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EC Type Examination Certificate

No. DK 0199.556

ECI

AUTOMATIC GRAVIMETRIC FILLING INSTRUMENT

Issued by **DELTA Danish Electronics, Light & Acoustics**
EU - Notified Body No. 0199

In accordance with the requirements for the automatic weighing instruments in Directive 2004/22/EC of the European Parliament and Council of March 31, 2004 on Measuring Instruments (MID).

Issued to ESiT Elektronik Sistemler Imalat ve Ticaret Ltd. Sti.
Nişantepe Mah. Gelinçiçeği Sok. No.36
Çekmeköy, 34794 İstanbul
TURKEY

In respect of An automatic gravimetric filling instrument designated **ECI** with variants of modules of load receptors, load cells and peripheral equipment.
Reference class 0.2
Maximum capacity, n × d
Verification scale interval: $d \geq 1$ g
Number of verification scale intervals: $n \leq 6000$ for single-interval
(however, dependent on environment and the composition of the modules)
Variants of modules and conditions for the composition of the modules are set out in the annex.

The conformity with the essential requirements in Directive 2004/22/EC Annex 1 and the specific requirements in Annex MI-006, chapter I & III are met by the application of OIML R61-1:2004, OIML D11:2004 section 12 & 13 applying severity level 3, WELMEC Guide 7.2, and WELMEC Guide 8.16-2:2014.

The principal characteristics and approval conditions are set out in the descriptive annex to this certificate.

The annex comprises 18 pages.

Issued on **2015-10-26**
Valid until **2025-10-26**

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Descriptive annex

Contents

1. Name and type of instrument and modules

The automatic weighing instrument designated ECI automatic gravimetric filling instrument is consisting of the electronic weighing controller ECI connected to a separate load receptor and peripheral equipment such as printers or other devices, as appropriate.

The instrument is a self-indicating filling instrument with single-interval.

The modules appear from Sections 3.2, 3.3, and 3.4; the principle of the composition of the modules is set out in Sections 6.1 and 10.

2. Description of the construction and function

2.1 Construction

2.1.1 ECI weighing controller

The weighing controller of the ECI automatic gravimetric filling instrument is Esit's weighing controller type ECI.

Enclosures and keyboard
The enclosure of ECI is made of plastic. It is 149 mm wide x 84 mm high x 73 mm deep and is designed to mount in a flat panel.
ECI has 5 keys and the symbols of these are shown in the lower part of the display.

The rear panel of ECI contains all cable connectors.

Display
ECI has a 4.5 inch graphic LCD display (101×33 pixels) used for display of weight, indicators, key symbols, error messages, and setup information.

Electronics
The weighing controller consists of a mainboard and 2 to 6 insertion modules.
The mainboard contains microprocessor control circuitry, keyboard, display and non-volatile memory for program, set-up and calibration parameters.
The module in slot 1 contains power supply, RS232 communication and isolated remote display communication.
The module in slot 2 contains the analogue to digital load cell interface and an USB connection.
Slot 3 to 6 may contains optional I/O interfaces.

The module is specified in Section 3.2.

2.1.2 Load cells

Set out in Section 3.3.

2.1.3 Load receptor

Set out in Section 3.4.

2.1.4 Interfaces and peripheral equipment

Set out in Section 4.

2.2 Functions

The main functions are described below.

2.2.1 Functions and devices

The automatic weighing instrument has the following permitted functions and devices that are subject to the Measuring Instrument Directive:

- Power up test
- Initial zero setting device (max. 20 % of Max)
- Semiautomatic zero setting device (max 4 % of Max)
- Zero tracking device (max 4 % of Max)
- Automatic zero setting device (max 4 % of Max)
- No motion detection and indication
- Automatic tare device
- Coarse filling device
- Fine filling device
- Stop mode (for check and verification purpose)
- Detection of significant fault

2.2.2 Software version

The software version of the ECI weighing controller is displayed at start-up.
The approved software version is 1.4.x

3. Technical data

The automatic weighing instruments and its modules are set out as follows:

3.1 ECI Automatic gravimetric filling instrument

Type:	ECI automatic gravimetric filling instrument
Models:	BF / BFB / BFE / BFT / BBF / VBF
Weighing controller:	ECI
Reference class:	0.2
Accuracy class:	0.2 or 0.5 or 1 or 2
Maximum capacity (Max):	n × d
Maximum Fill (MaxFill):	≤ Max
Minimum Fill (MinFill):	See tables below
Minimum capacity (Min):	= Minfill
Verification scale interval (d):	≥ 1 g
Filling speed:	up to 20 fills/min
Weighing range:	Single-interval
Number of Verification Scale Intervals (n):	≤ 6000
Loads per fill:	1
Maximum tare effect:	≤ 100 % of Max
Temperature range:	-10 °C to 40 °C
Weighing mode:	static
Electromagnetic class:	E2
Humidity:	Non-condensing
Maximum time between automatic zero-setting:	See tables below
Extra warm-up time:	See tables below

MinFill's dependency of accuracy class, d in g and d in µV.

