



United Kingdom of Great Britain and Northern Ireland

Certificate of EC type-examination of a measuring instrument

Number: UK/0126/0002

issued by the Secretary of State for Trade and Industry
Notified Body Number 0126

In accordance with the requirements of the Measuring Instruments (Automatic Catchweighers) Regulations 2006 (SI 2006/1257) and the Measuring Instruments (Non-Prescribed Instruments) Regulations 2006 which implement, in the United Kingdom, Council Directive 2004/22/EC, this certificate of EC type-examination has been issued to:

**Herbert Industrial Ltd
Smithfield House
Rookwood Way
Haverhill
Suffolk
CB9 8PB
United Kingdom**

in respect of an automatic catchweighing instrument designated the Gemini and having the following characteristics:

Maximum capacity	Max = 2 kg
Minimum capacity	Min = 0.1 kg
Scale interval	e = 1 g
Accuracy class	Y(a) and XIII(1)

The necessary data (principal characteristics, alterations, securing, functioning etc) for identification purposes and conditions (when applicable) are set out in the descriptive annex to this certificate.

A handwritten signature in black ink, appearing to read 'G Stones'.

Signatory: G Stones
for Chief Executive
National Weights & Measures Laboratory
Department of Trade and Industry
Stanton Avenue
Teddington
Middlesex TW11 0JZ
United Kingdom

Issue Date: 14 May 2007
Valid Until: 13 May 2017
Reference No: T1108/0032

Descriptive Annex

1 INTRODUCTION

This pattern of an automatic catchweigher, designated the Gemini, operates as an automatic weight or weight/price labeller (Category Y). The instrument may also operate as an automatic checkweigher (Category X).

It comprises a self-indicating and price computing weighing machine and control system, a weigh platform incorporating a weigh conveyor with a load cell manufactured by HBM, two additional conveyors, and a thermal label printer and applicator module.

The instrument is designed to weigh packs dynamically, with a maximum throughput depending upon the pack size, weight and label size. The conveyors can run at a maximum speed which is set in the PLU for the pack and can also be adjusted by the operator.

The Gemini can store PLUs in memory, which contain the price per unit weight data for each product/pack type, used in conjunction with the pack weight to calculate the price to pay. The required transaction and commodity data is sent to the printer where the labels are printed and automatically applied to the packs.

2 FUNCTIONAL DESCRIPTION

2.1 Mechanical

2.1.1 The main H-frame supports three modular conveyor assemblies, with the console mounted at the rear of the H-frame (Figure 1). The label printer, applicator and labelling conveyor are mounted on a separate stand-alone module. A sliding Perspex cover is provided over the weighing conveyor, which must be closed for weighing operations.

2.1.2 Photosensors are mounted on the H-frame, with the associated reflectors mounted below the conveyor belts along the central strip. The photosensors detect the position of the packs and are used to provide the control signals for the weighing and labelling operations.

2.1.3 The system may consist of three conveyors, comprising twin belts which are driven by a d.c. motor; the speed is adjustable, up to a maximum of 71 m/min. The separator conveyors module follows the optional infeed conveyor, which speed is set to run at a speed 20% slower to provide separation of packs arriving close together on the separator. Both conveyors run on a stop/start basis under the control of the microprocessor. The self-contained weighing conveyor module, mounted onto the H-frame, includes a scale comprising a 12 kg load cell type K-PW2AC6/12K-C-HG manufactured by HBM. The conveyor runs continuously in order that the packs are weighed dynamically.

2.2 Electrical

2.2.1 Mounted at the rear of the H-frame is the main electronics console housing the system electronics, which provides the weighing and control functions for the Gemini machine. It comprises of a PC card, up to two network cards, an I/O card, a colour LCD driver card, a hard disk, a floppy disk for engineer access, a SEP Server board, a power supply for the PC card, an A/D converter, motor speed controllers and an Ethernet hub. The system utilises three-way communications between the PC card, the SEP server and the printer, to ensure the correct operation of the system. Communications between the PC card and the SEP server is via a serial RS422 link, while Ethernet is used to link the PC card to the printer. A serial RS422 link provides the communications between the SEP server and the printer.

