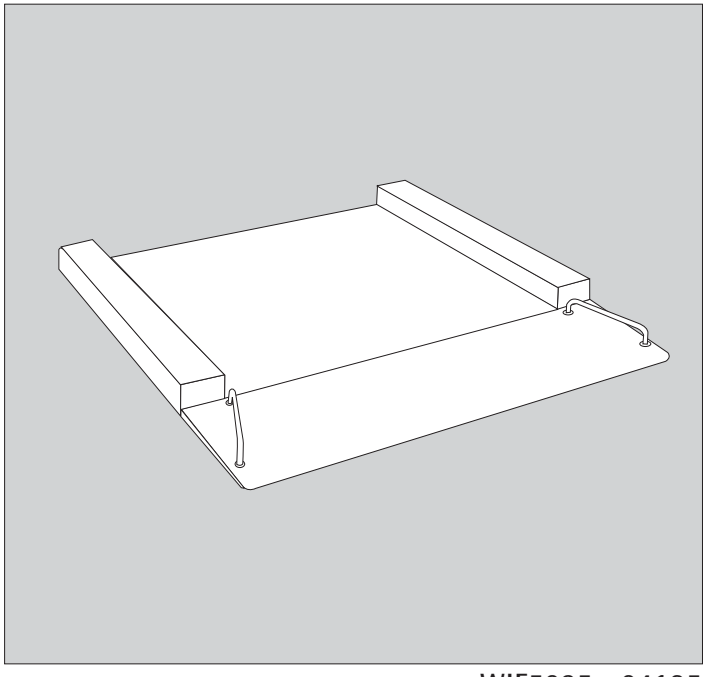
Service Manual

Sartorius Industry Series

Flat-bed Scales IF-Models
Electronic Precision Scales

Including Spare Parts List
and Service Specifications Sheets



WIF5035-e04125

Contents

General Information

Repairs

Important:

Prerequisites for working on Sartorius Industry Scales include considerable experience, completion of a Service Course at the main office in Goettingen, and the special tools and equipment described below. Please do not attempt or permit any unauthorized repair work!
If you remove the seal (warranty sticker), the scale is no longer covered under the warranty.

Overview of Flat-bed models

The models consist of a flat-bed scale with strain-gauge load cells, an analog/digital converter and an *isi* industrial terminal.

Models

IF600LIP-L0CE, IF600LIS-L0CE, IF600NLP-L0CE, IF600NLS-L0CE, IF600NNP-L0CE, IF600NNS-L0CE, IF600RNP-L0CE, IF600RNS-L0CE, IF1500NLP-L0CE, IF1500NLS-L0CE, IF1500NNP-L0CE, IF1500NNS-L0CE, IF1500RNP-L0CE, IF1500RNS-L0CE, IF1500RRP-L0CE, IF1500RRS-L0CE, IF1500WRP-L0CE, IF1500WRS-L0CE, IF3000NNP-L0CE, IF3000NNS-L0CE, IF3000RNP-L0CE, IF3000RNS-L0CE, IF3000RRP-L0CE, IF3000RRS-L0CE, IF3000WRP-L0CE, IF3000WRS-L0CE

Ordering special versions of the models ..

Note:

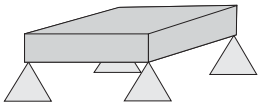
To order special versions, please add the ID code of the special version you need to the last letter of the order number for the standard model. For example, „P" stands for „electropolished," and „P4" for the AISI 316 TI stainless steel standard (German standard 1.4571) that is electropolished.

Ordering examples:

- The order number for a 600-kg flat-bed scale with the dimensions 1,250 x 1,250 mm and in the stainless steel version of AISI 304 (German std. 1.4301) is: IF600NNS-L0CE.
- The order number for a 600-kg flat-bed scale with the dimensions 1,250 x 1,250 mm and in the stainless steel version of AISI 304 (German std. 1.4301) with an electropolished finish is IF600NNS-L0CE**P.**
- The order number for a 600-kg flat-bed scale with the dimensions 1,250 x 1,250 mm and in the special-grade stainless steel (AISI 316 TI, German std. 1.4571) and with an electropolished finish is IF600NNS-L0CE**P4.**

Current model descriptions for IF weighing platforms

Example of the ordering code for a IF weighing Platform: **IFP4-1500RR-LCE** (Descriptions just like those of the combics series)

Platform	Material | Design	Number of load cells		Weighing Capacity (kg)	Platform size mm | order code		Resolution
IF	**P**	**4**	**-**		**RR**	**-**	**LCE**
	P = Painted steel S = Stainless steel XS= EX protected, Stainless steel	 Wäze01.eps		 Gew1500.jpg	 **RR = 1500x1500**		not verifiable: 15,000 d = L 30,000 d = I verifiable: 3.000 e = LCE 2x3.000 e = NCE

