Batchweighing Controller with Onscreen Operation for Automatic and Manual Batching of Solid and Liquid Materials

IT8000E
BATCH

IT8000E *BATCH* is a batchweighing controller for automatic weighing of solid and liquid materials in the **chemical, pharmaceutical, food and other industries.**

The controller connects to load cells or scales of all types and weight ranges, including Ex-area applications.

IT8000E *BATCH* is suitable for:
- Automatic multi-ingredient batchweighing in hoppers, mixers or tanks
- Recipe batchweighing on floor and pit-mounted scales including control of manually added ingredients
- Subtractive batchweighing (weighout) from hopper scales.

The system controls fast and dribble feed of **valves, screw feeders or similar for up to 31 materials.**

Batching sequences are recipe-controlled.
Recipes contain functions for automatic or manual weighing, weight tolerance check, operator inputs and synchronization steps.

Production and processing procedures can also be included into an automatic cycle, simply, safely and fast.

The controller offers functionality to conform with ISO 9001 standards:
- **Accurate fill control** through fast signal processing, trend-sensing preact adjustment and weight tolerance control
- **High operational security** through extensive monitoring functions and simple operation via onscreen menus

- Operator prompting and permanent indication of status with **clearly structured menus** on **color screen** ensure fast and error-free operation and minimum training requirements
- **Recording of all data** in a batch log, totals for raw material usage, production quantities and error reports.

The controller is available in two styles:
- **Compact stainless steel enclosure** for desk-top or wall mounting, or
- **Panel-mount housing.**

Typical Setting:

Systec Systemtechnik und Industrieautomation GmbH
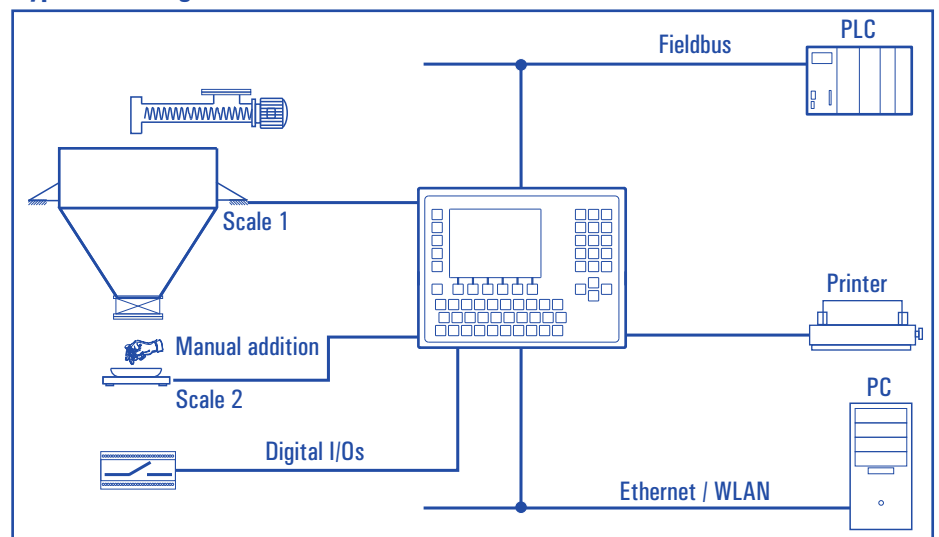
IT8000E *BATCH* is designed for:

- **Semi-automatic operation,**
  as stand-alone batchweighing controller with its own recipe and raw material database, or
- **Automatic operation,**
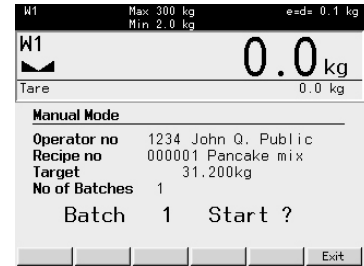 linked to a process control system or PLC with database maintenance and overall process control.

Sequence and operation are configurable and can be adapted to the requirements of a specific application.

Typical sequence in semi-automatic operation

To start a batch, batch size, number of batches and, possibly, application-specific data are keyboard entered. The sequence is started via the keyboard or from an external signal.
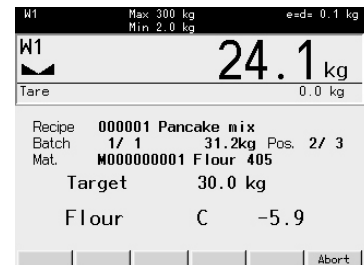
A batch log is printed at the end of each batch.