MinFill for:

verification scale interval (d): $1.0 \leq d < 1.6$ µV
extra warm-up time: ≥ 4 minutes
maximum time between auto-zero: ≤ 100 minutes

d	Accuracy class							
	X(0.2)		X(0.5)		X(1)		X(2)	
[g]	d	[kg]	d	[kg]	d	[kg]	d	[kg]
1	178	0.178	36	0.036	18	0.018	9	0.009
2	534	1.068	72	0.144	18	0.036	9	0.018
5	534	2.670	214	1.070	36	0.180	9	0.045
10	534	5.34	214	2.14	107	1.07	18	0.18
20	800	16.00	214	4.28	107	2.14	54	1.08
50	800	40.00	320	16.00	107	5.35	54	2.70
100	800	80.0	320	32.0	160	16.0	54	5.4
≥ 200	800		320		160		80	

MinFill for:

verification scale interval (d): $1.0 \leq d < 1.6$ µV
extra warm-up time: None
maximum time between auto-zero: ≤ 120 minutes

d	Accuracy class							
	X(0.2)		X(0.5)		X(1)		X(2)	
[g]	d	[kg]	d	[kg]	d	[kg]	d	[kg]
1	1598	1.598	320	0.320	107	0.107	27	0.027
2	1598	3.196	639	1.278	160	0.320	54	0.108
5	1598	7.990	639	3.195	320	1.600	80	0.400
10	2396	23.96	639	6.39	320	3.20	160	1.60
20	2396	47.92	959	19.18	320	6.40	160	3.20
50	2396	119.80	959	47.95	479	23.95	160	8.00
100	2396	239.6	959	95.9	479	47.9	240	24.0
≥ 200	2396		959		479		240	

MinFill for:

verification scale interval (d): $d \geq 1.6$ µV
extra warm-up time: ≥ 4 minutes
maximum time between auto-zero: ≤ 100 minutes

d	Accuracy class							
	X(0.2)		X(0.5)		X(1)		X(2)	
[g]	d	[kg]	d	[kg]	d	[kg]	d	[kg]
1	112	0.112	23	0.023	12	0.012	6	0.006
2	167	0.334	23	0.046	12	0.024	6	0.012
5	334	1.670	67	0.335	23	0.115	6	0.030
10	334	3.34	134	1.34	34	0.34	12	0.12
20	334	6.68	134	2.68	67	1.34	17	0.34
50	500	25.00	134	6.70	67	3.35	34	1.70
100	500	50.0	200	20.0	67	6.7	34	3.4
≥ 200	500		200		100		34	

MinFill for:

verification scale interval (d): $d \geq 1.6$ µV
extra warm-up time: None
maximum time between auto-zero: ≤ 120 minutes

d	Accuracy class							
	X(0.2)		X(0.5)		X(1)		X(2)	
[g]	d	[kg]	d	[kg]	d	[kg]	d	[kg]
1	500	0.500	134	0.134	34	0.034	17	0.017
2	999	1.998	200	0.400	67	0.134	17	0.034
5	999	4.995	400	2.000	100	0.500	34	0.170
10	999	9.99	400	4.00	200	2.00	50	0.50
20	1498	29.96	400	8.00	200	4.00	100	2.00
50	1498	74.90	999	29.95	200	10.00	100	5.00
100	1498	149.8	999	59.9	300	30.0	100	10.0
≥ 200	1498		599		300		150	

3.2 Weighing controller

The weighing controller has the following characteristics:

Type:	ECI
Accuracy class:	III
Weighing range:	Single interval
Maximum number of Verification Scale intervals:	10 000
Maximum subtractive tare effect:	-Max, within display limits
Fractional factor:	p'i = 0.5
Minimum input voltage per VSI:	1.0 µV
Minimum input voltage:	0 mV
Excitation voltage:	10 VDC
Analogue range:	±100 mV
Circuit for remote sense:	Active
Minimum input impedance:	35 ohm
Maximum input impedance:	1100 ohm
Internal resolution:	> 8 000 000 counts
Operating temperature range:	-10 °C to +40 °C
Mains power supply:	12 - 24 VDC
Peripheral interface:	Set out in Section 4

3.2.1 Connecting cable between the weighing controller and a junction box for load cell(s), if any

3.2.1.1 4-wire system

Cable between Weighing controller and load cell(s):	4 wires (no sense), shielded
Cable length:	The certified length of the load cell cable.

3.2.1.2 6-wire system

Cable between Weighing controller and load cell(s):	6 wires (sense), shielded

Maximum cable length between weighing controller and junction box (J-box) for load cell(s), if any:

- Option 1: 420 m/mm2

In case the (n) for the weighing instrument is less than (n) mentioned above, the following apply:

- Option 2:

Coefficient of temperature of the span error of the weighing controller: Es = 0.0005 [% / 25K]
Coefficient of resistance for the wires in the J-box cable: Sx = 0.0049 [% / ohm]

L/Amax = 295.86 / Sx * (emp / n - Es) [m / mm^2] in which emp = p'I * mpe * 100 / e

From this, the maximum cable length for the weighing instrument may be calculated with regard to (n) for the actual configuration of the instrument.

Reference: See Section 10.

The calculation program is obtainable by downloading at www.delta.dk/weighing.

3.3 Load cells

3.3.1 General acceptance of load cells

Any load cell(s) may be used for instruments under this certificate of type approval provided the following conditions are met:

1) A test certificate (EN 45501) or a respective OIML Certificate of Conformity (R60) is issued for the load cell by a Notified Body responsible for type examination under the Directive 2009/23/EC.

2) The certificate contains the load cell types and the necessary load cell data required for the manufacturer's declaration of compatibility of modules (WELMEC 2, Issue 6, 2014), and any particular installation requirements). A load cell marked NH is allowed only if humidity testing to EN 45501 has been conducted on this load cell.

3) The compatibility of load cells and indicator is established by the manufacturer by means of the compatibility of modules form, contained in the above WELMEC 2 document, or the like, at the time of EC verification or declaration of EC conformity of type.

4) The load transmission must conform to one of the examples shown in the WELMEC 2.4 Guide for load cells.

3.4 Load receptors

Movable platforms shall be equipped with level indicators.