Auxiliary Service Tools and Equipment

For service and repair work on these scales you will require suitable tools and an appropriate workspace.
In addition to standard tools, you will need the following special tools:

PCS.	Designation	Order no.
1	Torque wrench (up to 120 Nm)	
1	Set of Allen wrenches	6739-94
1	Set of open-end wrenches	
1	Soldering equipment, including soldering iron	6737-95
1	Digital voltmeter, 4 ½ digits	6738-62
1	Snap-ring pliers	

Accompanying Literature

Spare Parts List for Flat-bed scales
Sartorius Tool List - Status 9/91
Sartorius Service Manual for the *isi* 10, 20, 30 Industrial Terminals
Sartorius Installation Instructions for the YCO01 IS-0CE A/D converter
Sartorius Installation and Operating Instructions for Flat-bed scales

Service Work on the Load Cell

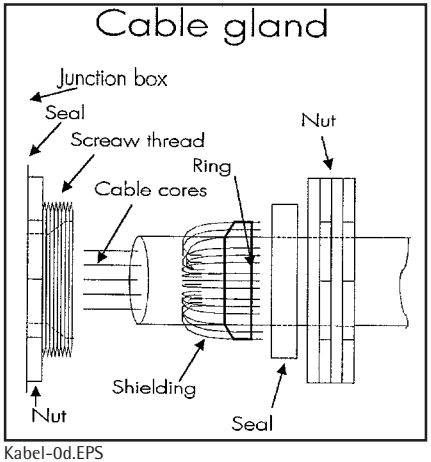
Important

The installation of the display and control unit and of the A/D converter on the scale must be performed by an authorized Sartorius service technician or a weighing equipment dealer trained by Sartorius.

Note:

- Disconnect the equipment from the power supply (unplug the AC adapter) before working on the equipment.
- Installation can only be performed using the special tools listed on page 3.
- Any work that may affect the IP65/68 protection rating must be performed with extreme care.
- If the installation is not performed in accordance with the relevant requirements as listed above, the equipment will not be covered under the warranty.

Initial verification of the weighing system as a whole for use in legal metrology can **only** be performed on equipment that has been released by Sartorius AG for verification and that has been **installed and put into operation** by a technician authorized by Sartorius AG.



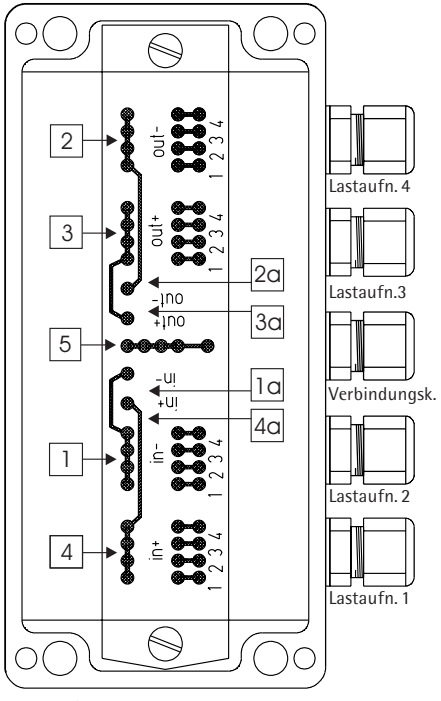
Kabel-0d.EPS

The 6-m connecting cable already installed (6) provides the necessary connection between the A/D converter and the junction box. After connecting the cable from the junction box to the terminal strip on the YCO01IS-0CE A/D converter, you have to connect the A/D converter to the *isi* industrial terminal and use the terminal to configure the A/D converter. See the installation instructions for the YCO01IS-0CE. For information on further settings, refer to the Sartorius Service Manual for the *isi* industrial terminals (publication number (WIS5011-e9504). Make sure that the grounding connection between the A/D converter and the weighing platform is intact (resistance < =1 ohm). The shield must be connected to the cable glands on the A/D converter and the junction box. The connecting cable shield must be connected to the cable glands on the A/D converter and the junction box (see illustration on the left).

The connecting cable shield is soldered to the PCB in the scale junction box. An additional grounding strap connects the cable gland to the junction box plate on the weighing platform frame.