2.2.2 The activities of the system are controlled by the microprocessor on the PC card and the microprocessor on the SEP server board. The PC compatible card contains a microprocessor and runs Windows '95 or Windows '98 application software to provide the operator interface and management of the system and PLU structure. The PC receives weight data from the SEP server and uses this data to perform the weight and transaction data calculations. The SEP server board incorporates a real-time processor which provides the control of the weighing and labelling operations via monitoring of the photosensors. It follows the progress of the pack at all times and provides the control signals for the conveyor start and stop, adjusting the belt speed and signals to printer to label the packs. The SEP server also obtains the weight data from the A/D converter and passes it to the PC card.

2.2.3 The system incorporates a power supply which provides the power for the PC card and the floppy disk and hard disk drives. A separate power supply provides a 24 V a.c. supply for driving the LCD panel. The SEP server board incorporates a power supply which is used to provide the control signals for the system.

2.2.4 The system is provided with two Ethernet cards, one of which provides an external Ethernet connection. The second card provides the connection between the PC card and an Ethernet hub which provides up to four Ethernet links, one for each of the connectable printers (see Authorised Alternatives).

2.2.5 The weighing circuit consists of the load cell, a separate power supply, and a conformed coated analogue to digital converter under control of the SEP server microprocessor. While the pack is transported across the weighing platform the A/D takes several weight readings and when the microprocessor determines that the weight is stable the count is used for weight and transaction data calculations.

2.2.6 The touch sensitive LCD provides the operator interface. During normal operation mode the display indicates the active PLU No., Tare, Weight, Unit Price and the calculated Price to Pay, along with additional function keys and status windows.

2.3 Devices

The instrument has the following devices:

- Initial zero-setting device (< 20 %)
- Semi-automatic zero-setting device (range of 4 % of Max)
- Zero-tracking device
- Automatic zero-checking device (600 packs or 5 minutes)
- Semi-automatic subtractive tare balancing device
- Preset tare device
- Zero indication
- Belt speed setting accessible to user
- Device to determine when stability criteria fulfilled
- Internal memory
- Counting device
- Static calibration not accessible to user
- Dynamic setting not accessible to user
- Device that acts upon significant faults
- Price computing
- Optional batch totalising device (see Section 7.18)
-

2.4 Label printer and applicator module (Figure 2)

2.4.1 The stand-alone labelling module is provided with a single belt which is driven by a d.c. motor. The conveyor speed is adjustable, up to a maximum of 71 m/min, with the conveyor set to run continuously.

2.4.2 The label printer and applicator is a custom labeller system and it is positioned over the labelling conveyor. The printer is controlled by a single-board PC, and a custom I/O board. An Ethernet card is provided for communications with the main processor. The software program is held in Flash memory, which is downloaded by the central processor at power-up.

2.4.3 The position of the printer assembly can be adjusted vertically, at right angles to the direction of the conveyors and can also be rotated about the vertical axis. The vertical position is controlled by push-buttons on the front of the console.

2.4.4 Labeller data is sent from the main board in the console to the printer controller board in the labeller via the Ethernet link. The SEP server is connected to the printer CPU by a serial link and provides control signals for the printer.

3 TECHNICAL DATA

3.1 The Gemini has the following technical characteristics:

Maximum capacity (Max)	: 2 kg
Scale interval (e)	: 1 g
Max operating speed	: 71 m/min
Minimum capacity (Min)	: 0.1 kg
Tare (T)	: -Max
Load cell model	: HBM type K-PW2AC6/12K-C-HG
Load cell E_{max}	: 12 kg
Climatic environment	: -10 to +40 °C category Y +5 to +40 °C category X Non-condensing (closed)
Electromagnetic environments	: E1 and E2
Power supply	: 230 Va.c. 50 Hz
Label applicator air supply pressure	: 5 bars
Display/keyboard location	: Touch sensitive LCD on console
Accuracy classes	: Y(a) and XIII(1)

3.2 Documentation and drawings

67-001-415	Reference Manual
67-003-300	Operator Manual
SK3760	General arrangement
SK3761	Gemini load receptor
SK3762	Gemini block diagram

3.3 Software

3.3.1 Control and configuration of the software is affected via the LCD panel on the console (Figure 3). Four Levels of operator access are provided which give password protection to different facilities within the operating system. In addition, metrologically critical settings require the physical presence of a Herbert Engineer dongle.