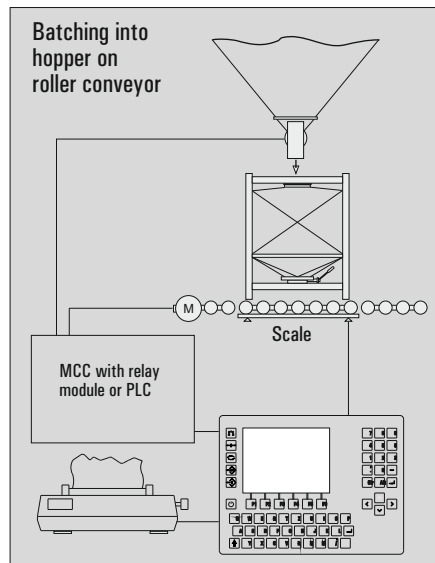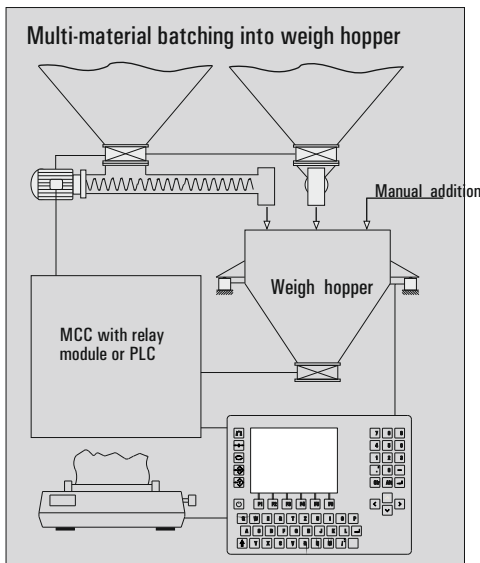Error messages are displayed in clear text and printed out on a printer (if connected).


```
W1              Max 300 kg        e=d= 0.1 kg
                Min 2.0 kg
W1
                           0.0 kg
Tare                            0.0 kg

Manual Mode
Operator no    1234 John Q. Public
Recipe no      000001 Pancake mix
Target              31.200kg
No of Batches      1

     Batch     1    Start ?

                                        Exit
```

Entry of target values


```
W2              Max 3 kg          e=d= 0.001 kg
                Min 0.020 kg
W2
                        1.093 Net
                               kg
Tare                         0.195 kg T

Recipe    000001 Pancake mix
Batch      1/ 1      31.200kg  Pos. 1/ 3
Mat.      M000000003 Salt

     Target          1.200 kg
     Remaining      -0.107 kg

0%        50%      -T        '+T       91.1%
Chg pot  Chg lot  Tara   X10        Abort
```
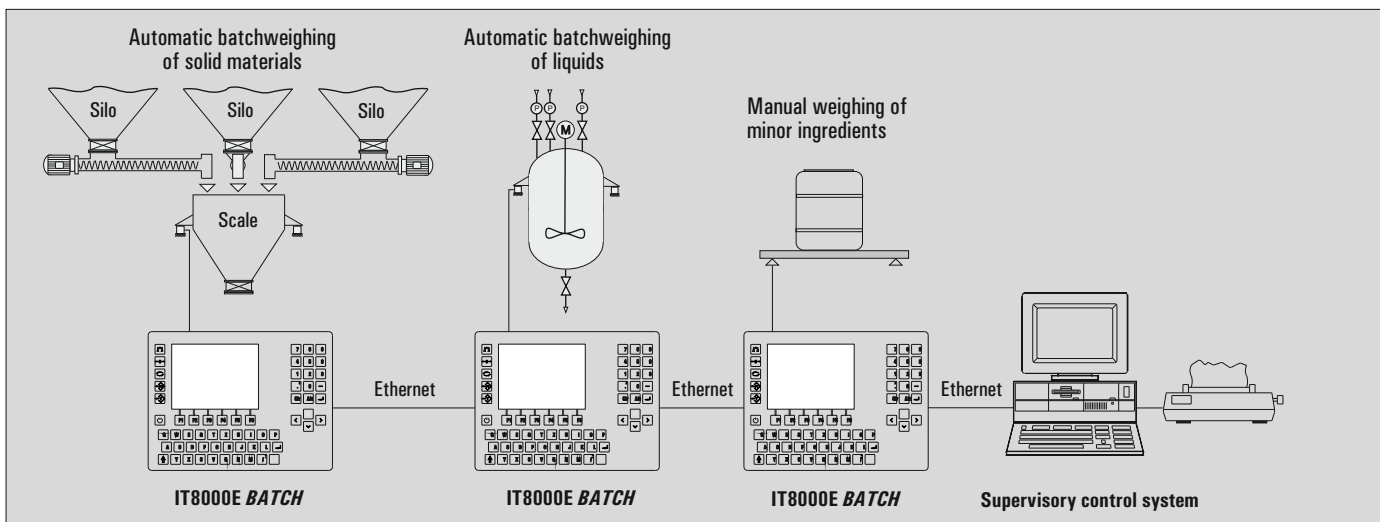
Manual weighing with bargraph display

