1 g
Zone of indecision (Ua) Standard deviation attributable to measurement error (s)	from 100 mg from 17 mg	from 500 mg from 83 mg	from 2 g from 333 mg	from 2 g from 333 mg
	(depends on product, throughput and ambient conditions)			
Throughput	max. 250 pc/min	max. 200 pc/min	max. 180 pc/min	max. 180 pc/min
	(depends on product, permissible zone of indecision and ambient conditions)			
Transport speed	0,2 ... 1,5 m/s	0,2 ... 1,2 m/s 0,5 ... 1,5 m/s	0,2 ... 1,0 m/s 0,5 ... 1,4 m/s	
Center-to-center distance Weighing belt (mm)	310	300 / 350 / 400 / 450 / 500 (see dimensions and "Equipment Versions" table)		
Belt width	40 mm / 80 mm / 120 mm / 160 mm (ZB / AB 150 mm)*	150 mm / 200mm / 300 mm		
	(see "Equipment Versions" table)			
Roller diameter	22 mm	30 mm		
Transport medium	Circular belt or belt	Belt		
	(see "Equipment Versions" table)			
Drives	Maintenance-free 24V EC motors with planetary gear train. Motor control is short-circuit proof with temperature monitoring.			
Input supply voltage	230 V _{AC} (+ 10 % / - 15 %); 50/60 Hz (L1, N, PE)			
Power consumption	approx. 500 VA			
Conveying direction	right to left or left to right (indicate when placing order)			
Working height	600 mm to 1100 mm (in 50-mm steps), leg-adjusting range: ± 25 mm			
Floor clearance	100 mm (± 25 mm)			
Temperature range	0° C to + 60° C (32 °F to 140 °F)			
Product temperature	-20°C - 50°C, higher product temperatures available on request			
Protection	IP 54 (standard feature), IP 65 (optional upgrade)			
Machine safety	Meets the requirements of EC Directive 89/392/EEC (machinery); Manufacturer's Declaration as per Appendix I B.			
Dimensions	see scale drawings			
Weight	approx. 250 kg			

* ZB, AB: Weighing belt, outfeed belt

**MODULAR CHECKWEIGHER SYNUS 6 / 10 / 15
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CoSYNUS with EVALUATION ELECTRONICS SYNUS 6 / 10 / 15

STANDARD EQUIPMENT	TYPE		
	6	10	15
AISI 304 (1.4301) stainless steel housing, IP65 protection	■	■	■
6.4" flat-screen TFT color display and keypad	■		
10.4" flat-screen TFT color display and keypad		■	
15" touch-screen TFT color display			■
Weight readout: choice of gross, net or differential weight	■	■	■
Operational display: distribution, yield, throughput, average value chart, large weight readout	■	■	■
Operating mode: classifying weigher with AWC evaluation / 3-way sorting or 4 user-definable available class delimiters / 3-way or 5-way sorting	■	■	■
Batch operation	■	■	■
5-way classification	■	■	■
Pulse-controlled sorting	■	■	■
Automatic zero-setting	■	■	■
Statistics	■	■	■
Documentation	■	■	■
Product memory for 200 products	■	■	■
Program-controlled belt speed	■	■	■
Inputs: "Hide weigher", event counter, external error message	■	■	■
Outputs: Feeder/batch, 3-way/5-way sorting, total counter/preselection, error message output	■	■	■
Self-monitoring function; error reports	■	■	■
Auxiliary functions: test pack, dialogs for diagnostics and service	■	■	■
Data stored in battery-backed memory	■	■	■
Choice of languages for program dialogs; user-selected	■	■	■
Channel B	■	■	■
Test with pieces	■	■	■
Check test piece	■	■	■
Product effect minimize	■	■	■
Metal amassment	■	■	■
Negative metal detection	■	■	■

OPTIONS	TYPE		
	6	10	15
Documentation using thermal strip-printer module (IP65-protected)	■	■	■
Documentation using external printer	■	■	■
Trend controller with display	■	■	■
Approval for use in legal metrology	■	■	■
Emergency stop switch	■	■	■
Individual-weight output interface for external analysis and connection to SQS systems	■	■	■
Field bus interfaces: Profibus, DeviceNet	■	■	■
Data communication: Ethernet, TCP/IP, SPCfWin client, XML client/server/Sartorius ProControl@Inline	■	■	■
FDA 21 CFR Part 11		■	■
Sartorius ProControl@Remote	■	■	■
USB Print	■	■	■