3.4.1 Bin, tank, and hopper load receptors

Construction in brief:	Load cell assemblies each consisting of a load cell stand assembly to support one of the mounting feet or suspension points of bin, tank or hopper.
Reduction ratio:	1
Junction box:	Mounted in, on or near the dead load.
Load cell:	Any R60 certified load cell according to Section 3.2.1.
Drawings:	Various.

3.4.2 Bag load receptors

Construction in brief:	Load cell assemblies each consisting of a load cell stand assembly to support one of the suspension points of the bag to be filled.
Reduction ratio:	1
Junction box:	Mounted in, on or near the dead load.
Load cell:	Any R60 certified load cell according to Section 3.2.1.
Drawings:	Various.

3.5 Composition of modules

In case of composition of modules, EN 45501 paragraph 3.5 and 4.12 shall be satisfied.

3.6 Documents

The documents filed at DELTA (reference No. T209554) are valid for the weighing instruments described here.

4. Interfaces and peripheral equipment

4.1 Interfaces

One or more of the following interfaces may be incorporated. The interfaces are protective interfaces within the meaning of 2004/22/EC annex I, sect. 8.1 and need not to be secured.

The weighing controller may be equipped with one or more of the following protective interfaces located on the main board or on separate interface boards.

- RS-232C
- RS-485 / RS-422
- USB
- Modbus (optional)
- Profibus (optional)
- Ethernet IP (optional)
- Analogue Output (optional)
- Digital I/O (optional)

4.2 Peripheral equipment

Connection between the weighing controller and peripheral equipment shall be done by screened cables.

The instrument may be connected to any simple peripheral device with a CE mark of conformity.

5. Approval conditions

5.1 Compatibility of modules

Composition of modules, EN 45501:2015, annex F shall be satisfied.

6. Special conditions for verification

6.1 Composition of modules

The environmental conditions should be taken into consideration by the composition of modules for a complete weighing instrument, for example instruments with load receptors placed outdoors and having no special protection against the weather.

The composition of modules shall agree with Section 5.2.

An example of a declaration of conformity document is shown in Section 10.

The calculation program is obtainable by downloading at www.delta.dk/weighing.

7. Securing and location of seals and verification marks

7.1 Securing and sealing

Seals shall bear the verification mark of a notified body according to ANNEX F of the Directive 2004/22/EC or alternative mark of the manufacturer according to ANNEX D of the Directive 2004/22/EC.

7.1.1 Weighing controller

Access to the configuration and calibration facilities is achieved by sealing the access to calibration switch with a sticker.

Sealing of the enclosure - to secure the electronics against dismantling/adjustment - is accomplished with a brittle plastic sticker across the assembly of the enclosure.

7.1.2 Weighing controller - load cell connector - load receptor

Securing of the load cell connector with the weighing controller is done by means of a brittle sticker.

7.1.3 Junction box for load cells

The junction box, if any, is sealed by means of brittle stickers or lead seals.

7.1.4 Peripheral interfaces

All peripheral interfaces are "protective"; they neither allow manipulation with weighing data or Legal Setup, nor change of the performance of the weighing instrument in any way, which would alter the legality of the weighing.

7.2 Verification marks

A metrological M-sticker and a sticker with verification mark are to be placed on the identification plate of the instrument.

8. Location of CE mark of conformity and inscriptions

8.1 Identification plate

All inscriptions for the instrument shall be placed on the identification plate, which is located on the display module.

8.1.1 CE mark and metrological M

A CE mark of conformity grouped together with space for the metrological M and year of production shall be located on the identification plate.

8.1.2 Inscriptions

The identification plate shall bear the following inscriptions:

- Manufacturer's trademark and / or name
- Type designation
- Serial number
- Accuracy class
- Max, Minfill and d (these shall additional be duplicated near the display unless the description plate is located near the display)
- Temperature range: -10 °C / +40 °C
- Electromagnetic class: E2
- Humidity: Non-condensing
- Maximum filling speed
- Type examination certificate number

9. Pictures

Figure 1. Control box for ECI automatic gravimetric filling instrument model BF with panel mounted ECI weighing controller.

