



Flexible and competitive  
electronic filling machine

*Kosan Crisplant's electronic filling machine type UFM epitomizes our development philosophy: To deliver genuine value to our business partners in the form of competitive, high-tech quality products.*

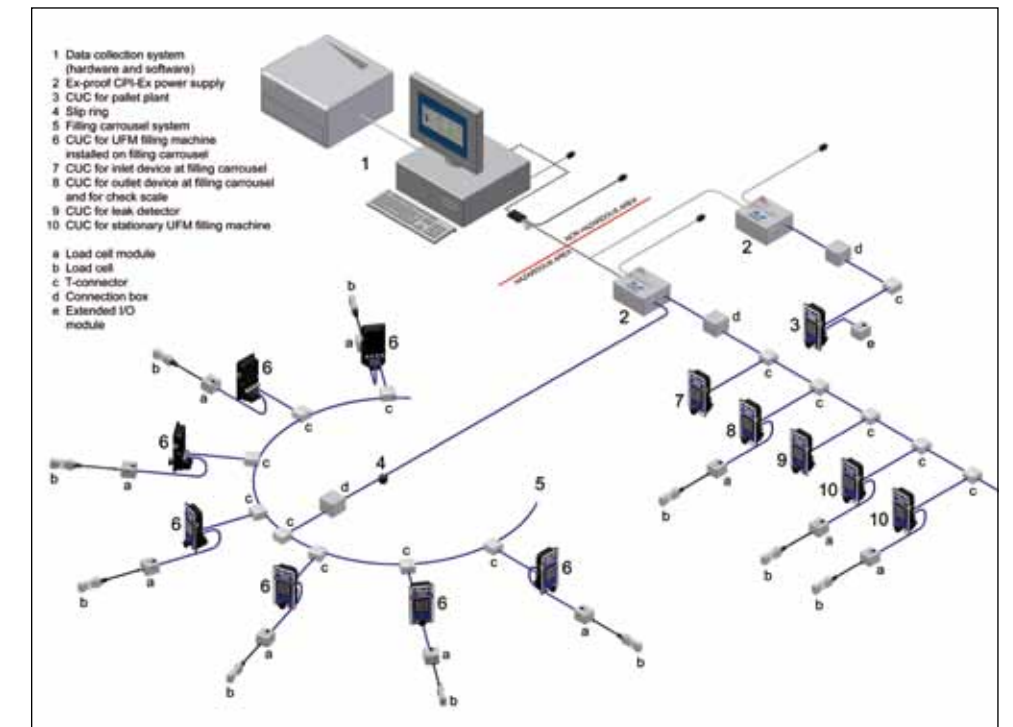
*The UFM is controlled using a CUC (Crisplant Universal Controller)*



*Ex-proof battery CBP-Ex*



*Ex-proof power supply CPI-Ex*



*Example of an intrinsically safe CUC network system with CPI-Ex power supplies, where the CUCs on the UFM filling machines and the CUCs on other machines communicate directly with each other*

**Power supply**

The UFM can be supplied either with an ex-proof central power supply (CPI-Ex), or an ex-proof 7 Ah battery supply (CBP-Ex) and accompanying battery charger.

The battery (CBP-Ex) is ideal as a temporary solution when phasing out old filling machines, or as a permanent solution in areas with unstable power supply.

The CBP-Ex has an operational life of approx. 240 hours per charge per filling machine, or approx. 240/n hours for n

number of connected filling machines to the same battery.

The power supply (CPI-Ex) functions as an insulation barrier between power coming from a main power supply in a non-hazardous area and distributed power to equipment in a hazardous area.

The internal separations inside the CPI-Ex are galvanic (for power) and optical (for data), which means that there is no physical connection between the input side and the output side of the

CPI-Ex (nothing coming from the input side can damage any components on the output side). The CPI-Ex also has a built-in transient protection, which protects it against excess voltage.

Power and data from the CPI-Ex to equipment in a hazardous area are transferred in the same cable, thereby reducing installation costs to a minimum.

**System solutions**

The UFM can be integrated into complete network solutions with direct data communication between e.g. central encoding, filling and control processes. All process data can be collected, processed and presented if a PC is connected.

The central encoding station can be built up as an operator controlled station – complete with keyboard or bar code board with a reading pen – or as a fully automatic station with a scanner.