Wiring Diagram

Connections in the Junction Box for the four Load Cells



Kabel3.EPS

Load cell 1

1	Black	Supply v. neg. (in–)
2	Red	Test signal neg. (out–)
3	White	Test signal pos. (out+)
4	Green	Supply v. pos. (in+)
5	Yellow	Shield

Load cell 2

1	Black	Supply v. neg. (in–)
2	Red	Test signal neg. (out–)
3	White	Test signal pos. (out+)
4	Green	Supply v. pos. (in+)
5	Yellow	Shield

Load cell 3

1	Black	Supply v. neg. (in–)
2	Red	Test signal neg. (out–)
3	White	Test signal pos. (out+)
4	Green	Supply v. pos. (in+)
5	Yellow	Shield

Load cell 4

1	Black	Supply v. neg. (in–)
2	Red	Test signal (neg. (out–)
3	White	Test signal pos. (out+)
4	Green	Supply v. pos. (in+)
5	Yellow	Shield

Connections from the Junction Box to the A/D Converter

Note: The power supply lines are twisted together with the shielding and soldered as required.

Junction Box			A/D Converter (*isi* Industrial Terminal)		
1a	Brown	Supply voltage negative (inV–)	1	White	Supply voltage positive
1a	Gray	Supply test voltage negative (in sense –)	2	Pink	Supply test voltage positive (sense+)
2a	Yellow	Test signal negative (out–)	3	Green	Test signal positive
3a	Green	Test signal positive (out+)	4	Yellow	Test signal negative
4a	White	Supply voltage positive (inV+)	5	Gray	Supply test voltage negative (sense–)
4a	Pink	Supply test voltage positive (in sense +)	6	Brown	Supply voltage negative
5		Shield	7		Shield

Calibration / Adjustment of the Flat-bed Scale

Preparation

Connect the scale to the YCO01IS-0CE A/D converter which is connected to the *isi* industrial terminal; then connect the scale to power supply
The weighing platform must be set up on a stable, even surface. Level the scale using the level indicator and allow it to warm up for at least 30 minutes.

Adjustment Sequence

Check and, if necessary, adjust the following factors when the scale is newly installed and after every maintenance or repair work:

1. Zero-point offset value
2. Off-center load
3. Span (to test the linearity)
4. Linearity
5. Then re-adjust span, if necessary

Zero-point Offset Value

Zero-point offset errors are displayed as follows on the *isi* industrial terminal:

- ERR 54/55 when the equipment is put into operation for the first time (or if the A/D converter is incorrectly connected).
- L/H after turning the equipment on (when the menu access switch is closed)

Adjustment of the Zero-point Offset Value

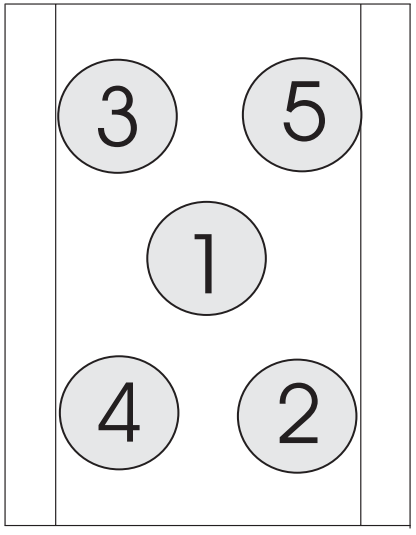
- The offset value cannot be adjusted on the scale at the place of installation (load cells are adjusted at the factory before delivery).

- Re-adjust the span
  (the menu access switch on the A/D converter is opened)

Note: **If the span cannot be adjusted, the defective load cell must be replaced.**

Off-center Load

Checking the Off-center Load



Eck3.EPS

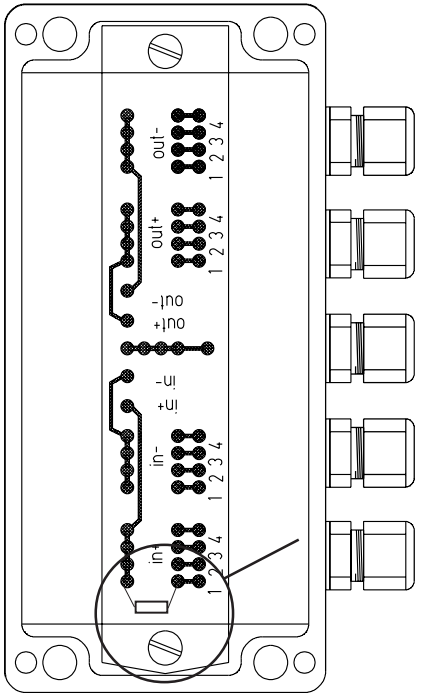
- **Connect the flat-bed scale to the *isi* industrial terminal and turn it on.**
- **Press the [→T1←] key on the terminal to tare the unloaded scale.**
- **Center the test weights on the weighing platform (position 1) and press the [→T1←] key on the terminal to tare the scale.**
- **Place the test weights on the positions 2, 3, 4 and 5 in sequence and read off the weight, with plus or minus sign, when the scale stabilizes**
- **Compare the error, if there is any, to the tolerance limits listed in the Service Specifications on page 20/21.**

Fine Adjustment of the Off-center Load

You can solder resistance values (< 1 ohm/total capacity: 50ppm) into the power supply lines in the junction box to perform fine adjustment of the off-center load.

