User manual

TriSORT PC/MultiMATIC

Code No. 99-97-2728 GB

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1 System description

The TriSORT sorting scale has been designed for automatic, weight-depending selection of pigs in group housing systems.

TriSORT permits to sort the pigs in 10 weight groups. In addition, overweight and/or shortweight pigs can be marked with two different colours by means of a colour marker.

The sorting scale is used in stand-alone operation. That means the TriSort computer precisely registers each individual weighing and processes the data. Furthermore the data can be forwarded to a Windows PC to allow for user-friendly tabular and graphical evaluations. One PC can manage up to 32 TriSort stations.

Two versions of the TriSORT sorting scale are available:

– sorting scale TriSORT with 2-way-sorting

– sorting scale TriSORT with 3-way-sorting

Optionally, both devices can be equipped with up to two colour-marking units.

All parts of the sorting scale are made of corrosion-resistant stainless steel and plastic.

The computer control unit is mounted on top of the sorting scale and protected by a cover.

For the operation of the sorting scale, an electric connection 110/230V 50-60Hz and a compressed air connection are required.

To allow for a more comfortable operation of the system and for better evaluation options, for example by means of weight behaviour curves, up to 16 TriSORT stations can be centrally controlled by means of the optional PC-software TriSORT PC.

1.1 Technical data

1.1.1 Electric connections

– 110/230V 50-60Hz re-pluggable

– power consumption max. 50VA

Installations and work on the electric components/structural groups may only be carried out by qualified personnel according to electro-technical regulations (e.g. EN 60204, DIN VDE 0100/0113/0160).

Dangerous electric tensions are bare in case of open control equipment. Please be aware of the danger and keep workers of other professions away from the danger zone !

1.1.2 Compressed air supply

required minimum pressure	8bar
required air supply	ca. 150 -160 l/min
working pressure	ca. 3,5 - 4,0 bar
filter pressure reducer	adjustable, with manometer

1.1.3 Measurements and weights

Table 1-1: Sorting scale TriSORT with 2-way-sorting

max. length	2.530 mm (entry open)
max. length	2.310 mm (entry closed)
max. width	555 mm
max. high	1.405 mm
transportation weigh	ca. 225 kg

Table 1-2: Sorting scale TriSORT with 3-way-sorting

max. length	2.530 mm (entry open)
max. length	2.310 mm (entry closed)
max. width	555 mm
max. high	1.405 mm
transportation weigh	ca. 235 kg

2 MultiMATIC

Version: Sorter V2.0 090703fT

2.1 Basic settings MultiMatic

⚠	Installations and work on the electric components/structural groups may only be carried out by qualified personnel according to electro-technical regulations (e.g. EN 60204, DIN VDE 0100/0113/0160).
⚠	Dangerous electric tensions are bare in case of open control equipment. Please be aware of the danger and keep workers of other professions away from the danger zone !

Instructions for setting up basic data upon taking Trisort into operation or in case of loss of data.

1. Step - Checking the supply voltage of the memory

An internal storage battery supplies the Multimatic computer, it constantly recharges during operation. At delivery, the storage battery is in "Off" mode and first has to be set to "On" by shifting the voltage jumper to activate the supply battery of the memory. (see figure 2-1).

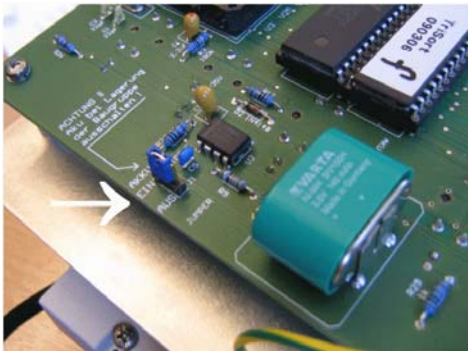


Figure 2-1: Jumper "Akku"

⚠	If the storage battery is in "ON" mode and the MultiMatic computer is switched off, the charged battery supplies the memory for 4 weeks. If it runs longer, you risk the loss of data.

2. Step - Resetting the memory

To remove incorrect data or possible misadjustments, it is absolutely necessary to delete the entire memory.

Switch on the computer. After approx. 30 seconds, it is ready for operation. To allow accurate setting, the sorter should be in "Pause" mode. For this push the STOP button. Pushing the "Menu" button leads you back to the main menu.

Pushing the arrow key leads you to the subsection *"Loeschen/Delete"* , which can be confirmed by ENTER. Confirm the query *"Delete all data?"* with the + button.

3. Step - Choose language

After the reset, the MultiMATIC -computer starts by default with the german language. To select a different language, follow these steps:

– Press the button

the following window appears:

```
*** HAUPTMENUE ***

Alarmprotokoll
```

– Press 5 times button

the following window appears:

```
*** HAUPTMENUE ***

Anlagedaten
```

– Press ENTER

the following window appears:

```
EINGABE ANLAGEDATEN
Verstaerkung des
Wiegesystems
1.000000
```

– Press 8 times the ↓ button
the following window appears:

```
EINGABE ANLAGEDATEN
Sprache, language
1=D,2=GB,3=DAN,4=FRA
 1
```

– Select with the + button the number of the desired language

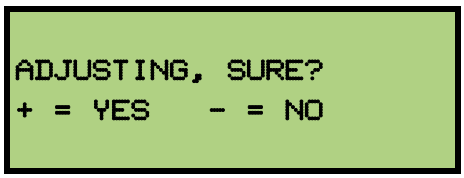
– Press ENTER

– Pushing the STOP button leads you back to the main menu.