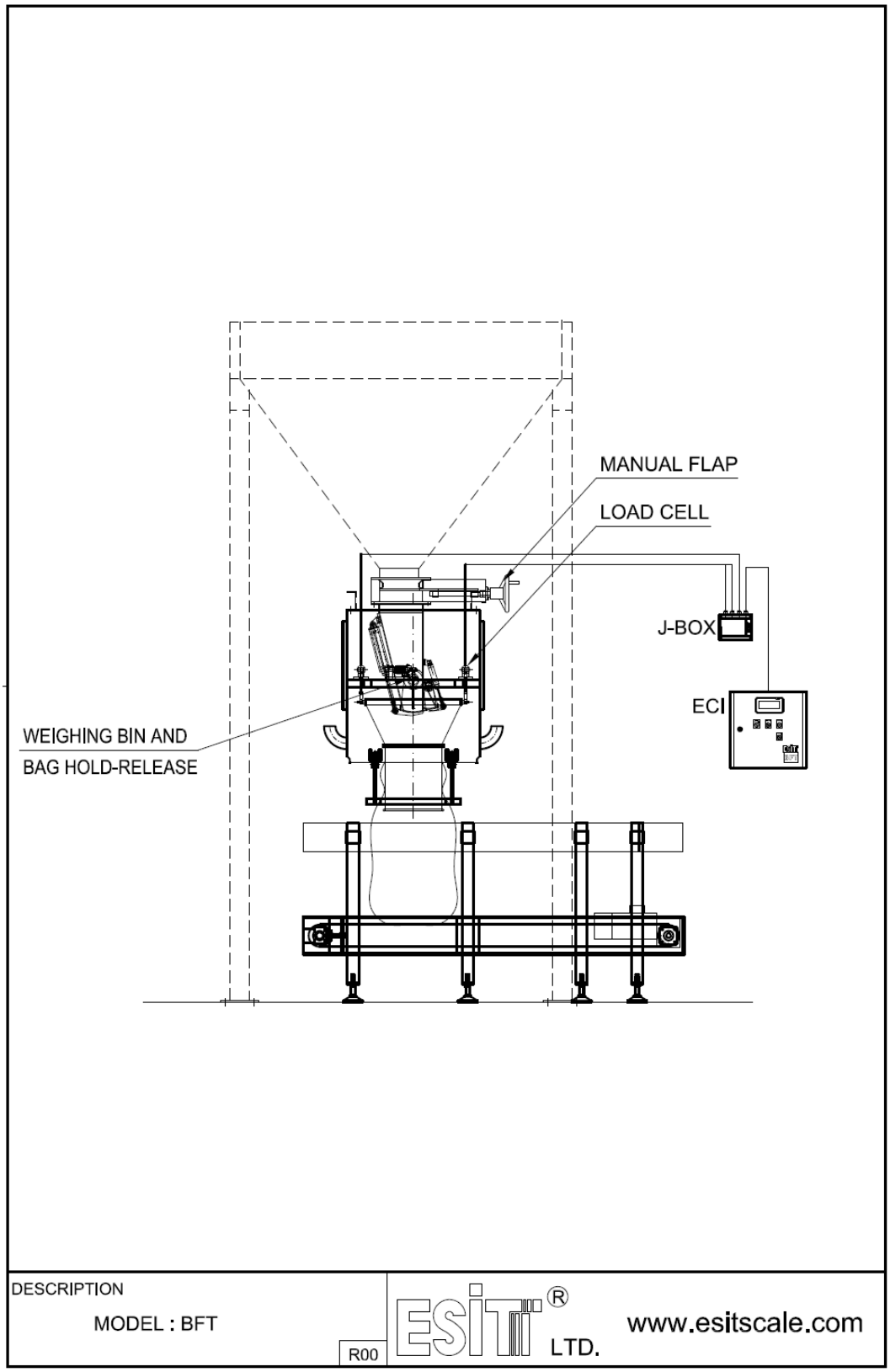

Figure 2. ECI automatic gravimetric filling instrument model BFT.

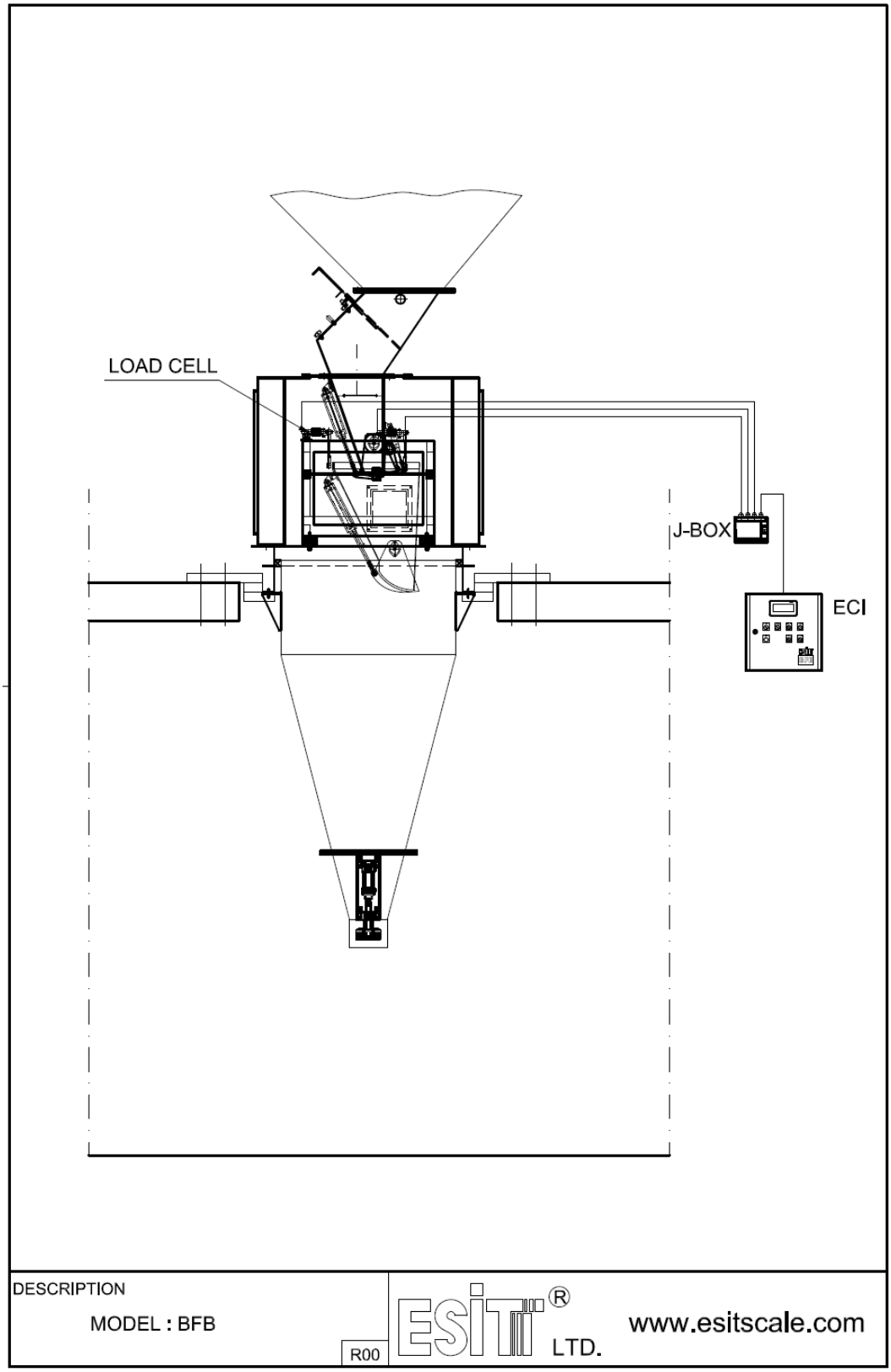

Figure 3. ECI automatic gravimetric filling instrument model BFB.