3.3.2 The operating software for the PC is stored on the hard disk in the executable files. The metrologically critical elements of this software are the Welmec.dll, version number V2.00 and the Calilog.db files. They are both protected by CRC checksums. Any errors in these checksums will be detected and will result in the machine being rendered inoperable.

3.3.3 The calibration mode of the machine protected by password and the need for a Herbert Engineer Dongle to be present. The calibration log creates a non-erasable record each time the machine is calibrated, and an on-screen viewer is provided. Any unauthorised access to the Calibration functions is prevented by the dongle, and any unauthorised modification to these files will be detected and will result in the machine being rendered inoperable.

3.3.4 Metrologically significant configuration settings are stored in a binary file that is protected by CRC checksum. These settings can only be accessed using the WELMEC Setup tool that only operates if a valid Herbert Engineer Dongle is present. Any unauthorised access to these configuration settings is prevented by the dongle, and any unauthorised modification to these files will be detected and will result in the machine being rendered inoperable.

3.3.5 Metrologically significant operational parameters are stored in various data files on the machine and are protected by CRC checksum. These settings can only be accessed by password and only if a valid Herbert Engineer Dongle is present. Any unauthorised access to these operational parameters is prevented by the dongle, and any unauthorised modification to these files will be detected and will result in the machine being rendered inoperable.

3.3.6 In-built functions exist for storing individual catchweight records, OCM batch records, and average weight batch records. The individual catchweight records contain automatically generated sequential pack Ids, pack data and CRC checksums. The OCM batch records contain automatically generated sequential pack Ids, the batch level and CRC checksums. The average weight batch records contain automatically generated average weight batch number, statistics and CRC checksums. On-screen viewers are provided, and are colour coded to highlight in red any records that have been tampered with. Any attempt to re-print an OCM batch label that includes pack data that does not pass its CRC check will fail. Additionally it is not possible to void a record where the CRC is incorrect.

3.3.7 The parameter change log provides a record of all parameter changes (metrologically significant or not). This can be used to view any changes made to machine parameters.

3.3.8 The software update log provides a non-erasable record of any software upgrades carried out on the machine. The software update log is protected by CRC checksum and any detected modification will cause the machine to fail start-up.

4 PERIPHERAL DEVICES AND INTERFACES

4.1 Interfaces

The instrument is provided with the following interfaces:

- RS232, RS485 and fibre optic serial communications
- PC standard Ethernet Network
- 24 V dc I/O, control for up to 8 devices
-

4.2 Peripheral devices

The instrument may be connected to any peripheral device that has been issued with a test certificate by a Notified Body responsible for Annex B (MI-006) under Directive 2004/22/EC in any Member State and bears the CE marking of conformity to the relevant directives;
or

A peripheral device without a test certificate may be connected under the following conditions:

- it bears the CE marking for conformity to the EMC Directive 89/336/EEC;
- it is not capable of transmitting any data or instruction into the weighing instrument, other than to release a printout, checking for correct data transmission or validation;
- it prints weighing results and other data as received from the weighing instrument without any modification or further processing; and
- it complies with the applicable requirements of Directive 2004/22/EC Paragraph 8.1 of Annex I.
-

5 APPROVAL CONDITIONS

The certificate is issued subject to the following conditions:

5.1 Legends and inscriptions

5.1.1 The following legends are durably and legibly marked on a rating plate fixed to the side of the console (Figure 4):

‘CE’ marking
Supplementary metrology marking
Notified body identification number
Serial number
Manufacturer’s mark or name
Certificate number

5.1.2 The following legends are shown in the top right-hand corner of the operator display:

Maximum capacity
Minimum capacity
Verification scale interval
Accuracy classification

5.1.3 The following legends are durably and legibly marked on a label securely fixed on the H-frame next to the pressure regulator:

“Set to 5 Bar”

5.1.4 The following text is located on the console near to the display:

“NOT TO BE USED FOR DIRECT SALES TO THE PUBLIC”

5.1.5 The following text is located on the cover over the weigh conveyor:

“COVER MUST BE IN PLACE DURING AUTOMATIC OPERATION”

6 LOCATION OF SEALS AND VERIFICATION MARKS

6.1 The CE marking shall be impossible to remove without damaging it. The rating plate shall be impossible to remove without it being destroyed.