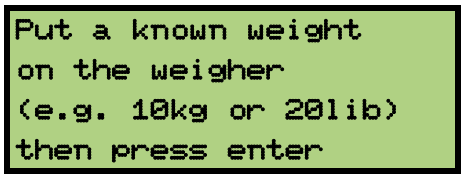
4. Step - Weigher adjustment

In the subsection *"Weigher adjustment"* it is possible to calibrate the weigher to reach an exact weight. (Please keep ready at least a 10 kg standard weight).

In this menu the weighing unit can be adjusted. This is necessary when installing the system. A change of the maximum weight for the weighing unit (SYSTEM DATA) also requires a new adjustment. When choosing this submenu a security query shows up first:

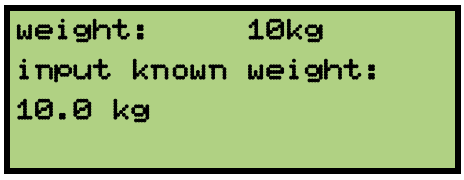


If you give your agreement here, an automatic tare of the weigher is effected first. Afterwards you are asked to load a defined weight to the unit.



Place this weight in the middle of the unit and press the ENTER-key!

The weight is determined and you are asked to enter the weight value (if you used a 10 kg weight, you just have to press ENTER).



Afterwards the sorter automatically calculates the tare and the amplification and enters these values into the system data. The weigher adjustment is completed now. The program automatically returns to the main menu.

5. Step - Network settings

If your TriSort system is connected with an external computer, go to the *"System data"* subsection in the Main menu. There, you will find a subsection *"Address of sorter in the feeding network"*. At delivery, it is set to 10. You can change the address in the network by pushing the + and - buttons. Confirm with Enter. Please compare this setting with the network assignment at your external computer. (Trisort.exe in the PC system data subsection). You get back to the *"Main menu"* by the Stop key

	Enter only network addresses greater than 10 or equal 10.

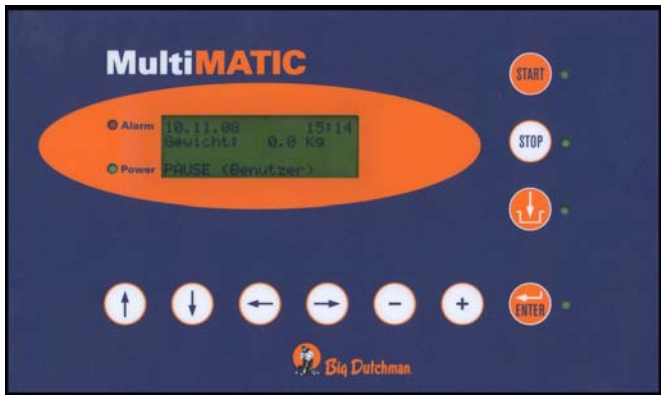
6. Step - Limit switch at the sorting gate

Limit switches at the sorting gate can be activated in the *"System data"* of the Main menu. In the subsection *"Switch at sorting gate"* you can choose between 1= Yes and 0= No. If you have limit switches at your sorting gate, change to 1 here and confirm with *"Enter"*.

7. Step - Entering time and date

The Main menu has a subsection *"Input of time / date"*. By pushing the arrow keys you reach the respective subsections hour, minute, day, month and year. These can be switched to the correct date and respective time by the using the + and - keys.

2.2 Software Operation



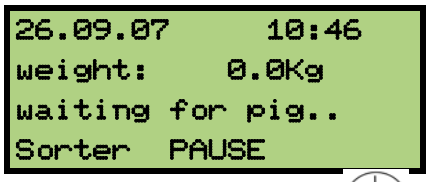
Operation of the system is carried out by a foil keyboard with 10 keys and a LCD-display with 4 lines and 20 characters per line.

Key functions:

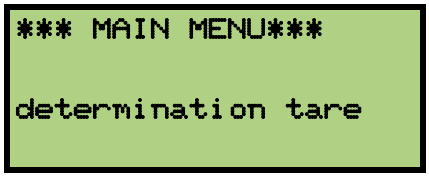
key		function
START	START	When the sorter was set into the “pause”-mode with key “STOP” it can be reactivated with key “START“.
STOP	STOP	With key “STOP” the sorting procedure can be brought to a standstill. The sorter remains in the “pause“-mode until key “START“ is pressed.
	INPUT	With this key you enter the input menu. First, the sorter switches into the “pause”-mode. Afterwards, the input menu is displayed.
ENTER	ENTER	With this key values are adopted respect. options of the particular menus are selected.
+	PLUS	With this key the values are increased when entering data.
-	MINUS	With this key the values are decreased when entering data.
→	ARROW RIGHT	With these keys the particular submenus of the input menus are chosen.
←	ARROW LEFT	
↓	ARROW DOWN	
↑	ARROW UP	

2.2.1 Example

The "state display"



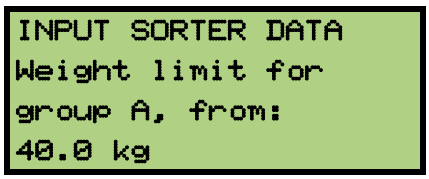
1. Press key "INPUT" 
2. Sorter main menu:



3. Press key "ARROW DOWN"  , until the text " Sorting data" is displayed:

4. Press key "ENTER" 

5. The display changes:



6. With the keys "PLUS" 

and "MINUS" 

you may now change this value.