The electronic UFM filling machine is an extremely versatile, reliable, flexible and competitive filling machine

based on either the electronic weighing principle or the massflow principle. It has become a success all over the

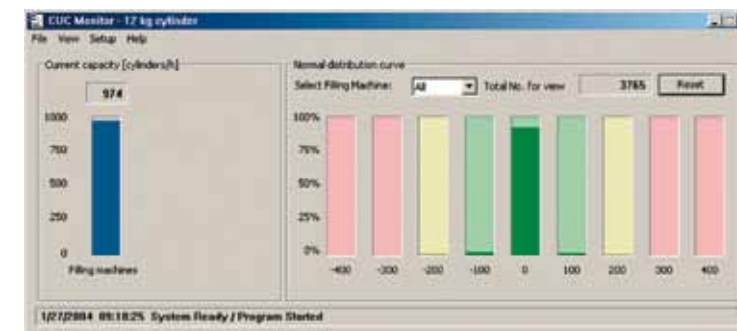
world as the natural choice for both new filling projects and as a replacement for worn-out mechanical filling machines.

We have incorporated and improved the best properties from some of our most valued and thoroughly tested products. This has made it possible to produce a modular product at a competitive price – a highly flexible product with a number of advanced facilities such as data communication, where required.

The UFM has a standard feature for communication with a PC system for collecting, processing and presenting data from the filling process.



*The UFM can be installed as a stationary unit on the floor, built into a chain or roller conveyor system or mounted on an existing or new carousel*



*Example of graphic real time display of total filling capacity and filling accuracy*



**Easy, intelligent and accurate filling**

A built-in electronic control/weighing computer, which calculates at internal intervals of 10 grams, controls and checks the filling process itself. It carries out somewhere in the region of 20,000 calculations during the course of a filling process lasting 45 seconds, ensuring an optimum filling result every time.

The correct mechanical design for weighing technique and intelligent software give the UFM the best possible filling accuracy with very small tolerances, which reduces the number of overfilled cylinders (no giveaways). The below filling report is generated at a filling plant with 24 of the more than 12,000 UFM's we have put into operation all over the world. The filling accuracy (98% of all filled cylinders are within a +/- 100 g margin) has been achieved by easy PC surveillance and regular optimisation of the filling process based on data from similar reports.

The UFM is operated and programmed by means of an adjustable CUC control box with built-in keyboard, display, and start/stop push-button.

The CUC control box is very easy to operate, no matter whether it is to be used for preprogramming of the filling process (fully automatic operation) or for manual keying-in (semi-automatic or manual operation).

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**Safety features**

For instance it is possible to program a fixed maximum tare value. This eliminates wrong entries and ensures against dangerous overfilling of cylinders, since the operator gets an error message in case he enters a value higher than the preset value. The value can easily and quickly be changed, according to the cylinder type.



Adjustable CUC control box – easy to use and to program

Dangerous gas leaks are avoided through automatic closing of the gas stop valve in case a rupture occurs on a gas hose or if the filling head is not correctly connected.

**Competitive price**

The UFM is a thoroughly tested product, both as an independent unit and as an integrated unit in a filling system. All components have been tested and are manufactured to stand up to long-term operation in harsh industrial environments, and generally they need no maintenance or adjustment.

The UFM has become a world-wide success due to the positive price development in electronic equipment relative to both previously known electronic equipment and traditional mechanical equipment.

We should be pleased to prepare a quotation with accompanying specifications, customised to individual requirements. And for comprehensive projects involving the replacement of a large number of filling machines by UFM's, we will evaluate alternative solutions to make projects even more cost-effective.

2004-04-16-filreport01

Filling machine statistics for 11 kg cylinder

From: 2004-04-12 00:00  
To: 2004-04-16 16:53  
Printed: 2004-04-17 16:53

Filling Machine	Variations in grammes					Total
	-200	-100	0	100	200	
1	20	52	1627	37	15	1751
2	31	75	1621	10	13	1750
3	28	57	1635	35	19	1774
4	45	85	1620	5	4	1759
5	17	54	1623	35	15	1744
6	13	28	1625	56	14	1736
7	23	64	1628	21	18	1754
8	13	27	1631	53	27	1751
9	35	79	1619	11	7	1751
10	19	59	1627	31	17	1753
11	18	56	1623	32	16	1745
12	22	60	1624	34	13	1753
13	29	65	1626	26	11	1757
14	18	63	1625	32	13	1751
15	19	52	1605	36	10	1722
16	11	24	1633	57	23	1748
17	23	56	1632	28	15	1754
18	24	52	1622	39	12	1749
19	26	56	1624	33	11	1750
20	22	51	1630	27	9	1739
21	21	53	1621	39	12	1746
22	24	55	1626	34	9	1748
23	23	49	1623	38	10	1743
24	27	57	1629	37	9	1759
<b>Total</b>	<b>551</b>	<b>1329</b>	<b>38999</b>	<b>786</b>	<b>322</b>	<b>41987</b>
<b>%</b>	<b>1,3%</b>	<b>3,2%</b>	<b>92,9%</b>	<b>1,9%</b>	<b>0,7%</b>	<b>100%</b>

Example of a filling report

The UFM is the natural choice for new projects, but it is also extremely attractive on the replacement market, as it can be installed rapidly and easily on existing filling carousels replacing worn-out mechanical filling machines. And installation on an existing carousel takes very little time, keeping production loss at a minimum.