Typical sequence in automatic operation:

To start a batch, recipe number, batch size, number of batches and the start command are transferred to the IT8000E *BATCH* over Ethernet.

Information and actual weight over the Ethernet interface.

On completion of a batch, batch information is transferred to the host system.

Automatic operation is typically used when a number of batchweighers equipped with IT8000E *BATCH* controllers are employed.


```
W1              Max 300 kg        e=d= 0.1 kg
                Min 2.0 kg
W1
                          24.1 kg
Tare                            0.0 kg

Recipe    000001 Pancake mix
Batch      1/ 1      31.2kg  Pos. 2/ 3
Mat.      M000000001 Flour 405

     Target          30.0 kg

     Flour        C     -5.9

                                        Abort
```

Automatic batching


```
W1              Max 300 kg        e=d= 0.1 kg
                Min 2.0 kg
W1
                           0.0 kg
Tare                            0.0 kg

M000000004 Ammonium bicarbonate    AmBiCar
M000000008 Butter                  Butter
M000000006 Caramel                 Caramel
M000000001 Flour 405               Flour
M000000003 Salt                    Salt
M000000011 Sodium bicarbonate      Sodium
M000000005 Vanilla                 Vanilla
M000000010 Water                   Water
M000000009 Whole milk powder       Whole m
                                        Exit
```

Table of raw materials

Multi-material batching into weigh hopper

Manual addition

Weigh hopper

MCC with relay module or PLC

Batching into hopper on roller conveyor

Scale

MCC with relay module or PLC

Automatic batchweighing of solid materials

Silo Silo Silo

Scale

Automatic batchweighing of liquids

Manual weighing of minor ingredients

IT8000E *BATCH*   Ethernet   IT8000E *BATCH*   Ethernet   IT8000E *BATCH*   Ethernet   **Supervisory control system**
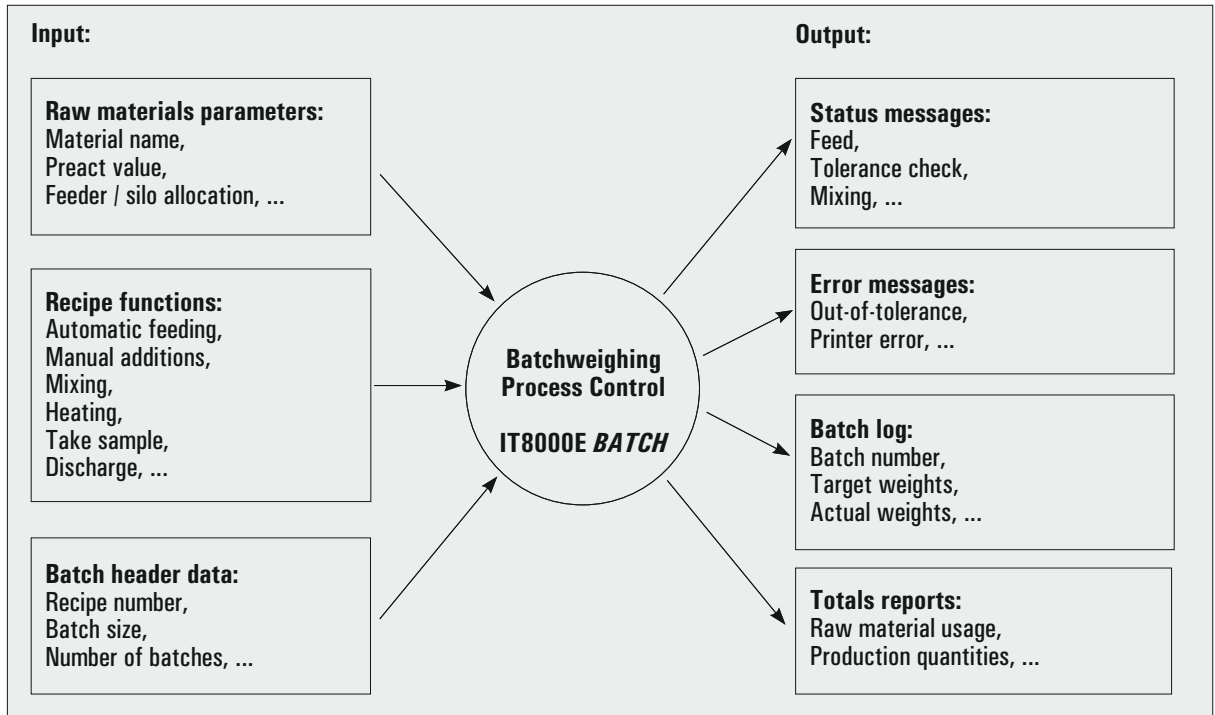
Recipes
- **Recipe database** with max. 300 recipes and max. 5,000 recipe lines
- **Capturing of production quantities** for each recipe
- **Each recipe line may have one of these functions:**
    - Automatic fill control
    - Manual additions
    - Subtractive weighing
    - Discharging
    - Zero check
    - Tare check
    - Confirm fixed value
    - Read data word
    - Write data word
    - Text prompts with operator acknowledgement
    - Synchronization step
    - Time preset
    - Control of mixer, heater, feeder etc.