The markings and inscriptions shall fulfil the requirements of Paragraph 9 of Annex I of the Directive 2004/22/EC.

6.2 A ‘tamper-evident’ label (Figure 5) is applied to the cover of the A/D converter box. As the load cell is hard-wired inside the A/D converter box, the cover would have to be removed to change the load cell, hence the seal would be broken to indicate that the cover had been opened.

6.3 ‘Tamper-evident’ labels are located on the weigh conveyor assembly and on the H-frame adjacent to the stamping plug, and bear the same serial number as the console.

6.4 Components that may not be dismantled or adjusted by the user will be secured by either a wire and seal or tamper evident label and securing mark. The securing mark may be either:

- a mark of the manufacturer and/or manufacturer’s representative, or
- an official mark of a verification officer.
-

7 ALTERNATIVES

7.1 Having the alternative configurations of the weighing system as shown below, in which case the descriptive markings are amended accordingly:

Maximum capacity:	$2 \text{ kg} \leq \text{Max} \leq 10 \text{ kg}$
Minimum capacity:	$\text{Min} \geq 0.100 \text{ kg}$
Scale interval:	$e \geq 0.001 \text{ kg}$
Number of scale intervals:	$n \leq 2000$
Maximum subtractive tare:	$T = - \text{Max}$
Throughput:	Above 2 kg, a proportionate reduction in throughput with increasing pack weight (set by manufacturer).
Load cell:	$E_{\text{max}} = 12 \text{ kg}$ for $\text{Max} \leq 4 \text{ kg}$ $E_{\text{max}} = 18 \text{ kg}$ for $\text{Max} > 4 \text{ kg}$

- 7.2** Having up to three additional label printer and applicator modules.
- 7.3** Having overhead pack guides mounted above the infeed and/or separator conveyors.
- 7.4** Having the infeed conveyor removed from the system.
- 7.5** Having a barcode verifier and label catcher fitted to the printer and applicator module. The barcode verifier scans the barcode that is printed on the label. If the barcode is unreadable, the catcher swings out to catch the label as it 'blown' from the applicator. The next pack passing through the system will not be labelled either as it is not possible to return the catcher to its home position in sufficient time to enable the pack to be labelled. Any packs which are unlabelled are removed from the active batch totals.
- 7.6** Having the printing mechanism replaced by thermal transfer. The thermal transfer film is held on its core by the dispensing shaft. The film is fed down, via a guide roller, to join the label paper before they pass together under the thermal print head. The action of the thermal print head causes the ink on the film to be deposited onto the label. An image is built up on the label in the normal way, by turning on and off the thermal dots arranged in a linear bar on the thermal head. Used film exits the thermal head assembly and is wound up on a take-up shaft. The take-up shaft rotates via the action of a "polycord" belt driven from a 24 V dc motor.
- 7.7** Having the system arranged as a Left to Right conveyor arrangement.
- 7.8** Having up to eight pack diverters/centraliser assemblies, connected to RS-232 or fibre optic ports on the console.
- 7.9** Having a different print reel mechanism to facilitate the use of wide print spools.
- 7.10** Having a mechanical label folder situated after the labelling module.
- 7.11** Having a sleeving and printing machine connected.
- 7.12** Having the addition of a feature enhancement to the Gemini weigh-price labelling system. The enhancement, known as "SuperBanding", allows the Gemini to pick the most appropriate PLU for any particular pack in-flight. The PLUs to be used are arranged into a "table" (BTT) that details the individual PLU characteristics, such as priority and packing targets.
- 7.12.1** The standard PLU selection hotshot is used to enter PLU selection screen. The Gemini will display, depending on a console option, either the PLU list or the BTT list in a generic selector. The programmable button will allow the operator to switch the list to the other type, i.e. if starting with the PLU list, pressing the programmable button will switch the list to BTT. If the operator selects to load a PLU, Gemini will operate as normal. If the operator selects to load a BTT, the PLU manager will load it.