   First, the display changes in steps of 0,5 kg. If you keep the keys pushed down, the step size of the modification becomes larger. Thus, it is possible to carry out large alterations of the values within a short time.

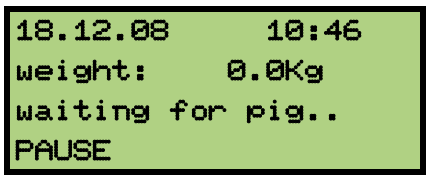
   When you have entered the desired value you may return to the main menu with key "STOP" 

.

   Pressing key "STOP" again leads you back to the state display.

All necessary for the operation of the sorter can be changed according to the a.m. procedure.

2.3 State Display



The state display is arranged as follows:

First line:

Here, the current date and time is displayed.

Second line:

Here, the momentary weight of the weighing unit is displayed.

Third line:

Here, the sorting procedure is displayed. E.g. "waiting for pig" or " sorting to B"

Forth line:

Here, the sorter condition is displayed. The sorter can either be in the "PAUSE"-mode (no pigs are sorted, the entry is permanently open) or the sorter is activated. In this case "sorter runs" would be displayed in the fourth line.

The sorter condition can be changed with the keys "STOP" 

and "START" 

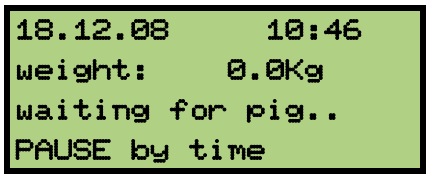
.

The sorter can be stopped by pressing the respective keys as described above. The feeding system can also stop the sorter if it is connected with the sorter.

This can be adjusted at the corresponding feeding. The feeding then starts the sorting procedure when the valves of the section are fed. The sorting procedure is stopped after a certain time has passed.

It is, however, possible, to enter 10 different times in the sorter data. Within these entered periods the sorter is set free automatically.

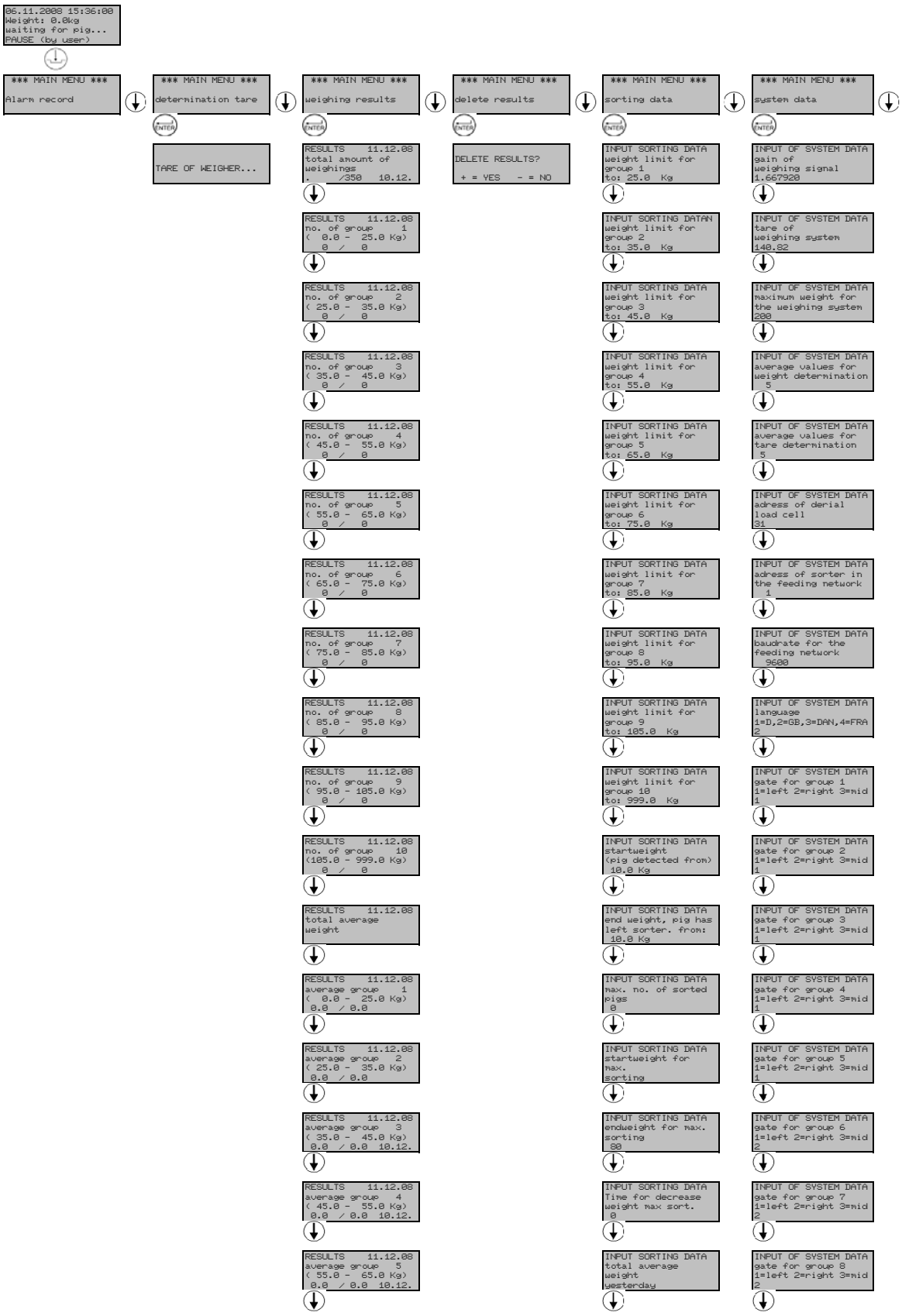
If the sorter switches to the pause mode according to the entered periods, this is marked as follows:

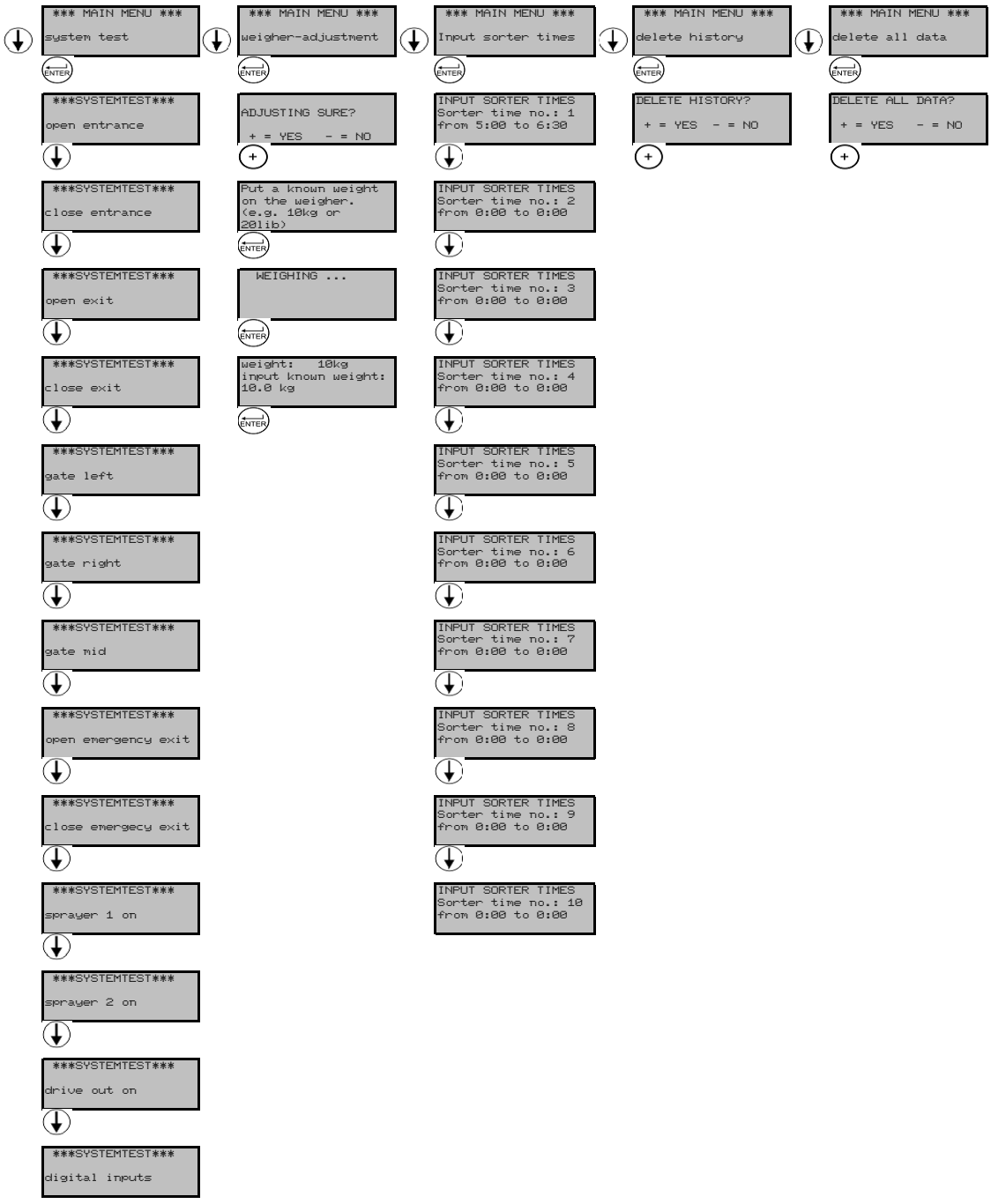


or

if both pause modes are correct.