Note:

To perform another fine adjustment, short-circuit present adjustment resistors in the junction box.
After having measured the off-center load error, adjust the three corners with the greatest errors to the corner with the smallest error. **Errors can only be adjusted within a few display digits.**



Eck2..EPS

- Turn the flat-bed scale over.
- Remove the 4 screws from the cover plate.
- Lift the cover plate with the junction box carefully out of the frame.
- Turn the scale to the upright position, again making sure that the cable to the junction box does not touch the frame (this affects repeatability).
- Open the junction box.
- Unsolder the power supply line from the load cell that is to be adjusted; re-solder it after adding the resistor in position 1 as shown in the illustration on the left.

- Check the off-center load after each adjustment, because the added resistor affects the output signal of the entire circuit.
- Follow the above instructions in reverse order to close the scale.

Span Adjustment

Adjust the Span

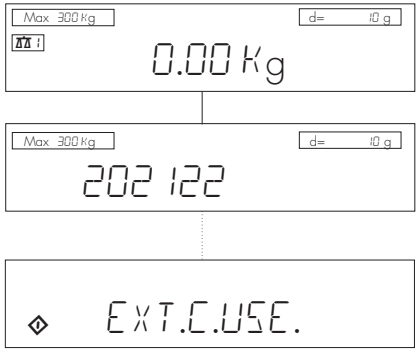
This section describes the procedure for external span adjustment using the *isi* industrial terminal.

Important:

The scale will only accept a weight that is within a tolerance range of approximately ±2% of the nominal weight. If the error is greater, the menu access switch on the A/D converter must be opened before adjustment can be performed (see the installation instructions for the YCO01-0CE).

Note:

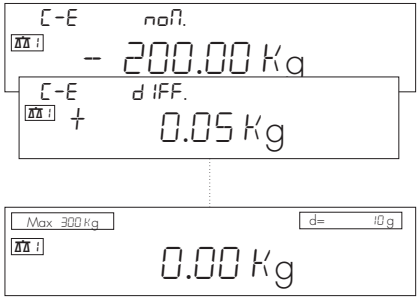
Before you can adjust the span with user weights, the weights must be entered in the system configuration (see the installation instructions for the YCO01-0CE).



Ex_cal10.EPS

- Connect the flat-bed scale to the *isi* terminal and turn it on.
- Unload the scale (clear the weighing platform); if the display does not show zero, press the [→0←] key on the terminal.
- Once 0.00 kg is displayed (depending on the A/D converter configuration), enter the service password ([2] [0] [2] [1] [2] [2]) and press [ISO TEST].
- The program jumps to the service menu.

- Use the arrow keys ([^][v]) to select the "External calibration (user weights)" menu item and press [↵].



Ex_cal11.EPS

- The calibration weight is displayed on the terminal (for example, 200 kg).
- Center the required weight on the weighing platform.
- The weight is stored automatically when the scale stabilizes and the difference between it and the last span adjustment is displayed. If this difference is outside the tolerance range indicated in the Service Specifications (see page 20), press [ISO TEST] to store the new adjustment. If an adjustment is not required (difference is within tolerance limits), press [CF] to cancel the adjustment routine.

- Remove the calibration weight and press the [→0←] key.

- This concludes the span adjustment procedure.

Important:

Following span adjustment, always close the menu access switch on the A/D converter and turn off/on the *isi* industrial terminal.

Linearization

Checking the Linearity

- You have to adjust the span before checking the linearity.
- Check the linearity for the entire weighing range under 1/4, 1/2, 3/4 and maximum load conditions.
- Compare the values displayed with the tolerance ranges listed in the Service Specifications (see page 20).
- If the error exceeds the tolerance limits, you need to adjust the linearity.