- 7.13** Having a base labeller connected.
- 7.14** Having the photosensors replaced by cross-bed photosensors.
- 7.15** Having a reduced operating temperature range anywhere within the approved range specified in Section 3.1. The descriptive markings are amended accordingly.
- 7.16** Having an alternative construction (Figure 6), in which case the instrument is designated the Gemini Solo. The Solo is based on a sub-set of the Gemini components. It is limited to only one printer and also has a reduced operating speed which is software configurable.
- 7.16.1** The instrument has only one infeed conveyor, instead of two. Instead of being on a separate free-standing module, the out-feed conveyor and printer are mounted integrally on the main frame of the instrument, together with the control cabinet, infeed and weighing system. When fitted with the standard printer the label catcher and “label on shoe” sensor are omitted.
- 7.17** Having an Ink Jet printer as an alternative printer type on the standard Gemini and Solo instruments. It is integrated within the software in a similar manner to the standard printer, thus allowing a combination of standard and Ink Jet printers to be supported by a single instrument.
- 7.17.1** The Ink Jet printer control unit is physically separate to the Gemini. The Ink Jet print head is mounted over a Gemini controlled conveyor to ensure correct pack and print placement. The Gemini sends label formatting data and variable pack data to the Ink Jet printer via serial or Ethernet communications.
- 7.18** Having a Genesis printer provided for printing batch totalising information. The batch totalising device is implemented as an option that can be enabled or disabled. The device allows a Batch Target Count, Weight or Value to be programmed in a PLU, or set up via the Operation screen. The software for programming the Genesis printer can reside on the Gemini, but is only accessible when the instrument is stopped.
- 7.18.1** When the instrument is started with the device active, as packs are processed, the pack count, weight and values are totalised. Once the batch target is reached, data is sent to the Genesis printer where a label is printed. The batch totals are then reset and the process repeats. The label printed by the Genesis printer typically contains product related data, along with the values totalised by the Gemini. The batch totals values are identified by a special word or symbol on the label, with all totals the algebraic sums of all the values printed.
- 7.19** Having an alternative minimum capacity (Min) of 0.050 kg.
- 7.20** Having a modified support structure which facilitates the use of the space beneath the unit. A typical example is shown in Figure 7.

8 ILLUSTRATIONS

- Figure 1 Photograph of Gemini
- Figure 2 Photograph of label printer and applicator module
- Figure 3 Operator touch sensitive LCD
- Figure 4 Rating plate
- Figure 5 Location of seals on A/D box
- Figure 6 Gemini Solo
- Figure 7 Modified support structure

9 CERTIFICATE HISTORY

ISSUE NO.	DATE	DESCRIPTION
UK/0126/0002	14 May 2007	Type examination certificate first issued.