2.4 Overview


06.11.2008 15:36:00
Weight: 0.0kg
waiting for pig...
PAUSE (by user)
*** MAIN MENU ***
Alarm record
*** MAIN MENU ***
determination tare
TARE OF WEIGHER...
*** MAIN MENU ***
weighing results
RESULTS 11.12.08
total amount of weighings
0 /350 10.12.
RESULTS 11.12.08
no. of group 1
(0.0 - 25.0 Kg)
0 / 0
RESULTS 11.12.08
no. of group 2
(25.0 - 35.0 Kg)
0 / 0
RESULTS 11.12.08
no. of group 3
(35.0 - 45.0 Kg)
0 / 0
RESULTS 11.12.08
no. of group 4
(45.0 - 55.0 Kg)
0 / 0
RESULTS 11.12.08
no. of group 5
(55.0 - 65.0 Kg)
0 / 0
RESULTS 11.12.08
no. of group 6
(65.0 - 75.0 Kg)
0 / 0
RESULTS 11.12.08
no. of group 7
(75.0 - 85.0 Kg)
0 / 0
RESULTS 11.12.08
no. of group 8
(85.0 - 95.0 Kg)
0 / 0
RESULTS 11.12.08
no. of group 9
(95.0 - 105.0 Kg)
0 / 0
RESULTS 11.12.08
no. of group 10
(105.0 - 999.0 Kg)
0 / 0
RESULTS 11.12.08
total average weight
RESULTS 11.12.08
average group 1
(0.0 - 25.0 Kg)
0.0 / 0.0
RESULTS 11.12.08
average group 2
(25.0 - 35.0 Kg)
0.0 / 0.0
RESULTS 11.12.08
average group 3
(35.0 - 45.0 Kg)
0.0 / 0.0 10.12.
RESULTS 11.12.08
average group 4
(45.0 - 55.0 Kg)
0.0 / 0.0 10.12.
RESULTS 11.12.08
average group 5
(55.0 - 65.0 Kg)
0.0 / 0.0 10.12.
*** MAIN MENU ***
delete results
DELETE RESULTS?
+ = YES - = NO
*** MAIN MENU ***
sorting data
INPUT SORTING DATA
weight limit for group 1
to: 25.0 Kg
INPUT SORTING DATAN
weight limit for group 2
to: 35.0 Kg
INPUT SORTING DATA
weight limit for group 3
to: 45.0 Kg
INPUT SORTING DATA
weight limit for group 4
to: 55.0 Kg
INPUT SORTING DATA
weight limit for group 5
to: 65.0 Kg
INPUT SORTING DATA
weight limit for group 6
to: 75.0 Kg
INPUT SORTING DATA
weight limit for group 7
to: 85.0 Kg
INPUT SORTING DATA
weight limit for group 8
to: 95.0 Kg
INPUT SORTING DATA
weight limit for group 9
to: 105.0 Kg
INPUT SORTING DATA
weight limit for group 10
to: 999.0 Kg
INPUT SORTING DATA
startweight (pig detected from)
10.0 Kg
INPUT SORTING DATA
end weight, pig has left sorter. from:
10.0 Kg
INPUT SORTING DATA
max. no. of sorted pigs
0
INPUT SORTING DATA
startweight for max. sorting
INPUT SORTING DATA
endweight for max. sorting
80
INPUT SORTING DATA
Time for decrease weight max sort.
0
INPUT SORTING DATA
total average weight yesterday
*** MAIN MENU ***
system data
INPUT OF SYSTEM DATA
gain of weighing signal
1.667920
INPUT OF SYSTEM DATA
tare of weighing system
140.82
INPUT OF SYSTEM DATA
maximum weight for the weighing system
200
INPUT OF SYSTEM DATA
average values for weight determination
5
INPUT OF SYSTEM DATA
average values for tare determination
5
INPUT OF SYSTEM DATA
adress of derial load cell
31
INPUT OF SYSTEM DATA
adress of sorter in the feeding network
1
INPUT OF SYSTEM DATA
baudrate for the feeding network
9600
INPUT OF SYSTEM DATA
language
1=D,2=GB,3=DAN,4=FRA
2
INPUT OF SYSTEM DATA
gate for group 1
1=left 2=right 3=mid
1
INPUT OF SYSTEM DATA
gate for group 2
1=left 2=right 3=mid
1
INPUT OF SYSTEM DATA
gate for group 3
1=left 2=right 3=mid
1
INPUT OF SYSTEM DATA
gate for group 4
1=left 2=right 3=mid
1
INPUT OF SYSTEM DATA
gate for group 5
1=left 2=right 3=mid
1
INPUT OF SYSTEM DATA
gate for group 6
1=left 2=right 3=mid
2
INPUT OF SYSTEM DATA
gate for group 7
1=left 2=right 3=mid
2
INPUT OF SYSTEM DATA
gate for group 8
1=left 2=right 3=mid
2