Adjusting the Linearity with an *isi* Industrial Terminal

Important:

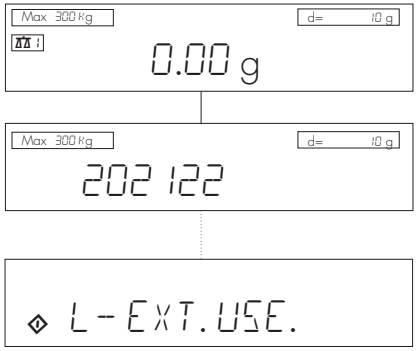
The scale will only accept a weight that is within a tolerance range of approximately ±2% of the nominal weight. If the error is greater, the menu access switch on the A/D converter must be opened before adjustment can be performed (see the installation instructions for the YCO01-0CE)

Note:

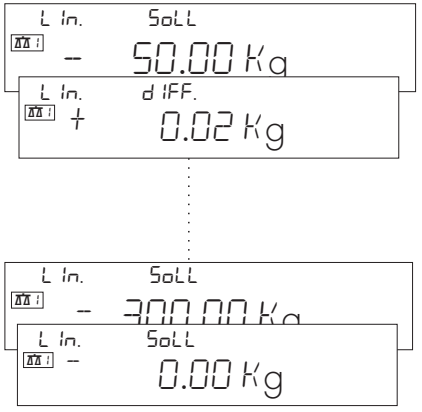
Before you can adjust the linearity with user weights, the weights must be entered in the system configuration (see the installation instructions for the YCO01-0CE).

- Turn on the industrial terminal to power up the scale.

- Once 0.00 kg is displayed (depending on the A/D converter configuration), enter the service password (2 0 2 1 2 2) and press ISO TEST.



Ex_lin10.EPS



Ex_lin11.EPS

- The program jumps to the service menu.

- Use the arrow keys ([^][v]) to select the "External linearization (user weights)" menu item and press [↵].

- The first linearization weight is prompted.
- Center the displayed weight on the weighing platform.

- The difference between this and the last linearization weight for this position is displayed.
- Press [ISO TEST] to store the first linearization weight; the next linearization weight is displayed.

- Each linearization weight is prompted in sequence and then stored by pressing [ISO TEST].

- The zero point is checked last, with the scale unloaded.
  This concludes the linearization procedure.

Note: After adjusting the linearity, it must be checked again for the entire weighing range. If necessory adjuot the span again.

Important: Following linearization, always close the menu access switch on the A/D converter and turn off/on the *isi* industrial terminal.

Replacing the Load Cell

- Disconnect the *isi* industrial terminal from the power supply.
- Turn the scale over, remove the cover plate and carefully lift it, together with the junction box, out of the frame.
- Unsolder the individual wires of the load cell cable from the terminal strip; loosen the cable gland and pull it carefully out of the junction box, together with the load cell cable.
- Remove the two M12 screws and take out the load cell.
- Remove the defective load cell from the weighing platform.
- Install the new load cell in the same position.

Note:

Make sure that the surfaces of the load cell and the pallet frame are clean and free of foreign objects (clean if necessory).

- Guide the connecting cable through the tube.
- Tighten the 2 load cell screws to 90 Nm.
- Thread the cable through the cable gland in the junction box.
- Use wire ties to secure the load cell cable.

Important:

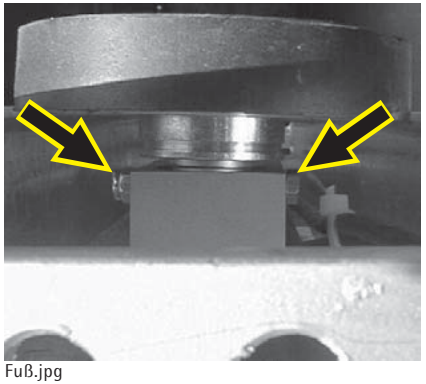
Do not shorten the load cell cable!

- Connect the individual wires of the connecting cable to the PCB (junction box) according to the wiring diagram (see page 5).
- Tighten the cable gland and close the junction box.

Note:

After replacing the load cell:

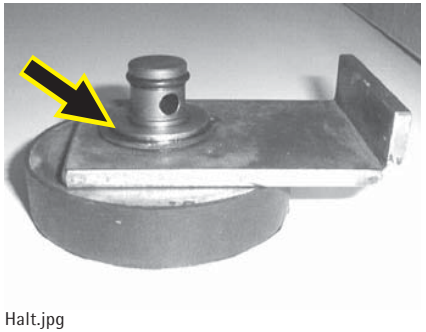
- Check the off-center load and adjust if necessary.
- Adjust the span.
- Adjust the linearity.
- Re-adjust the span if necessary.



Fuß.jpg

Replacing the Load-bearing Foot

- Turn the flat-bed scale over.
- Remove the load cell.
- Remove the fastening screw (see illustration) and replace the foot.
- Tighten the 2 screws on the load cell to 90 Nm.



