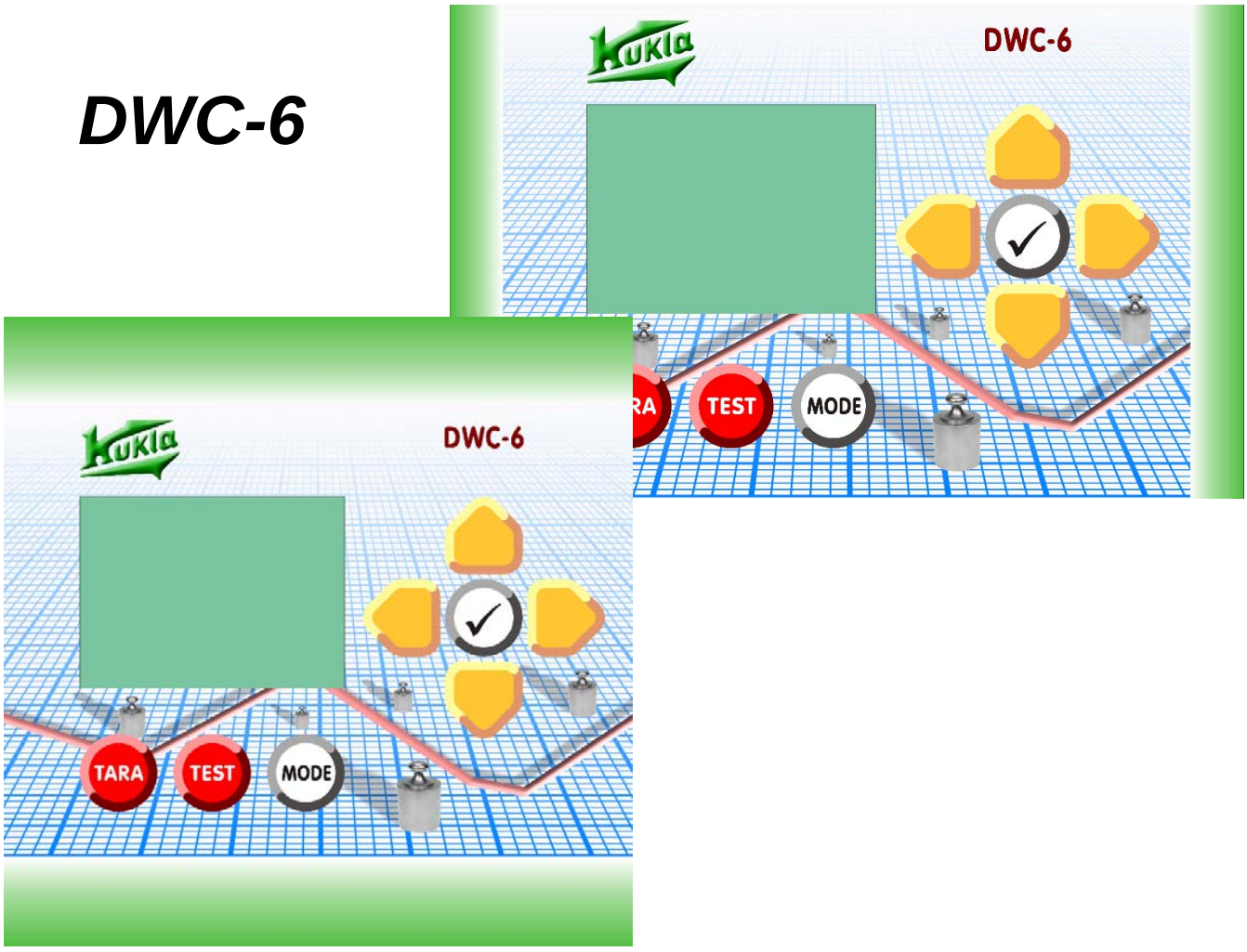
Weighing computer

Service instructions
T1

DWC-6



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Software indication

These instructions are based on Software version P01.26
In course of the technical progress changes can be carried out at the software. At subsequent software versions therefore deviations are possible compared to these instructions.