Raw materials
- **Automatic batching** of up to 31 raw materials
- **Manual batchweighing** of a further 269 materials
- **Parameter entry** of material number, name, preact value etc. for each raw material
- **Feeder assignment** (e.g. to silos) is configurable
- Capturing of raw material usage for each material.

Input:

Raw materials parameters:
Material name,
Preact value,
Feeder / silo allocation, ...

Recipe functions:
Automatic feeding,
Manual additions,
Mixing,
Heating,
Take sample,
Discharge, ...

Batch header data:
Recipe number,
Batch size,
Number of batches, ...

Batchweighing Process Control IT8000E *BATCH*

Output:

Status messages:
Feed,
Tolerance check,
Mixing, ...

Error messages:
Out-of-tolerance,
Printer error, ...

Batch log:
Batch number,
Target weights,
Actual weights, ...

Totals reports:
Raw material usage,
Production quantities, ...

Typical batchweighing sequence for a mixer mounted on load cells
- Zero check
- Automatic feeding of major materials with tolerance check and preact adjustment
- Manual addition of minor materials with tolerance check
- Mixing
- Wait for request signal
- Discharging
- Transfer and/or print batch log.

Typical example of a recipe batching sequence for a container on a roller-bed scale
- Zero check
- Move container onto scale
- Tare control
- Automatic feeding of materials with tolerance check and preact adjustment
- Move container off scale.

Feed control

- Fast and dribble feed with countdown display and tolerance check
- Automatic recalculation of target weights based on desired batch size
- Manual feeding with display of remaining target weight and bargraph display, with capturing of batch numbers
- Manual filling with change of item and horizontal weighing
- Automatic trend-sensing preact adjustment (selectable)
- Automatic top-up feed (jog) in the event of minus tolerance (selectable)
- Material flow check with violation alarm (selectable)
- Automatic intermediate discharge when batch size is larger than weighing range (selectable)
- Capturing of operator number.

Operation

- Operator prompting on high-contrast color TFT display, data entry via alphanumeric sealed membrane keyboard or optional PC keyboard.
- Sequence and operation can be individually configured. This eliminates unnecessary operator steps.
- Input, printout and transfer of application-specific data, e.g. order number or batch number
- Operator prompting in English, German, French, Russian or Dutch, other languages on request.

Reporting

- Batch log
- Error messages
- Files, totals, parameters
- Logging on printer and/or to file (internal memory or external USB device)
- Data transmission to host.

Files

- Recipe file with 5,000 function entries (recipe lines)
- Raw material file with 300 entries
- Personnel file with 100 entries.