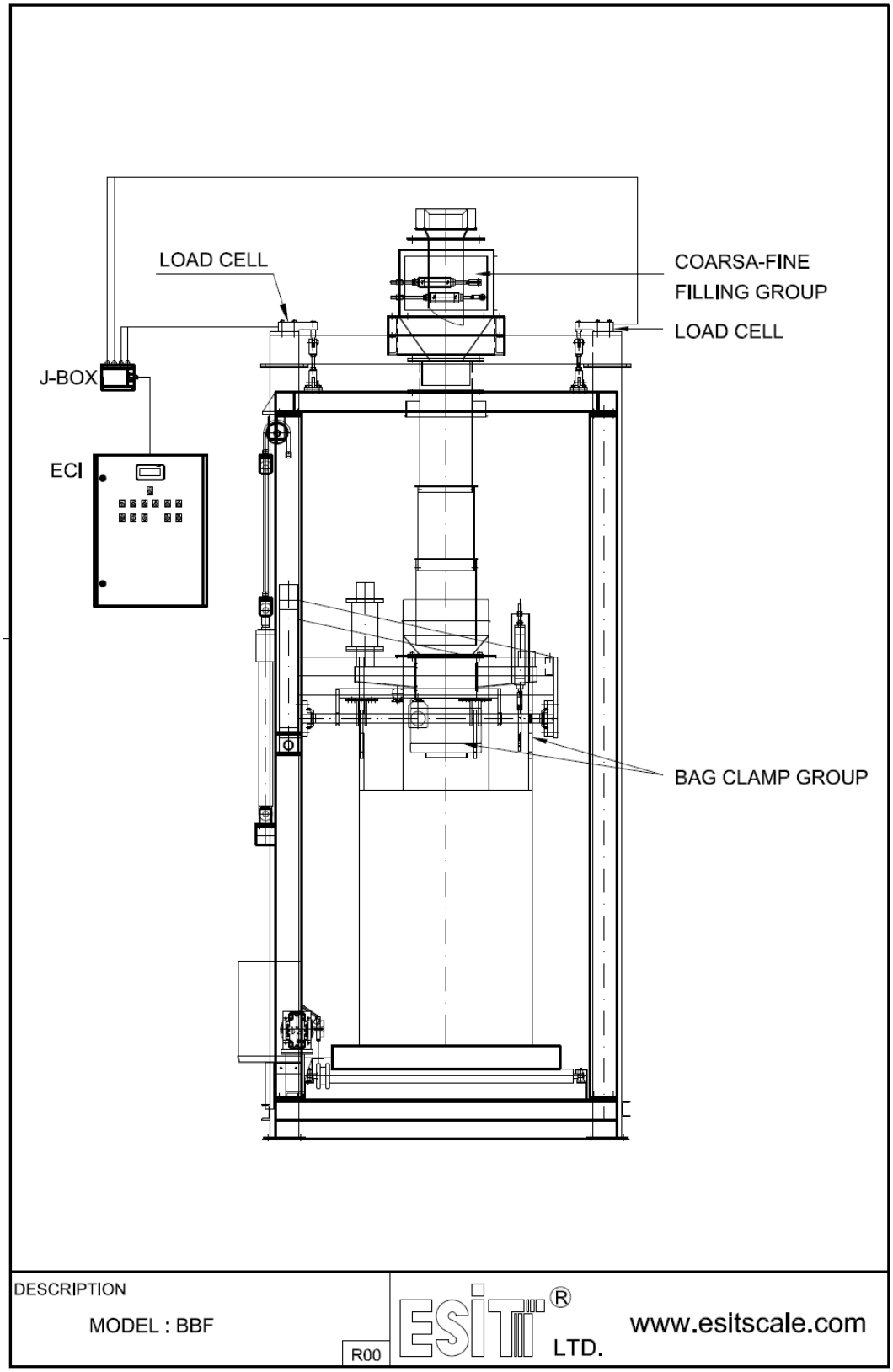

Figure 4. ECI automatic gravimetric filling instrument model BBF.