The following series of photos shows how easy it is to e.g. mount a UFM with an ex-proof battery supply on an existing filling carousel.



(1) After dismantling the filling machine to be replaced, a customer-designed adapter plate (included in the supply) is mounted on the carousel.

(2) The new UFM is placed on the adapter plate.

(3) The existing or a new filling head is mounted on the new hoses from the filling machine.

(4) The new gas stop valve (included in the supply) is mounted on the existing ball valves on the circular pipes on the carousel, and the gas and compressed

air hoses from the filling machine are connected.

(5) The UFM is levelled and height-adjusted so that it is in level with the existing introduction and ejection units.

(6) The ex-proof battery is placed on the carousel plane, after which the plug connection from the filling machine is connected.

(7) Now the UFM is ready to be gassed. The control box is adjusted to the desired position, and the filling machine is easily calibrated on the key-

board. The net values of each cylinder type to be processed are also easily keyed in and stored in the control box.

(8) Finally the cylinder stops are adjusted on the weighing plate of the filling machine to the actual cylinder type, so that the cylinders are placed correctly on the weighing plate at each introduction.

(9) You are now ready to fill with your new battery-driven, electronic filling machine!



The modular design allows us to tailor-make the UFM to any individual need and desire. We have already designed and supplied more than 45 different models, which makes the UFM the world's most flexible filling machine.

The UFM works both as an independent filling unit or as part of an integrated filling system. The machine can be installed directly on the floor, in-line in a chain or roller conveyor system or be mounted on a filling carousel. The UFM can be supplied complete with filling heads for all types of valves and cylinders.

The UFM is approved as a check scale and so it is available with a software configuration for automatic check-weighing of the cylinder immediately after the filling process.



UFM with double centring device for automatic filling of industrial cylinders with centre valves



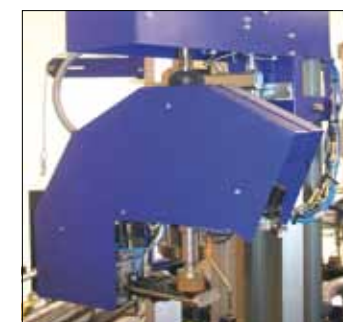
UFM with pusher for camping cylinders with centre valves



UFM for manual filling of industrial cylinders with screw valves



UFM with single centring device and three automatic filling heads for domestic cylinders with centre valves



Optional installation of manual, semi-automatic or fully automatic filling heads

**Available models**

**Installation:**  
The UFM can be installed as a stationary unit on the floor, built into a chain or roller conveyor system or mounted on an existing or new filling carousel

**Filling heads:**  
The UFM can be equipped with fully automatic, semi-automatic (self-decoupling) or manual filling heads for both centre and screw valves

**Cylinder types:**  
The UFM is a universal modular filling machine for all cylinder types

**Optional functions:**

- Single or double centring unit
- Massflow meter
- More filling heads on one machine
- Fully automatic opening and closing of the hand wheel on cylinders with screw valves

**Necessary connections**

**LPG installation:**  
Filling pressure: Max. 2.1 MPa. (21 bar)  
Test pressure: Max. 3.0 MPa. (30 bar)

**Compressed air installation:**  
Working pressure: Min. 0.6 MPa. (6 bar)  
Max. 1.0 MPa. (10 bar)

**Electrical power installation (via the central power supply or the battery):**  
Voltage: 1-phase + neutral + earth (voltage variation from 85 to 264 V AC)  
Frequency: Variation 50/60 Hz

**Earth net:**  
Max. transition resistance between earth wire and earth:  $\leq 2.0 \text{ Ohm}$

**Consumption data**

**Compressed air:**  
Depending on the model (type of filling head, with or without centring unit, etc.)

**Electrical power:**  
< 1.0 w



Universal filling machine for all cylinder types

**Weight**

Approx. 90-200 kg depending on the model

**Approvals**

The filling machine is designed for use in hazardous areas classified as Zone 1 according to IEC 79-10 and Class I, Division 1 according to NEC (USA), article 500. The UFM is also EC approved and designed in accordance with current EU directives, incl. the ATEX Directive (94/9/EC).