Figure 1 Photograph of Gemini

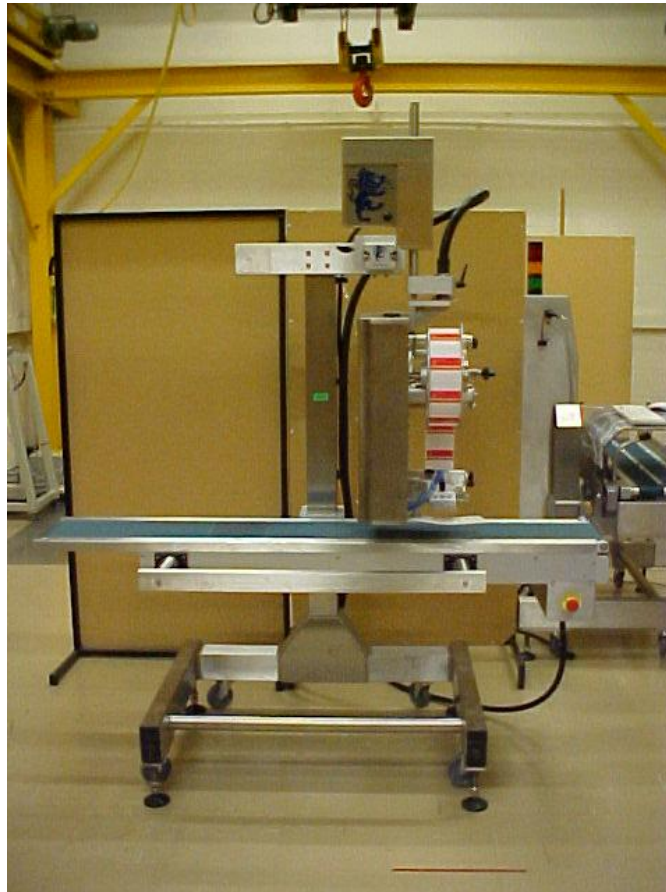




Figure 2 Photograph of label printer and applicator module



Figure 3 Operator touch sensitive LCD

MANUFACTURED BY
HERBERT INDUSTRIAL LTD
 HAVERHILL, SUFFOLK, UK

MODEL	Gemini	MAX	<input type="text"/>
SERIAL NUMBER	<input type="text"/>	MIN	<input type="text"/>
CERT. No	UK/0126/0002	°C	<input type="text"/>
		F	<input type="text"/>
TEMPERATURE RANGE	<input type="text"/>	MAX SPEED	<input type="text"/>
	<input type="text"/>	m/s	
		MAX PACK RATE	<input type="text"/>
		PACKS/min	

<p>! WARNING THIS APPARATUS MUST BE EARTHED</p> <p>! ATTENTION L'APPAREIL DOIT ETRE MIS A LA TERRE</p> <p>! ACHTUNG DIES ES GERAT MUSS GEERDNET U ERDEN</p>	<p>POWER REQUIREMENTS PUISSANCE DE RACCORDEMENT ANSCHLUSS/LEISTUNGS-ORTE</p> <p>V <input type="text"/></p> <p>Hz <input type="text"/> Ø <input type="text"/></p> <p>I_N/L <input type="text"/></p>	<p>PRIMARY FUSE RATING VALEUR FUSIBLE PRINCIPAL HAUPTSICHERUNGS-ORTE</p> <p>In <input type="text"/> A,T</p> <p>I_{ac} <input type="text"/> kA</p> <p>PNEUMATIC PRESSURE <input type="text"/> kPa m <input type="text"/> kg</p>
<p>! ALWAYS REPLACE FUSE WITH CORRECT TYPE AND RATING</p>	<p>! REPLACER UN FUSIBLE DE MEME DIMENSION AVEC L'INTENSITE ADEQUATE</p>	<p>! BEI AUSTAUSCH DER SICHERUNGEN AUF RICHTIGEN TIERT UND TYPE ACHTEN</p>