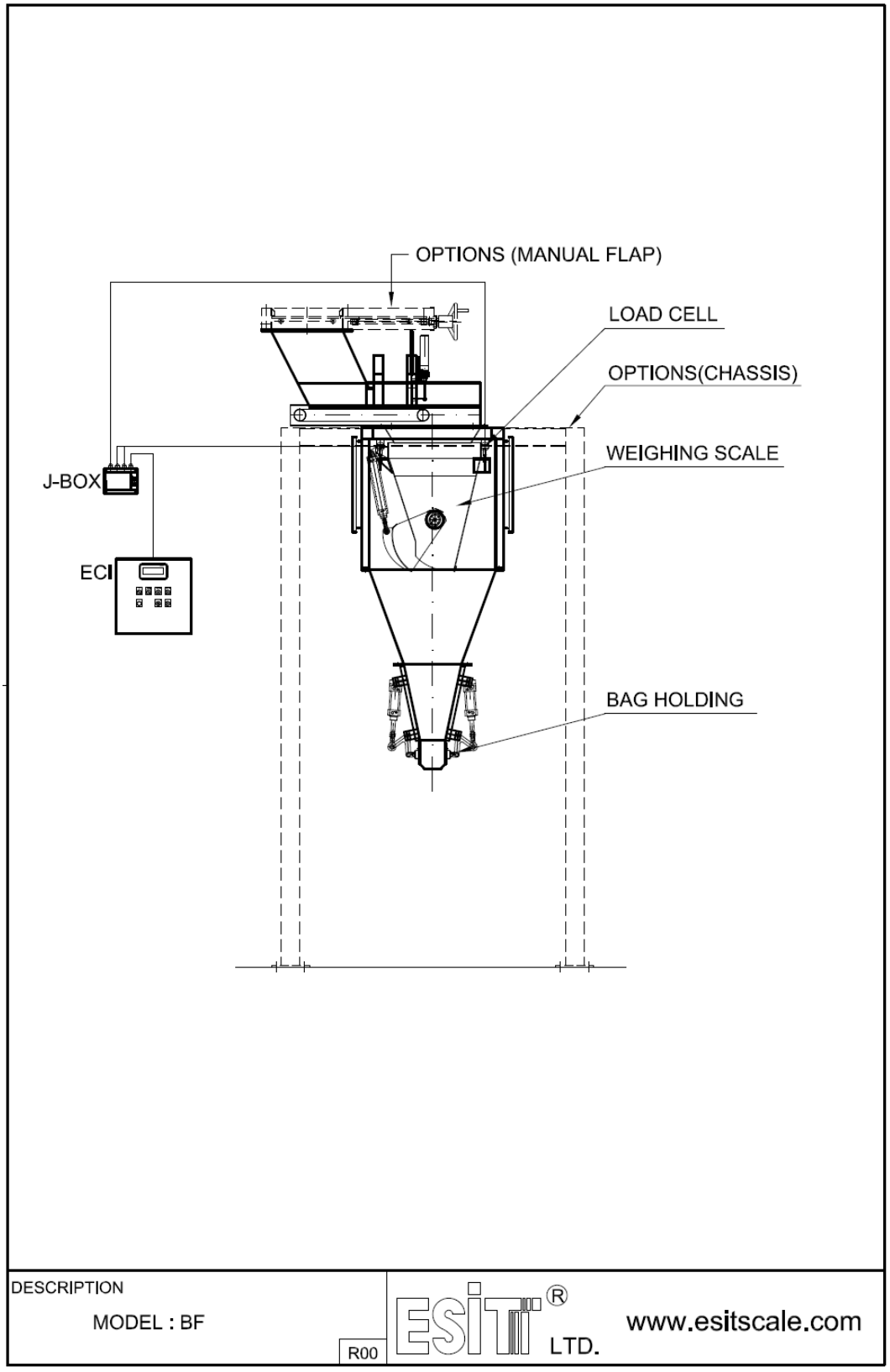

Figure 5. ECI automatic gravimetric filling instrument model BF.