*** MAIN MENU ***
system test
ENTER
SYSTEMTEST
open entrance
SYSTEMTEST
close entrance
SYSTEMTEST
open exit
SYSTEMTEST
close exit
SYSTEMTEST
gate left
SYSTEMTEST
gate right
SYSTEMTEST
gate mid
SYSTEMTEST
open emergency exit
SYSTEMTEST
close emergecy exit
SYSTEMTEST
sprayer 1 on
SYSTEMTEST
sprayer 2 on
SYSTEMTEST
drive out on
SYSTEMTEST
digital inputs
*** MAIN MENU ***
weigher-adjustment
ENTER
ADJUSTING SURE?
+ = YES - = NO
+
Put a known weight
on the weigher.
(e.g. 10kg or
20lib)
ENTER
WEIGHING ...
ENTER
weight: 10kg
input known weight:
10.0 kg
ENTER
*** MAIN MENU ***
Input sorter times
ENTER
INPUT SORTER TIMES
Sorter time no.: 1
from 5:00 to 6:30
INPUT SORTER TIMES
Sorter time no.: 2
from 0:00 to 0:00
INPUT SORTER TIMES
Sorter time no.: 3
from 0:00 to 0:00
INPUT SORTER TIMES
Sorter time no.: 4
from 0:00 to 0:00
INPUT SORTER TIMES
Sorter time no.: 5
from 0:00 to 0:00
INPUT SORTER TIMES
Sorter time no.: 6
from 0:00 to 0:00
INPUT SORTER TIMES
Sorter time no.: 7
from 0:00 to 0:00
INPUT SORTER TIMES
Sorter time no.: 8
from 0:00 to 0:00
INPUT SORTER TIMES
Sorter time no.: 9
from 0:00 to 0:00
INPUT SORTER TIMES
Sorter time no.: 10
from 0:00 to 0:00
*** MAIN MENU ***
delete history
ENTER
DELETE HISTORY?
+ = YES - = NO
+
*** MAIN MENU ***
delete all data
ENTER
DELETE ALL DATA?
+ = YES - = NO
+

2.5 Main menu

2.5.1 Data input

For the operation of the sorter certain data have to entered once when installing the sorter. Besides, weight limits have to changed on operation of the system or it might be that you want to see e.g. the weighing results.

For the data input please press key "INPUT". 

The main menu with the first option "determination tare" is displayed.

With the keys "arraow down"  and "arrow up"  you now choose the desired input option (the desired submenu). Confirm with "ENTER" 

With the help of the arrow keys you now have to select the value to be changed. Change this value with the keys "PLUS"  und "MINUS" 

2.6 Alarm record

The alarm record indicates soft alarms and hard alarms. The following alarm messages can occur with TriSORT:

No. 1: Pig stays on scale Soft alarm

See "Sorter system data - Alarm" for the reason for this alarm

No. 2: Pig stays on scale Hard alarm

See "Sorter system data - Alarm" for the reason for this alarm

No. 3: Entrance cannot be closed Soft alarm

See "Sorter system data - Alarm" for the reason for this alarm

No. 4: Entrance cannot be closed Hard alarm

See "Sorter system data - Alarm" for the reason for this alarm

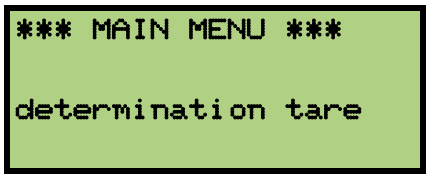
No. 5: Sorter gate cannot be moved

See "Sorter system data - Alarm" for the reason for this alarm

No. 6: Weighing system (scale could not be read 5 times, continued trials ...)

If this message occurs more frequently or regularly, please contact the after-sales service. There could be a malfunction or loose contact. If you find this entry in the alarm record and the scale does not indicate anything or only wrong values, please also contact the after-sales service.

2.7 Determination tare



In operation the sorter tares automatically as soon as a pig left the weighing unit. Dirt in the unit therefore does not influence the following weighing procedure.

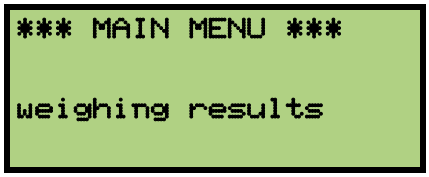
A manual tare can be carried out with option "determination tare"

After pressing key ENTER the screen shortly displays „TARING OF WEIGHTER.....“.

Afterwards the scale is set to "0" and the input switches back to the main menu.

Press key STOP and leave the main menu.

2.8 Weighting results



In this submenu you may inform yourself about the current weighing results.

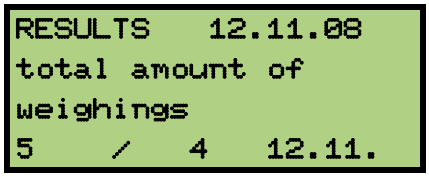
With the keys "arrow down" and "arrow up" the following values can be shown:

– total number of weighing procedures
– number of weighing procedures of the pigs sorted to group 1 to 10
– average weight of all weighing procedures
– average weight of the pigs sorted to group 1 to 10

Use the buttons "Plus" + and "Minus" - to scroll to the next / previous day. The results of 500 days is the maximum that can be saved.