*** SAFETY REGULATIONS ***

Being under voltage the device must not be opened. Danger of electric shock exists. Service works at the weighing equipment are permitted only for qualified personnel. In case of works at the weighing belt the drive has to be switched off.

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General description

Belt scales are available for installation into conveyor belt plants or with own weighing belt.
Alternatively the weighing electronics of series DWC-6 can be installed into impact flow meters as well.

The conveying capacity (P) is determined by multiplying the weight (g) acting on the load cell by the belt speed measured (v).
From these both values also the material quantity already conveyed in form of a counter is determined.

As special form the weighing electronics of series DWC-6 also can be applied as flow meter (known also as impact flow meter). Thereto the force (g), arising by the impact of the falling material, is multiplied by the theoretic fall velocity(v). Also here a capacity (P) and a counter reading are determined.

Operation of the weighing system

Preparations for start-up

Before the plant is started, the scale has to be tared in manual operation with weighing belt being empty. If possible, a test with test weight and a material test should be carried out then, in order to ensure the measuring accuracy of the scale.

Taring and test of the scale are described in detail in chapter MAINTENANCE !

Structure of the system

The evaluation unit is provided with a foil-keyboard with 8 keys.

The both red keys „TARE“ and „TEST“ in general serve for calling the functions of the same name.

Key „MODE“ in general serves for calling the menu structure or returning to it.

The arrow keys „UPWARD“ and „DOWNWARD“ are used for (vertical) moving of the cursor or for changing a number. The arrow keys „LEFT“ and „RIGHT“, however, are used for horizontal moving of the input-cursor.

The key with the checkmark is called key „OK“ and serves for confirming inputs.

In singular cases individual keys may be allocated by special functions, which are described either in the display or in the operating instructions.

At DWC-6AF on the rear side of the device there is a small switch which activates the parameterizing level. At DWC-6AW this switch is in the cable socket.
The manufacturer recommends handling of the parameterizing level only by qualified staff.

Call of indication- and adjustment pictures

With key Mode the selection is called

```
MODE
→ GRAPHIC SCREEN
  TEXT SCREEN
  Status
  CONTROL
  Set clock
  ActualParamet.
```

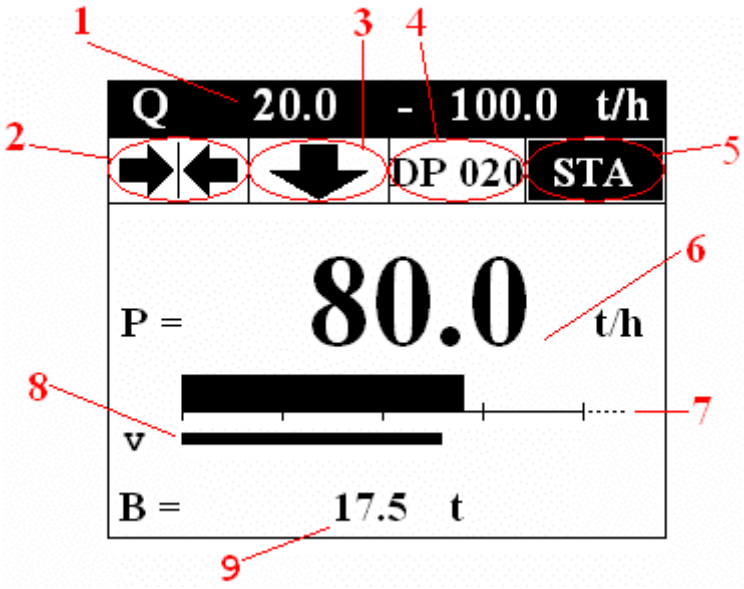
With the arrow-keys (▲▼) the arrow left in the picture is moved to the position requested, with key „°“ the call is done.

DESCRIPTION OF THE INDICATION PICTURES

For reading the operational data and for control indications several pictures are available in normal operation.

Graphic Screen

After switching on the power supply the „**GraphScreen**“ is represented.