Halt.jpg

Removing the Drive-on Ramp Brace

- Remove the load-bearing foot
- Remove the snap ring
- Remove the brace

Service Specifications

Model	Weighing capacity	Readability	Reproducility		Off-center load		Span accuracy				Linearity			TCS
			Test weight	Permissible tolerances	Test weight	Permissible tolerance (±)	Class	Adjustm. weight	Test weight	Permissible tolerance (±)	Tare-weight	Test-weight	Permissible tolerance (±)	ppm/K
IF600LIP-L0CE[1)] IF600LIS-L0CE[1)] IF600NLP-L0CE[1)] IF600NLS-L0CE[1)] IF600NNP-L0CE[1)] IF600NNS-L0CE[1)] IF600RNP-L0CE[1)] IF600RNS-L0CE[1)]	600 kg	20 g	200 kg	60 g	200 kg	200 g	M1	200 kg	500 kg	200 g	---	150/ 300/ 450/ 600 kg	200 g	10
IF1500LIP-L0CE[1)] IF1500LIS-L0CE[1)] IF1500NLP-L0CE[1)] IF1500NLS-L0CE[1)] IF1500NNP-L0CE[1)] IF1500NNS-L0CE[1)] IF1500RNP-L0CE[1)] IF1500RNS-L0CE[1)]	1500 kg	50 g	300 kg	150 g	500 kg	500 g	M1	500 kg	1500 kg	500 g	---	300/ 700/ 1100/ 1500 kg	500 g	10
IF3000LIP-L0CE[1)] IF3000LIS-L0CE[1)] IF3000NLP-L0CE[1)] IF3000NLS-L0CE[1)] IF3000NNP-L0CE[1)] IF3000NNS-L0CE[1)] IF3000RNP-L0CE[1)] IF3000RNS-L0CE[1)]	3000 kg	100 g	600 kg	300 g	1000 kg	1000 g	M1	1000 kg	3000 kg	1000 g	---	700/ 1500/ 2200/ 3000 kg	1000 g	10

TOL_IF_E.XLS

[1)] be applicable also to special model ...P/P4

These metrological tolerances only apply to use of the weighing equipment in standard applications not subject to the requirements of legal metrology.

When the weighing equipment, scale or balance is used as a legal measuring instrument, the maximum permissible errors on verification must not be exceeded according to the European Standard EN 45501.

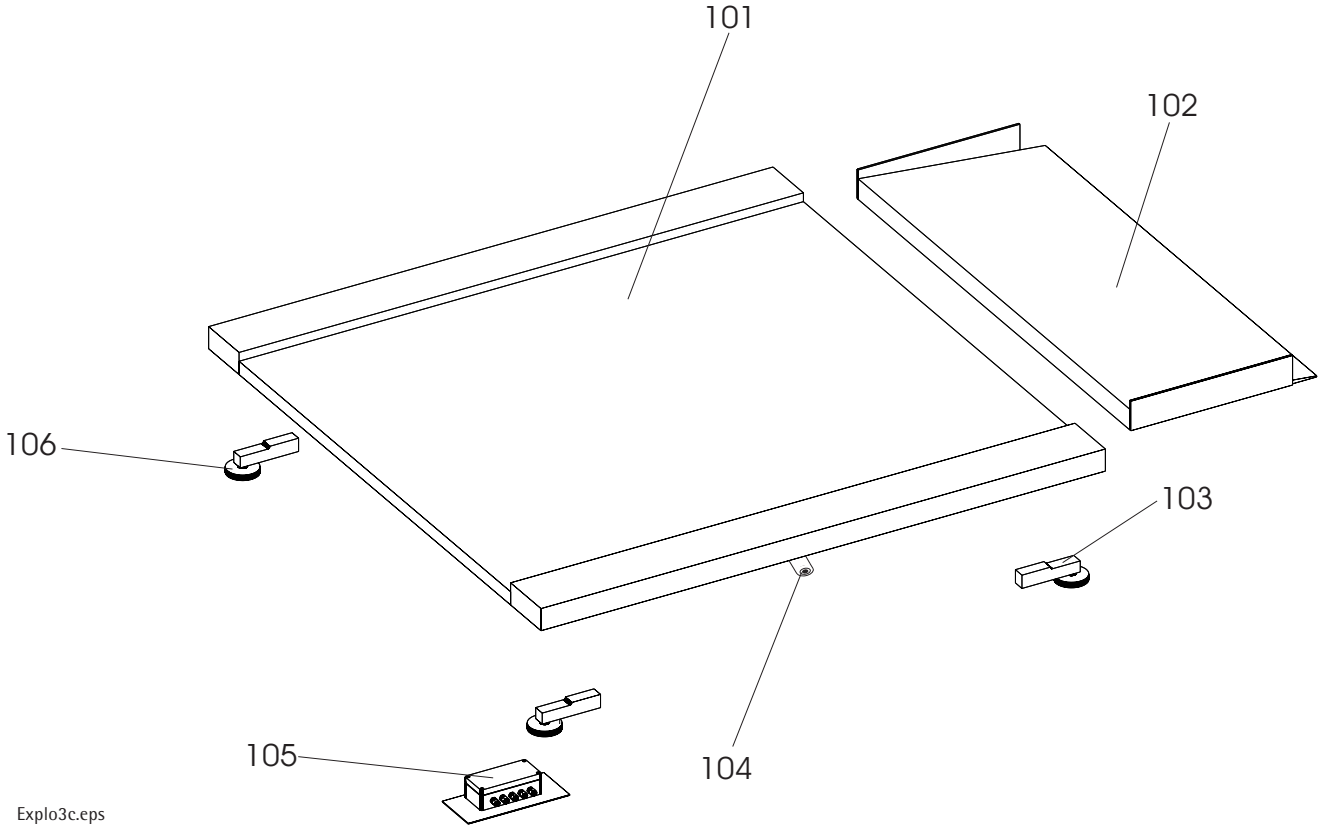
Service Specification for FIP4....