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Incoming Inspection		■	■
5 classifying outputs with pulse output or signal maintaining logic (for example for control of LEDs or external counters)	■	■	■
Monitoring of average weight and repetitive rejections (only with 3-way sorting)	■	■	■
Touch Guard	■	■	■
Reject mechanism	■	■	■
Control of customer's sorting mechanism	■	■	■
Package length and distance monitoring	■	■	■
Automatic sampling		■	■
Volume evaluation	■	■	■
Check precision of measuring	■	■	■
Pulser	■	■	■
Notification of metal with separate acknowledgment	■	■	■
Reject monitoring on good lane for metal	■	■	■
Reject monitoring on good lane for wrong weight	■	■	■
Fill level rejected product box metal or wrong metal weight	■	■	■

TECHNICAL DATA

STANDARD EQUIPMENT		TYPE		
		6	10	15
INPUTS	Activate test pack, hide weigher, event counter, external error message, fill level rejected product box Inputs galvanically isolated with a relay or with optocoupler input, depending on use.	■	■	■
OUTPUTS	Feeder/batch, 3-way/5-way sorting, total counter/preselection, fault signal Outputs: Feeder/batch and error galvanically isolated with a relay contact, other outputs with a relay contact or optocoupler output, depending on use.	■	■	■
SERIAL INTERFACE	CANopen (for weigh cell)	■	■	■
TEMPERATURE RANGE	0° C to + 40° C (32 °F to 104 °F)	■	■	■

OPTIONS		TYPE		
		6	10	15
ANALOG INPUTS	0 - 20 mA, 0 - 10 V - Voltage input: impedance 100 k Ω		■	■
ANALOG OUTPUTS	0 - 20 mA, 0 - 10 V - Voltage output: burden \geq 2 k Ω - Current output: burden \leq 300 Ω	■	■	■
SERIAL COM PORTS	RS-422 / RS-232 / current loop	■	■	■
PRINTER (THERMAL STRIP-PRINTER MODULE)	Thermal printer in AISI 304 (1.4301) stainless steel housing, paper roll and internal take-up roller, resolution: 384 dots per line, 42 characters per line, printing speed: 480 lines per sec, text and graphic modes, IBM compatible Dimensions: 140 x 266 x 140 mm (W x H x D) Weight: approx. 2.7 kg Type of protection: IP65	■	■	■
TYPE-APPROVAL CERTIFICATE	Certified in accordance with OIML R51	■	■	■

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WS 1 kg VERSIONS
AA / TL Center-to-center distance (AA) / Load platform length (TL) [mm]

BB Belt width [mm]

- Circular belt or belt version
- Circular belt version
- Belt version

BB x AA / TL [mm]		
Metal detection belt	Weighing belt	Outfeed belt
150 x 800 / 830 ■	40 x 310 / 332 ■	150 x 300 / 330 ■
150 x 800 / 830 ■	80 x 310 / 332 ●	150 x 300 / 330 ■
150 x 800 / 830 ■	120 x 310 / 332 ●	150 x 300 / 330 ■
150 x 800 / 830 ■	160 x 310 / 332 ○	150 x 300 / 330 ■
Total length (GL) 1500 mm		

WS 2 / 5 / 7 kg VERSIONS
AA / TL Center-to-center distance (AA) / Load platform length (TL) [mm]
 for metal detection, weighing and outfeed belts

BB Belt width [mm]

GL Total length [mm]

- Belt version

BB	BB x AA / TL [mm]			GL
	Metal detection belt	Weighing belt	Outfeed belt	
150	800 ■	300	300	1500
	800	350	350	1600
		400	400	1700
		450	450	1900
	200	800	500	500
300			300	1500
350			350	1600
900		400	400	1700
		450	450	1900
300	800	500	500	2000
		350	350	1600
		400	400	1700
	900	450	450	1900
		500	500	2000

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TABLE

AA-MB	= Center-to-center distance metal detection belt [mm]	BB	= Belt width [mm]
AA-WB	= Center-to-center distance weighing belt [mm]	E	= Search coil aperture width [mm]
AA-AB	= Center-to-center distance outfeed belt [mm]	C	= Search coil aperture height [mm]
A	= Variable, see dimensional drawing [mm]	LH	= Internal height [mm]
B	= Variable, see dimensional drawing [mm]	F	= Variable, see dimensional drawing [mm]
		X1	= Variable, see dimensional drawing [mm]

AA-MB	AA-WB	AA-AB	A	B
800	300	300	1047	387
800	350	350	1072	412
800	400	400	1097	437
900	450	450	1222	562
900	500	500	1247	587

BB	E	C	LH	F	X1
150	225	90	50	692	420
150	225	125	85	692	420
150	225	150	110	692	420
200	275	90	50	742	435
200	275	125	85	742	435
200	275	150	110	742	435
300	375	90	50	842	495
300	375	125	85	842	495
300	375	150	110	842	495