1	Adjusted nominal capacity
2	Belt stopped (no material feeding)
3	Belt empty (no material measurable) In case of load or speed over 200% OL (=Overload) is indicated.
4	Indication of the kind of Bus and adjusted Bus address (DP -> ProfibusDP online) (XX -> Bus offline) (empty field -> no Bus system installed or no address adjusted)
5	In Status picture (3.3) messages are indicated
6	Conveying capacity in kg/h or t/h
7	Conveying capacity in % as bar diagram
8	Speed in % as slender bar
9	Quantity counter A , B or C By pressing „UPWARD“ or „DOWNWARD“ switching to another counter is possible.

Text Screen

```
A=      120.0 t
B=       56.5 t
C=       56.5 t
P= 83.27 t/h
p= 83.2%
v=100.5% 100mm/s
g= 82.8%
01/01/2007 02:58
```

A=	Total quantity counter "A"
B=	Quantity counter "B"
C=	Quantity counter "C"
P=	Conveying capacity as absolute value
p=	Conveying capacity in per cent
v=	Speed of weighing belt in per cent & as absolute value
g=	Load of measuring length in per cent

Reset of counters

Reset of quantity counter „B“ is activated by pressing arrow-key key „UPWARD“ (▲)for at least 5 seconds. In the exact same manner with key „DOWNWARD” (▼) the quantity counter „C“ can be deleted.
If a printer is connected to the electronics, a printout with date and time takes place. In case of demand both functions also can be activated via external digital inputs.

Quantity counter „A“ is not deletable !

Status picture

In the status picture the actual state of the scale is apparent. Among others error messages are indicated in the status picture (remedy in case of occurrence of errors see Point 5.4)

```
Status
  MinLoad
  Belt empty
  -  -
  -  -
  -  -   00000014
```

Control

Under „**CONTROL**“ actual measured values, signal states, output values and internal information can be read.

```
Control
> IO-Ports
  ALIBI-MEMORY
  Fieldbus



 EXIT->MODE
```

Selection picture „**CONTROL**“.
Available are:

```
IO-Ports
AD=034831  82.86
DA=000759  83.3%
U1=0 U2=1 U3=0
K1=0 K2=1 TA=0

t = 10000
 EXIT->MODE
```

IO-Ports:
AD = indication of both the actual AD-value (signal from load cell) and the attendant load value in per cent.
DA = indication of the actual DA-value.
U1, U2, U3 = indication of the actual states of Optos
K1, K2 = indication of the actual states of relays
TA = status indication of the tacho input
t = indication of the actual tare-value.

```
+ALIBI-MEMORY  +

Cchecksum: OK
C007     87990kg
01/01/2007 18:34


EXIT->MODE
```

ALIBI-MEMORY:
Here the deleted counter readings are indicated.
On opening the window always the counter reading deleted lastly appears (see counter index, e.g.: C007)
as well as date and time of deletion.
With arrow-keys (▲▼) it is possible to switch between the deleted counter readings.

```
Field bus
   10000  805000
x0000015x0000000
   40000   42000
       0       0
x0000000x0000000
       0       0
EXIT->MODE
```

Field bus: (optional)

Line1: Output of actual capacity	Output of Quantity counter B
Line2: Output of status	Output of relay states
Line3: Output of counter A	Output of Quantity counter C
Line4:	
Line5: Input signal of Opto states	
Line6:	

Please, see details for Field bus communication in Field bus manual !

Setting of the clock

After calling „**Set clock**“ the real time clock can be adjusted..
The adjustments are changed with the arrow-keys UPWARD/DOWNWARD. The effective changeable position is marked by a cursor. The input position can be moved by the arrow-keys LEFT/RIGHT.

```
 Set clock

     14:31


   31/10/2007
       ^
```

With key MODE the picture is left and the time is taken over. The time adjusted here is automatically used for all printouts on optional printers, too.

Actually parameterized (ActualParamet)

In this menu all parameters are represented acc. to PA-list. They cannot be changed.

```
+Nom. capacity +

    100000 kg/h
.       ^
Min         0
Max  10000000
 NEXT-> OK
 EXIT->MODE
```

ActualParamet

Key „OK“ calls the next parameter.
With key „MODE“ the menu can be left prematurely.

Start-up

The erection resp. the installation of the weighing device has to be done acc. to the instructions in the mechanic part of the manual.