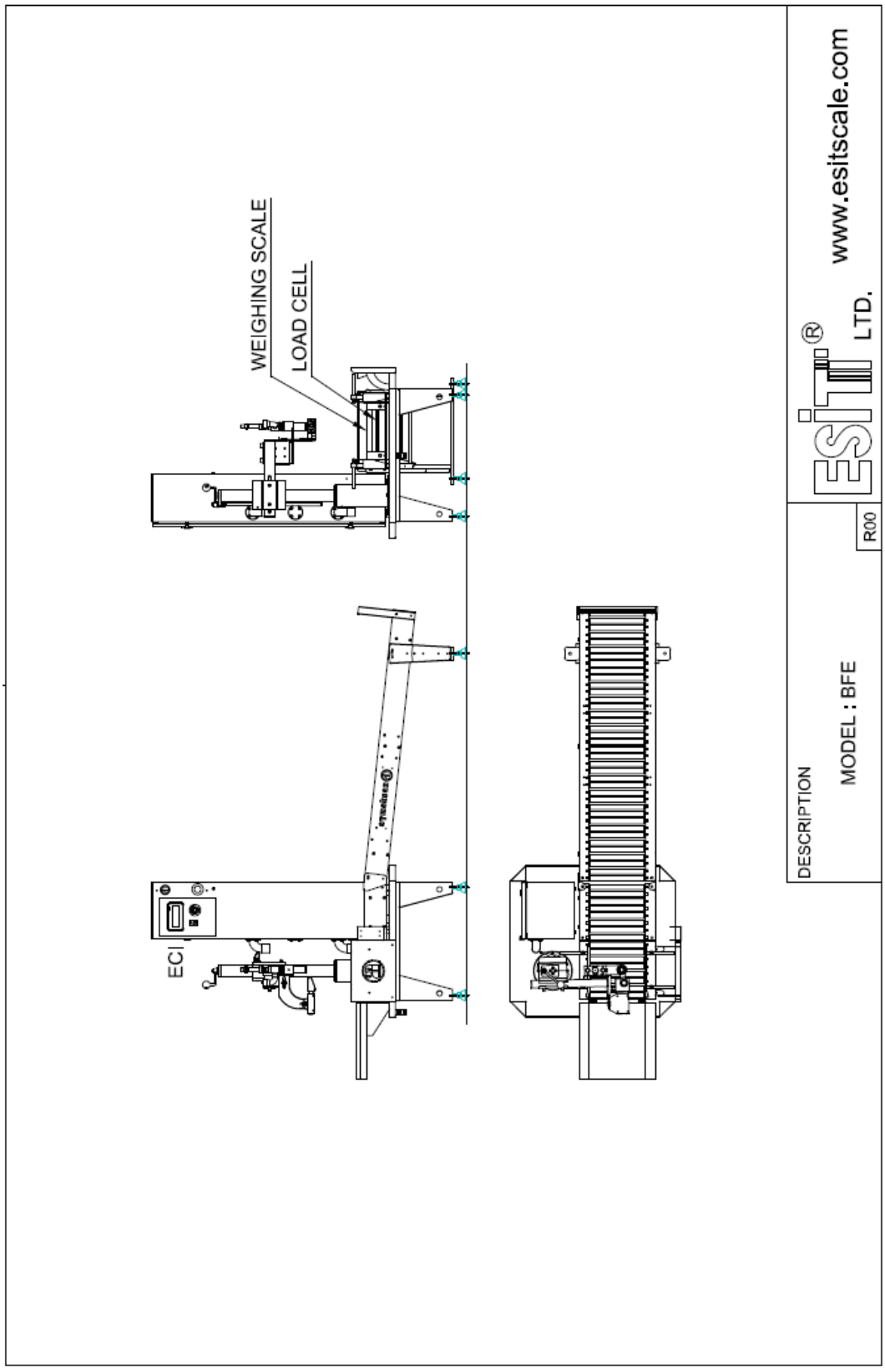

Figure 6. ECI automatic gravimetric filling instrument model BFE

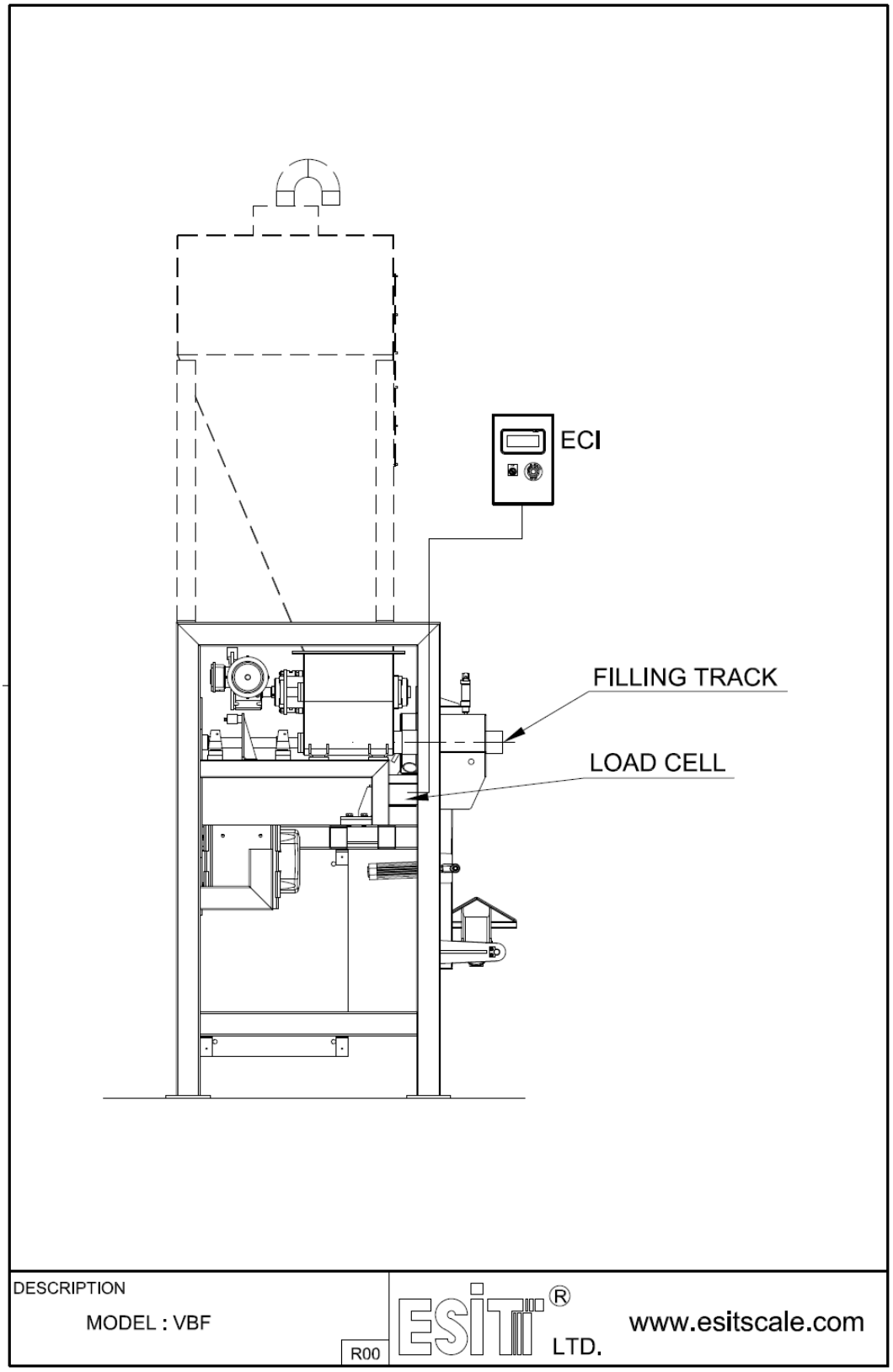

Figure 7. ECI automatic gravimetric filling instrument model VBF.