The weighing accuracy of the load cell is according to OIML R 60, NTEP 3000d, accuracy class C3.

**Other data**

The weighing computer calculates and shows the weight in kg or lbs.

**Weighing range:**  
Min. 2 kg - Max. 120 kg

**Display division:**  
100 g (e.g. 15.1 kg, 15.2 kg, 15.3, etc.)

**Kosan Crisplant a/s**

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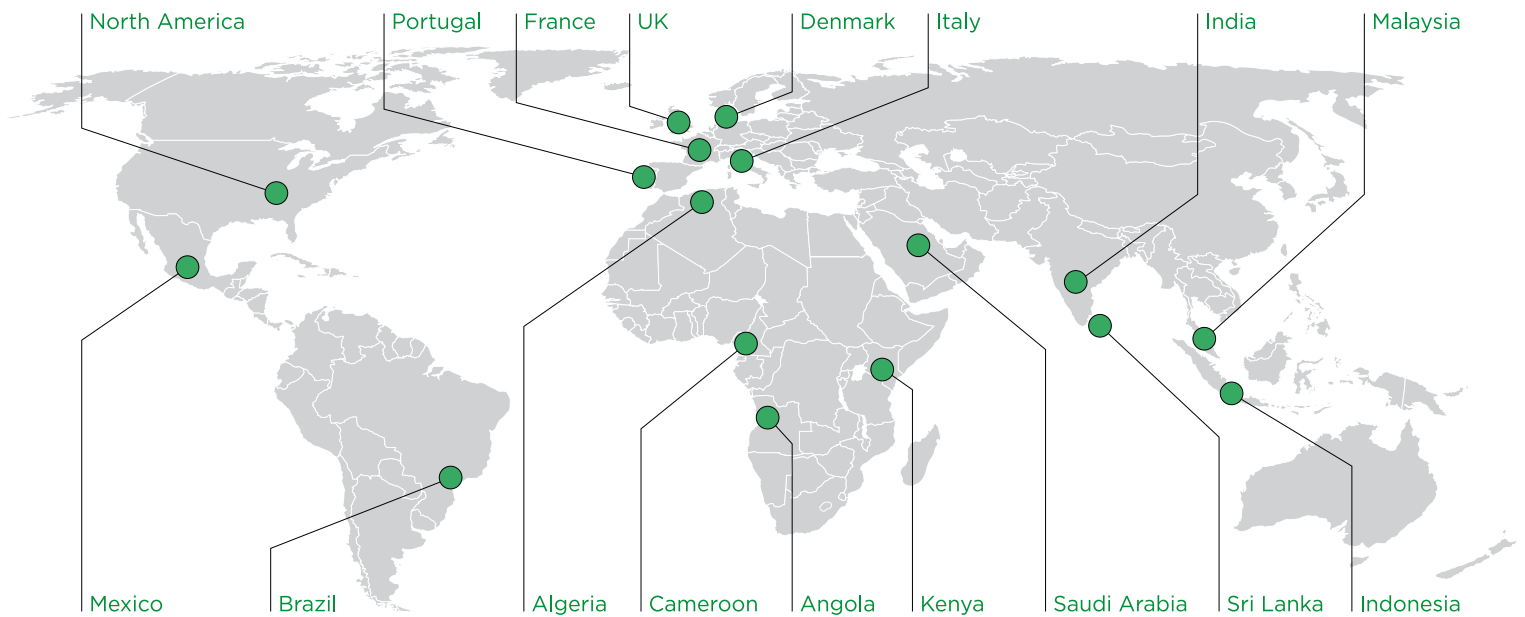
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Kosan Crisplant is a **MAKEEN** company  
ENERGY

Kosan Crisplant is a project-oriented corporation supplying equipment, plants and systems for filling and maintenance of LPG cylinders and offering after-sales and engineering services, facility management, and a one-stop shop for gas equipment including equipment for ammonia and cryogenic gasses.

We are continuously working on developing of new systems, products and services to meet the customers' and the market's future demands for increased capacity, efficiency and, above all, safety.

Profiting from more than 65 years of experience in the gas business, Kosan

Crisplant has also entered the market for small-scale LNG projects, introducing a unique fully automatic zero-emission LNG bunkering facility for ships.

Since 1951, Kosan Crisplant has supplied 2650 LPG plants in more than 130 countries all over the world.