Model	Weighing capacity	Readability	Reproducility		Off-center load		Span accuracy				Linearity			TCS
			Test weight	Permissible tolerances	Test weight	Permissible tolerance (±)	Class	Adjustm. weight	Test weight	Permissible tolerance (±)	Tare-weight	Test-weight	Permissible tolerance (±)	ppm/K
IFP4-150..-LCE	150 kg	20 g	200 kg	60 g	200 kg	200 g	M1	200 kg	500 kg	200 g	--- *(50)* kg	150/ 300/ 450 600 kg	200 g	10
IFP4-300..-LCE	300 kg	20 g	50 kg	60 g	100 kg	0,1 kg	M1	100 kg	300 kg	0,2 kg	--- *(100)* kg	70/ 150/ 220/ 300 kg	100 g	10
IFP4-600..-LCE	600 kg	20 g	200 kg	60 g	200 kg	200 g	M1	200 kg	500 kg	200 g	--- *(200)* kg	150/ 300/ 450/ 600 kg	200 g	10
IFP4-1000..-LCE	1000 kg	50 g	500 kg	100 g	500 kg	500 g	M1	500 kg	1000 kg	500 g	--- *(200)* kg	100/ 500/ 700/ 1000 kg	500 g	10
IFP4-1500..-LCE	1500 kg	50 g	300 kg	150 g	500 kg	500 g	M1	500 kg	1500 kg	500 g	--- *(500)* kg	300/ 700/ 1100/ 1500 kg	500 g	10
IFP4-3000..-LCE	3000 kg	100 g	600 kg	300 g	1000 kg	1000 g	M1	1000 kg	3000 kg	1000 g	--- *(1000)* kg	700/ 1500/ 2200/ 3000 kg	1000 g	10

TOL_IF_E.XLS

Note: These metrological tolerances only apply to use of the weighing equipment in standard applications not subject to the requirements of legal metrology.
When the weighing equipment, scale or balance is used as a legal measuring instrument, the maximum permissible errors on verification must not be exceeded according to the European Standard EN 45501.