The electric connections (cable connections) are to be made acc. to the connecting diagrams attached. Adherence to the corresponding norms (DIN, ÖVE etc.) as well as of the prescriptions of the competent power supply company must be ensured.

The weighing device has to be grounded via a large cross section (at least 16mm2).

MAINTENANCE INSTRUCTIONS

The belt scale (weigh feeder) is a sensitive measuring device. Since sometimes interfering material sediments may occur, a corresponding maintenance operating expense is indispensable.
The maintenance intervals depend on the ambient conditions. After start-up a daily check should be done. Due to the state determined thereby the maintenance intervals can be correspondingly changed later on.

Status control Belt scale

In principle the maintenance works at the scales are limited to pollution control and checking of tare.

ATTENTION!
After replacing parts of the scale or after exchange of the digital weighing electronics the impeccable function of the scale has to be re-established by taring and tests.

At belt scales both after the start-up and in case of possible measuring errors the exact alignment of the weighing rollers and of the adjoining limiting rollers have absolutely to be observed. The maximal deviation (height difference resp. profile difference) must not be higher than 0,5mm.

Generally also the state of the rollers (attachments or deviation) has to be regularly checked in order to guarantee a precise measuring for a long time.

Taring

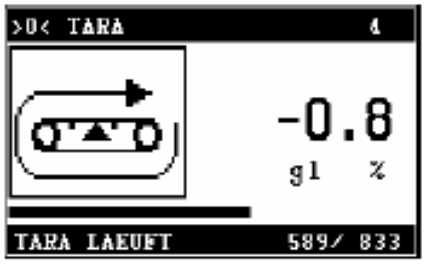
To ensure the supply of correct results, the tare of the scale (zero point) has to be adjusted properly.

Attention!
Before starting taration, the scale has to be checked for disturbing influences and the belt should have run at least for 15 minutes.

Taring always at running belt! Impact flow meters are tared with conveying distance switched-off.

The taring process is started with key >0< Taste from Graphic- or Text screen and runs down automatically in following steps:

- **`EMPTY THE SCALE`** (only if the scale does not recognise "EMPTY" at the start of taring).
- **`SettlingTime`** (5 seconds)
- Storage of tare measured values (one belt revolution).



If the parameter **`Belt empty`** is exceeded, a **`Tare error`** appears and the taring is stopped.

Test

If in normal operation key „TEST" is pressed, the test with test weight begins

Test with test weight (test load):

Determines the percental deviation of the scale with the aid of the test weight (nominal = 0.0%) over a test length (Parameter „**`Belt length`**").
The weighing belt drive must run.
The plant must not convey any weighing material during the test with test weight!

Proceeding at test with test weight:

1. If the message "**EMPTY THE SCALE!**" appears, the tare of the scale is not o.k. The Test has to be stopped, the scale has to be checked and tared.
   After two belt revolutions in case of "**EMPTY THE SCALE!**" the test with test weight is automatically stopped.
   If "**LAY ON TESTW.!**" Is indicated, lay on the test weight (sometimes the test weight consists of tow weights which have to be laid on the left and right side of the weighing bridge).
   If there is a motor test weight device the test weight is laid on by pressing key "ENTER.
2. If the load by the test weight achieves approx. 70% of the test weight parameter, the indication changes to "**`SettlingTime`**". The settling time is about 10 seconds..
3. The test with test weight runs down.
   While the test is running down, the load value with test weight is indicated ("**`g1`**").

4. Evaluation

   The result gives information about the measuring accuracy of the scale. If the deviation is higher than the admissible tolerance, a correction can be carried out.

   If at the test with test weight a deviation higher than the admissible tolerance (1%) is measured, the test has to be repeated with key „DOWNWARDS“ (▼).

   Only if several subsequent test with test weights have the same result being above the tolerance limit and if it is sure that the deviation determined at the test is not caused by a disturbance at the scale, the correction possibility may be used..

Possible reasons of a too big deviation which have to be eliminated before the correction:

- Pollution of weighing roller(s)/weighing bar resp. of measuring length limiting
- Pollution of the weighing belt or maybe bad run of weighing belt.
- Damage of weighing belt.
- Material sediments on test weight (at fix-mounted test weight)
- Test weight(s) not correctly laid-on
- Material guiding not correctly adjusted. The material guiding must not impede the scale.
- Taring was not carried out.