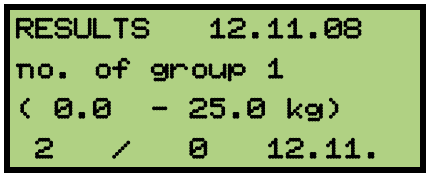
With key STOP the submenu "weighing results" can be left.

2.8.1 Total amount of weighings



This menu displays the total amount of weighings of all groups that have so far been registered (today). Use the "Minus" - key to scroll to the previous day.

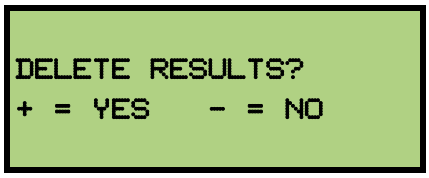
2.8.2 No. of group 1-10



This menu displays the number of weighings (today) for the selected group.

2.9 Delete results

The weighing results can be deleted in this submenu. Before deletion a security question appears:

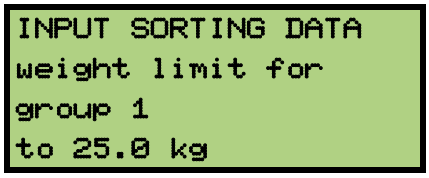


After pressing key + all average values and the number of the weighing procedures are deleted. Afterwards the sorter returns automatically to the main menu.

2.10 Sorting data

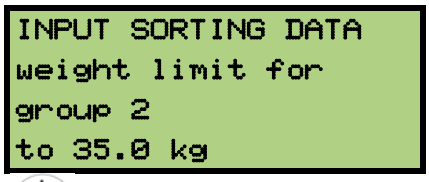
2.10.1 Weight limit for group 1-10

For a correct function of the sorter the weight limits for the particular weight groups have to be entered in menu "sorting data". After pressing the ENTER key the submenu "sorting data" is displayed. You now have to enter the first limit value.

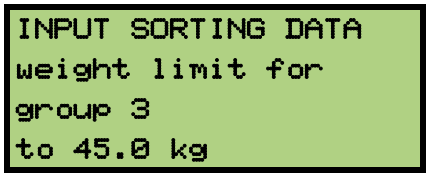


The value can be changed with the "PLUS" + and "MINUS" - keys.

Use the ↓ key to switch to the next group.



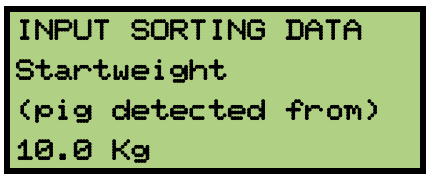
↓



and so on...

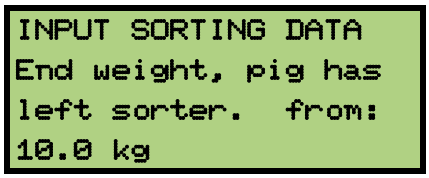
In this manner you can freely define up to 10 weight groups.

2.10.2 Start weight (pig detected from)



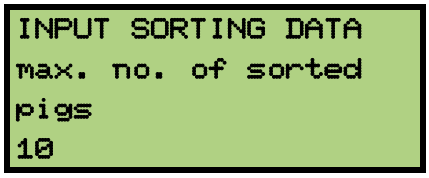
When TriSORT registers a weight larger than this weight, the weighing and sorting procedure starts. Weights below this value are ignored.

2.10.3 End weight (pig has left sorter)



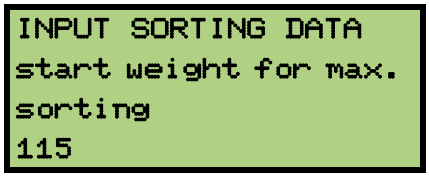
If the exit gate is open and the scale registers a weight below this value, the exit is closed again, the scale is tared anew, the entrance is opened and waiting for the next animal.

2.10.4 Max. no. of sorted pigs



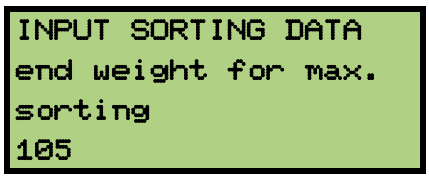
Enter here, how many animals are supposed to be sorted out.

2.10.5 Start weight for max. sorting



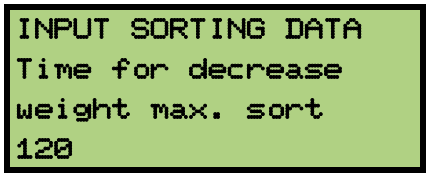
The sorter starts sorting out of animals at this weight.

2.10.6 End weight for max. sorting



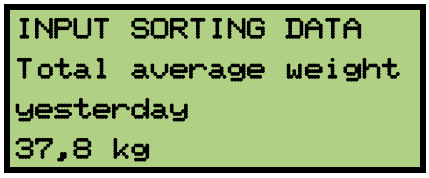
The sorter does not sort out animals below this weight.