Simple integration

- Stand-alone or remote-controlled operation possible – material parameters, recipes etc. can be keyboard entered or downloaded
- Accept, Start, Interrupt functions are possible via external switches.

Weighing electronics

- Integrated signal amplifier to connect up to 2 scales with 8 strain gauge load cells each in 4- or 6-wire mode
- Two more scales can be connected via external ADCBox
- Calibration as single or multiple-range and as single or multi-interval scale
- Fast signal processing (50–800 updates / sec.)
- Weights and Measures approved resolution of 6,000 d with a max. preload of 80 %, internal resolution 524,000 d.

Operating temperature

–10 °C (+14 °F) to +40 °C (+104 °F), max. 95 % relative humidity, non-condensing.

Security

- Power-fail-safe data storage
- Power fail recovery, continuation of program possible after power failure
- Password protection for all data
- Battery-backed real-time clock
- Display, printout and transfer of all error messages is possible.

Ethernet interface (option: WLAN)

Connection to PC network via integrated Ethernet interface with configurable IP address, for data transmission to printer/PC (option), for communication with the host system or remote diagnosis over Internet.

Serial interfaces

- For printer (option)
- RS232, 20mA CL, RS422, RS485, selectable, protocol/baud rate configurable.

Integrated USB interface (option)

To connect printer, scanner, PC keyboard or to store weighing data on USB stick.

Parallel interfaces / Fieldbus

- 8 internal opto-isolated inputs / outputs (24 V) or
- External relay modules to connect to MCCs / PLC or
- Ethernet/IP, Profibus DP, Profinet or Modbus TCP to connect to MCCs / PLC / host system.

Electrical connections

110 (–15 %)–240 (+10 %) VAC; 50 / 60 Hz, option: 12–30 VDC, power consumption max. 20 VA.

Accessories

Relay module with secure separation of inputs and outputs (24 V, 3 A).

Ex2/22 version

For installation in Ex zones 2 and 22.

Construction:

Desk/wall version	Panel-mount version

- Stainless steel housing, IP69K, NEMA 4X
- Dimension W x H x D: 330 x 239 x 134 mm (13.0" x 9.4" x 5.3")
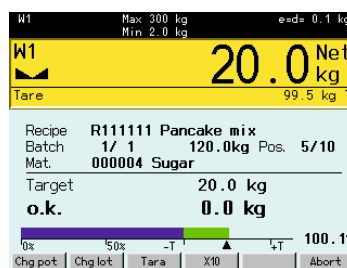
- Stainless steel housing, fascia plate protected to IP69K, NEMA 4X
- Dimension W x H x D: 285 x 224 x 69 mm (11.2" x 8.8" x 2.7")
- Cutout in panel: 268 x 207 mm (10.6" x 8.1")

Display / operation:

Bargraph display	Raw material table

Bargraph display:
```
W1              Max 300 kg        e=d= 0.1 kg
                Min 2.0 kg
W1                        20.0  Net
                                 kg
Tare                              99.5 kg T

Recipe   R111111 Pancake mix
Batch    1/ 1        120.0kg Pos.  5/10
Mat.     000004 Sugar
Target              20.0 kg
o.k.                 0.0 kg

0%     50%    -T      ▲    +T    100.1%
Chg pot  Chg lot  Tara  X10        Abort
```

Manual weighing with bargraph display

Raw material table:
```
W1              Max 300 kg        e=d= 0.1 kg
                Min 2.0 kg
W1                         0.0  kg
Tare                               0.0 kg

..\Files\Raw materials              9/300
Material-No.    000001
Name            Flour 405
Short name      Flour
Feeder-No.      1
Consumption              0.00kg
Stock                 1000.00kg
▼ Coarse preact      2.0000kg
         Print   Find   Delete  Info  Exit
```

Maintenance of of raw material file

Directives: 2009/23/EC, 2004/108/EC, 2006/95/EC, 2004/22/EC

Standards: EN 45501, OIML R76-1, EN 61000-6-2, EN 61000-6-3, NAMUR NE21, EN 60950

CE — EC approval as non-automatic weighing instrument

NTEP approval as indicating element

ETL certified in accordance with UL 60950-1 and CSA C22.2 No. 60950-1

EMI compliance with FCC Part 15

Measurement Canada: Approval as non-automatic weighing instrument

Ukraine: Approval as non-automatic weighing instrument

EtherNet/IP

PROFINET   PROFIBUS