Figure 4 Rating plate

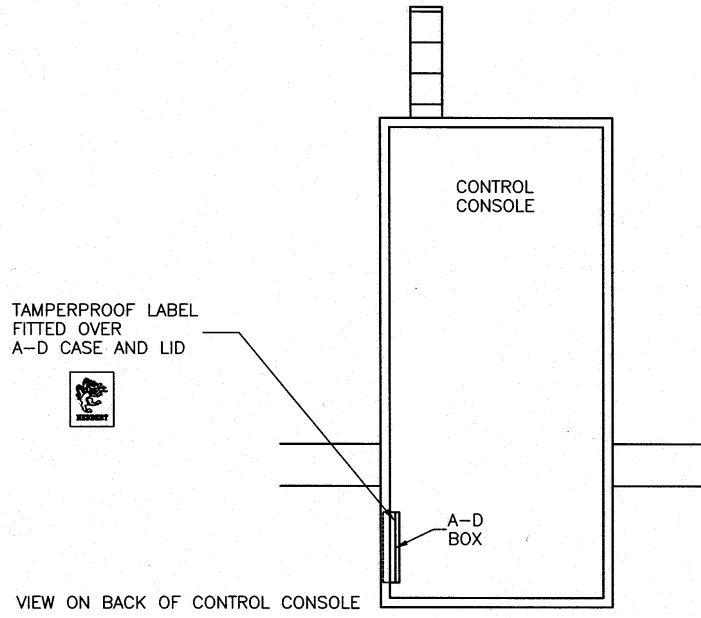


Figure 5 Location of seals on A/D box



Figure 6 Gemini Solo

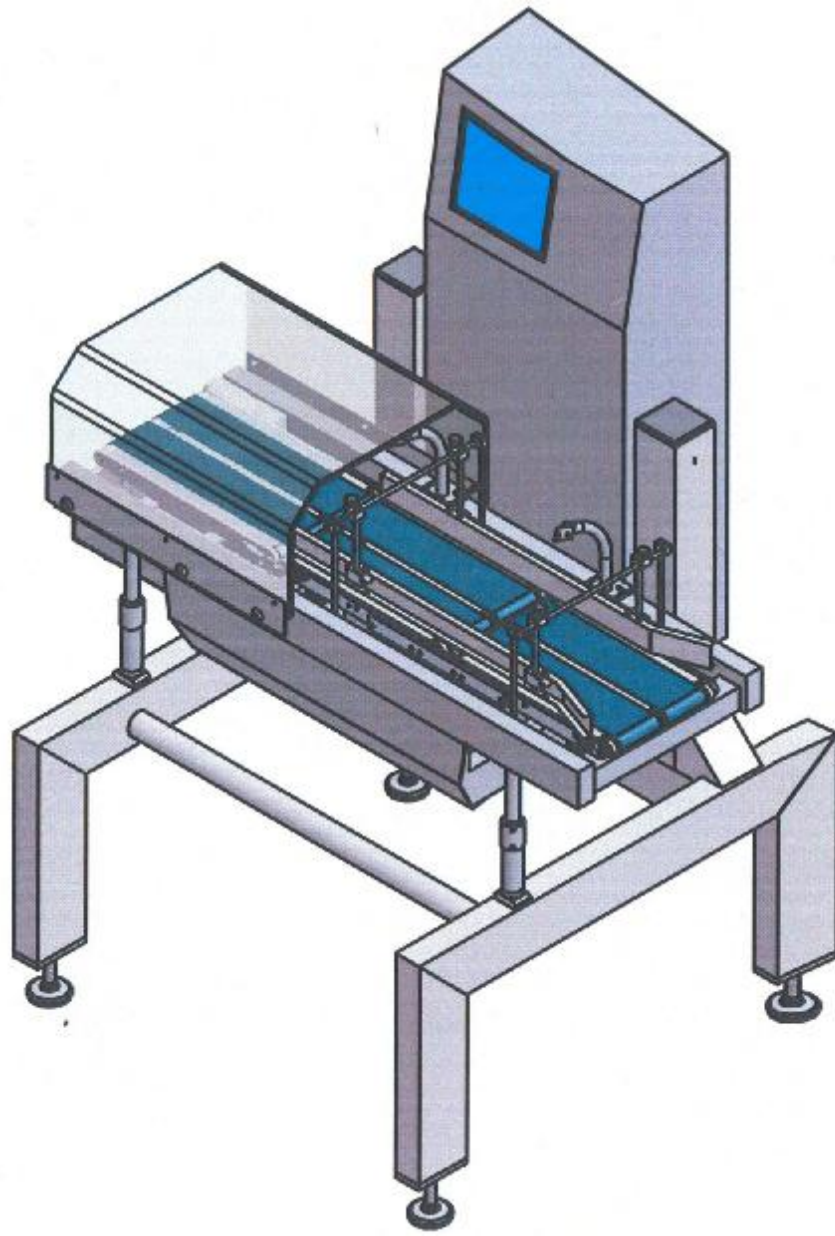


Figure 7 Modified support structure

Price £10.00 net

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Department of Trade and Industry

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