Material test:

Permits material check with 10-fold resolution of counting compared with normal operation. The evaluation is done at the measuring point „**g1**“.

Preparation of material test:

Provide for a material sample with at least 100 counting steps.

Proceeding at material test.

1. Press key “TEST” and start material test with key „UPWARD“ (▲).
2. The picture “**MAT-TEST**” appears.
3. Switch on material conveying. The weighing belt load should be within the normal range (“**g1**” = approx. 50-80%) during material test.
4. When the material has passed, stop the material transport.
5. Terminate material test with “MODE“.

Evaluation of material test.

1. The text “**RE-WEIGHING**” appears.
2. Re-weigh the material sample conveyed.
3. Overwrite the suggested value (= the value measured by the scale) with the actual value of the material sample. With arrow keys „UPWARD“ and „DOWNWARD“ (▲▼) the correction is done in steps of one and with keys „LEFT“ and „RIGHT“ (◄►) in steps of ten.
4. After pressing key „ENTER“ the correction is indicated and afterwards automatically normal operation is achieved.

Status messages and error messages

Meaning of errors and remedy in case of occurrence of errors

• A/D-Error

Reason: The measured value at the weighing channel is either lower than 1.000 or higher than 40.000.

Remedy:
1. Check, if a damage can be determined at the load cell(s).
2. Check, if the cable connection between weighing electronics and load cell(s) is o.k.
3. Check supply voltage for load measuring and measuring signal:
   Connection 2/3: 3,3 VDC
   Connection 1/4: Measuring signal, maximal 6,6mV, 0mV at relieved load cell(s) (see test protocol).

• Min Load

Reason: The material load has dropped beneath a value deposited in the parameterizing..

Remedy: Provide for more material discharge. If the material feeding being too light is due to changed material properties, maybe a re-adjustment of the material feeding is required

• Max Load

Reason: The weighing belt is overloaded

Remedy: Provide for a lower material discharge. If the material feeding being too heavy is due to changed material properties, maybe a re-adjustment of the material feeding is required. Maybe the weighing range (nominal capacity) is undervalued.

• Belt stopped

Reason: No tacho pulses arrive (drive switched off).

Remedy: See also „**Drive/Tacho**".

• Belt empty

Reason: The belt load is beneath the limit value „**Belt empty**".

• Drive/Tacho

Reason: No tacho signal can be measured, although a signal is received at Opto-input „Belt runs".

Remedy: If the message comes with running drive, check tacho for correct function.

• Belt-mis-run

Reason: The belt run monitoring signals an off-center run of the weighing belt.

Remedy: Check belt steering device, adjust belt to centric run.

• Taration Err.

Reason: During the taring process the value **„Belt empty"** was exceeded.

Remedy: Check/clean the scale, repeat taration.

• Fault motor

Reason: A signal is received at Opto-input „Fault motor".

Remedy: Check the motor for possible faults.

IMPORTANT KEY COMBINATIONS

General operation

(Arrow) -keys	Scope of application:	Function:
UPWARD or DOWNWARD	Graphic Screen	Changes the indicated counter A->B->C ->A...
UPWARD at least 5 seconds	Text Screen	Deletes counter B incl. printout, in case of existing printer
DOWNWARD at least 5 seconds	Text Screen	Deletes counter C incl. printout, in case of existing printer
TEST	Graphic Screen or Text Screen	Starts test process of the scale
>0<	Graphic Screen or Text Screen	Starts taring process of the scale
>0<	Parameterizing mode	Automatic calibration of the Weighing-channel-Offsets at empty-running belt
LEFT and RIGHT	Status picture	Acknowledgement of actual Status- and Error messages

RESET and COLD START-Combinations

Keys (combination):	Scope of application:	Function:
UPWARD and DOWNWARD simultaneous	always	RESET of the scale computer Comparable with Voltage OFF/ON
LEFT / RIGHT simultaneous	Parameterizing mode	Must simultaneously be confirmed with „>0<“ and „TEST“. ***ATTENTION:*** ***All parameters are deleted !***