Exploded-view drawing



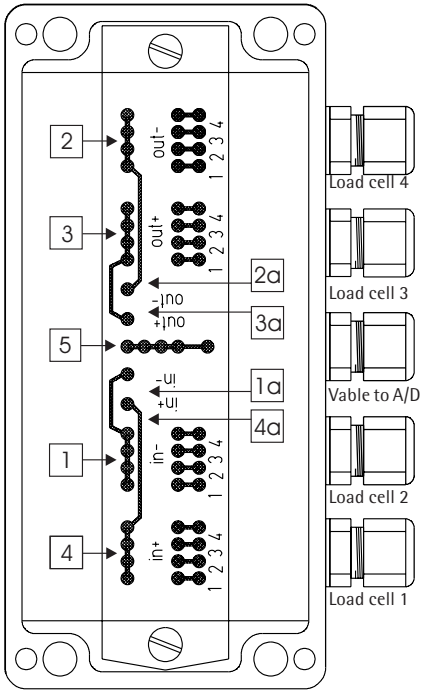
Explo3c.eps

Spare parts list for flat-bed scales

Index	Bezeichnung	Description	Sartorius Ersatzteil-Nr.	IF600LIP-L0CE [1]	IF600NLP-L0CE [1]	IF600NNP-L0CE [1]	IF600RNP-L0CE [1]	IF600LIS-L0CE [1]	IF600NLS-L0CE [1]	IF600NNS-L0CE [1]	IF600RNS-L0CE [1]	IF1500NLP-L0CE [1]	IF1500NNP-L0CE [1]	IF1500RNP-L0CE [1]	IF1500RRP-L0CE [1]	IF1500WRP-L0CE [1]	IF1500NLS-L0CE [1]	IF1500NNS-L0CE [1]	IF1500RNS-L0CE [1]	IF1500RRS-L0CE [1]	IF1500WRS-L0CE [1]	IF3000NNP-L0CE [1]	IF3000RNP-L0CE [1]	IF3000RRP-L0CE [1]	IF3000WRP-L0CE [1]	IF3000NNS-L0CE [1]	IF3000RNS-L0CE [1]	IF3000RRS-L0CE [1]	IF3000WRS-L0CE
100	Explosions Zeichnung	Drawing	69Z00024																										
103	Wägezelle	Load cell	69IF0010						4																				
103	Wägezelle	Load cell	69IF0011															4											
103	Wägezelle	Load cell	69IF0012																										4
103	Wägezelle	Load cell	69IF0015	4																									
103	Wägezelle	Load cell	69IF0016										4																
103	Wägezelle	Load cell	69IF0017																				4						
104	Libelle ohne Halter	Spirit level	69IF0018	1					1				1					1					1					1	
105	Kabelkasten	Junction box	69IF0001	1					1				1					1					1					1	
106	Lastfuß	Foot	69IF0003	4									4										4						
106	Lastfuß	Foot	69IF0004						4									4										4	
151	Lötplatine	Connection PCB	69IF0006	1					1				1					1					1					1	
152	Messkabel (6m)	Cable	69IF0007	1					1				1					1					1					1	
153	PG-Verschraubung winkelig	Screwed connector angular	69IF0008	1					1				1					1					1					1	
Hinweis	Einige Index-Nummern sind lediglich in der Zeichnung, aber nicht in der											[1] gilt auch für Sondermodell ...P/P4																
	Liste aufgeführt. Diese Positionen sind nicht als Ersatzteil vorgesehen!																												
Note	A number of parts are not carried as spare parts and consequently do											[1] be applicable also to special model ...P/P4																
	not appear in the spare parts lists!																												

Dur_a.xls

Wiring Diagram the IUXS.. or IFXS..



Kabel3.EPS

Connections in the Junction Box for the Load Cells 1-4

Pin assignment	Designation	1. Version	2. Vers.[1]	3. Vers.[2]
4 Supply v. pos. (in+)	(V +)	green	red	blue
1 Supply v. neg. (in-)	(V -)	black	blue	black
3 Test signal pos. (out+)	Signal +	white	green	white
2 Test signal neg. (out-)	Signal -	red	gray	red
	Sense +		white	green
	Sense -		schwarz	gray
5 Shield	GND	yellow	(Shield)	(Shield)

1) Sartorius Hamburg MP58T, green Cable 2) Combics (011...), gray Cable

Connections in the Junction Box for the A/D Converter

Pin assignment	Designation	1. Version		2. Vers.[1]
4 Supply v. pos. (in+)	(V +)	white		red
1 Supply v. neg. (in-)	(V -)	brown		blue
3 Test signal pos. (out+)	Signal +	green		green
2 Test signal neg. (out-)	Signal -	yellow		gray
6 Shield wire +	Sense +	pink		white
7 Shield wire -	Sense -	gray		black
5 Shield	GND			(Shield)

1) Sartorius Hamburg MP58T, grünes Cable

Load Cell connection (color plate)

	Bridges supply voltage		Test voltage			
Load cell manufacturer	+Exc/ +Supply/ +Input	-Exc/ -Supply/ -Input	+Signal/ +Output	-Signal/ -Output	+Sense	-Sense
Sartorius Hamburg						
(z.B.: MP58T/...)	**red**	**blue**	**green**	**grey**	**white**	**black**
Combics (011...)	**blue**	**black**	**white**	**red**	**green**	**grey**
Load cell from						
Flintec	**green**	**black**	**white**	**red**		
Cable construction:						
Sartorius Hamburg (GWT)	d 5mm, 6 wires, **green**, screen grounded					
Combics	d 5mm, 6 wires, **grey**, screen grounded					

GWT HBM_12.08.04.xls

Sartorius AG

Weender Landstraße 94–108
37075 Goettingen, Germany
Telefon (0551) 308-4440
Fax (0551) 308-4449
Internet: http://www.sartorius.com
E-mail: Int.Service@Sartorius.com

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