10. Composition of modules – an example

COMPATIBILITY OF MODULES

Ref.: WELMEC 2

Non-Automatic Weighing Instrument, single-interval

Certificate of EU Type-Approval N°: TAC: DK0199.556

INDICATOR A/D (Module 1)		Type:	ECI			
Accuracy class according to EN 45501 and OIML R76:		$Class_{ind}$ (I, II, III or IIII)		III		
Maximum number of verification scale intervals (n_{max}):		n_{ind}		10000		
Fraction of maximum permissible error (mpe):		p_1		0,5		
Load cell excitation voltage:		U_{exc}	[Vdc]	10		
Minimum input-voltage per verification scale interval:		Δu_{min}	[µV]	1		
Minimum load cell impedance:		R_{Lmin}	[Ω]	35		
Coefficient of temperature of the span error:		Es	[% / 25°C]			0,0005
Coefficient of resistance for the wires in the J-box cable:		Sx	[% / Ω]			0,0048
Specific J-box cable-Length to the junction box for load cells:		$(L/A)_{max}$	[m / mm²]			431
Load cell interface:			6-wire (remote sense)			
Additive tare, if available:		T^+	[% of Max]	0		
Initial zero setting range:		IZSR	[% of Max]	-10	/	10
Temperature range:		T_{min} / T_{max}	[°C]	-10	/	40
Test report (TR), Test Certificate (TC) or OIML Certificate of Conformity:						
LOAD RECEPTOR (Module 2)		Type:				
Construction:			Hopper			
Fraction of mpe:		p_2		0,5		
Number of load cells:		N		3		
Reduction ratio of the load transmitting device:		$R=F_M / F_L$		1		
Dead load of load receptor:		DL	[% of Max]	70		
Non uniform distribution of the load:		NUD	[% of Max]	20		
Correction factor:	$Q = 1 + (DL + T^+ + IZSR^+ + NUD) / 100$			2		
LOAD CELL ANALOG (Module 3)		Type:	Esit BB			
Accuracy class according to OIML R60:		$Class_{LC}$ (A, B, C or D)		C		
Maximum number of load cell intervals:		n_{LC}		3000		
Fraction of mpe:		p_3		0,7		
Rated output (sensitivity):		C	[mV / V]	2		
Input resistance of single load cell:		R_{LC}	[Ω]	350		
Minimum load cell verification interval:	($v_{min\%}$ = 100 / Y)	$v_{min\%}$	[% of Emax]	0,005		
Rated capacity:		E_{max}	[kg]	100		
Minimum dead load, relative:		$(E_{min} / E_{max}) * 100$	[%]	0		
Temperature range:		T_{min} / T_{max}	[°C]	-10	/	40
Test report (TR) or Test Certificate (TC/OIML) as appropriate:						
COMPLETE WEIGHING INSTRUMENT			Single-interval			
Manufacturer: ESIT		Type:	ECI aut. gravimetric filling inst., model BF			
Accuracy class according to EN 45501 and OIML R76:		$Class_{WI}$ (I, II, III or IIII)		III		
Fractions: $p_i = p_1^2 + p_2^2 + p_3^2$:		p_i		1,0		
Maximum capacity:		Max	[kg]	60		
Number of verification scale intervals:		n		3000		
Verification scale interval:		e	[kg]	0,02		
Utilisation ratio of the load cell:		$\alpha = (Max / E_{max}) * (R / N)$		0,20		
Input voltage (from the load cells):		$\Delta_u = C * U_{exc} * \alpha * 1000 / n$	[µV/e]	1,33		
Cross-section of each wire in the J-box cable:		A	[mm²]	0,22		
J-box cable-Length:		L	[m]	10		
Temperature range to be marked on the instrument:	Not required	T_{min} / T_{max}	[°C]			
Peripheral Equipment subject to legal control:						

Acceptance criteria for compatibility				Passed, provided no result below is < 0	
$Class_{WI}$	<=	$Class_{ind}$ & $Class_{LC}$	(WELMEC 2: 1)	$Class_{WI}$:	PASSED
pi	<=	1	(R76: 3.5.4.1)	1 - pi =	0,0
n	<=	n_{max} for the class	(R76: 3.2)	n_{max} for the class - n =	7000
n	<=	n_{ind}	(WELMEC 2: 4)	n_{ind} - n =	7000
n	<=	n_{LC}	(R76: 4.12.2)	n_{LC} - n =	0
E_{min}	<=	DL * R / N	(WELMEC 2: 6d)	(DL * R / N) - E_{min} =	14
$v_{min} * \sqrt{N} / R$	<=	e	(R76: 4.12.3)	e - (v_{min} * $\sqrt{N}$ / R) =	0,011
or (if v_{min} is not given)				Alternative solutions: ↑ ↓	
$(E_{max} / n_{LC}) * (\sqrt{N} / R)$	<=	e	(WELMEC 2: 7)	e - ((E_{max} / n_{LC}) * ($\sqrt{N}$ / R)) =	
Δu_{min}	<=	Δu	(WELMEC 2: 8)	$\Delta u - \Delta u_{min}$ =	0,33
R_{Lmin}	<=	R_{LC} / N	(WELMEC 2: 9)	(R_{LC} / N) - R_{Lmin} =	82
L / A	<=	$(L / A)_{max}^{WI}$	(WELMEC 2: 10)	$(L / A)_{max}^{WI}$ - (L / A) =	1465
T_{range}	<=	$T_{max} - T_{min}$	(R76: 3.9.2.2)	(T_{max} - T_{min}) - T_{range} =	20
Q * Max * R / N	<=	E_{max}	(R76: 4.12.1)	E_{max} - (Q * Max * R / N) =	60,0

Signature and date:

Conclusion . . . . . ***PASSED***

This is an authentic document made from the program:
"Compatibility of NAWI-modules version 3.2".