2.10.7 Time for decrease weight max. sort.



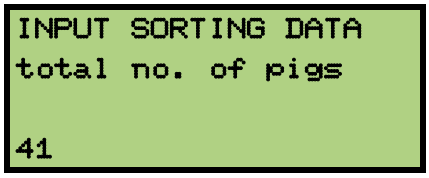
After this time has passed, the start weight is reduced by 1 kg respectively until the end weight or until the desired number of animals has been sorted out.

2.10.8 Total average weight yesterday



The TriSORT computer shows the average weight of all yesterday's weighings.

2.10.9 Total number of pigs



Number of pigs that have access to this TriSORT station. This value has to be entered once open starting the sorting procedure. This allows statistical calculations.

2.11 System data

Once when installing the sorter, certain technical data have to be entered. These data have to be defined in submenu "system data".

2.11.1 Gain of weighing signal

The TriSORT computer calculates and enters this value upon alignment of the weighing system. It should not be modified manually, since the scales can then no longer operate precisely.

2.11.2 Tare of weighing system

The TriSORT Computer calculates this value upon alignment of the weighing system and upon taring. It is then stored automatically. It should not be modified manually as is the case with amplification.

2.11.3 Maximum weight for the weighing unit

This is the maximum carrying capacity of the load cells.

2.11.4 Average values for weight determination

During operation, the software calculates average values.

Since the number of weighings of the weigh box is >1000 / sec., it already calculates approx. 100 average values / sec. internally. The TriSORT software then evaluates the average value from 5 values each and draws on it for weight evaluation.

2.11.5 Average values for tare determination

During taring, the software evaluates average values.

Since the number of weighings of the weigh box is >1000 / sec., it already calculates approx. 100 average values / sec. internally. The TriSORT software then evaluates the average value from 5 values each and draws on it for weight evaluation.

2.11.6 Address serial load cell

Here, you have to enter the address of weighing electronics (weigh box). In most cases, it is address 31 (delivery status of weigh boxes).

2.11.7 Address of sorter in the feeding network

This is the address of the sorter in the network. The TriSORT PC software can administer up to 32 TriSORT stations. For this purpose, each station has to have its own address. Each address (No.) can only be assigned once in the network! After entering the address, the TriSORT computer (Multimatic) has to be restarted (switched on and off). The address becomes valid only after that.

Enter only network addresses greater than 10 or equal 10.

2.11.8 Baudrate for the feeding network

The baudrate in the network is always 9600 for the sorter.

2.11.9 Language

Enter here the desired language.

2.11.10 Gate for group 1

left, right or mid

Here you have to determine into which gate the pigs of group 1 have to be sorted.

The groups will be set in "SORTING DATA".

2.11.11 Gate for group 2

left, right or mid

Here you have to determine into which gate the pigs of group 2 have to be sorted.

The groups will be set in "SORTING DATA".

2.11.12 Gate for group 3

left, right or mid

Here you have to determine into which gate the pigs of group 3 have to be sorted.

The groups will be set in "SORTING DATA".

2.11.13 Gate for group 4

left, right or mid

Here you have to determine into which gate the pigs of group 4 have to be sorted.

The groups will be set in "SORTING DATA".

2.11.14 Gate for group 5

left, right or mid

Here you have to determine into which gate the pigs of group 5 have to be sorted.

The groups will be set in "SORTING DATA".

2.11.15 Gate for group 6

left, right or mid

Here you have to determine into which gate the pigs of group 6 have to be sorted.

The groups will be set in "SORTING DATA".

2.11.16 Gate for group 7

left, right or mid

Here you have to determine into which gate the pigs of group 7 have to be sorted.

The groups will be set in "SORTING DATA".

2.11.17 Gate for group 8

left, right or mid

Here you have to determine into which gate the pigs of group 8 have to be sorted.

The groups will be set in "SORTING DATA".

2.11.18 Gate for group 9

left, right or mid

Here you have to determine into which gate the pigs of group 9 have to be sorted.

The groups will be set in "SORTING DATA".

2.11.19 Gate for group 10

left, right or mid

Here you have to determine into which gate the pigs of group 10 have to be sorted.

The groups will be set in "SORTING DATA".

2.11.20 Gate at alarm

left, right or mid

If the alarm "pig on weigher" occurs or the sorter is presently in the "Pause" mode, the sorting gate is switched in this direction.

2.11.21 Learning phase

No Time+Animal Only time

The learning mode has the following three modes:

– No: The learning mode is switched off. TriSORT is in the sorting mode. Attention: This setting might possibly be overwritten by the value "Learning mode in time-pause"!

– Time+Animal: The sorting gate switches from one position to the next corresponding to the entered time. This only happens, however, if an animal has entered the scale. This avoids switching back and forth between the gates if no animals are entering the scale. Of course, this setting reduces the noise level at quiet times and the wear and tear of mechanic parts.

– Only time: After the entered time, the sorting gate switches from one position to the other, no matter if an animal has entered the platform or not.

2.11.22 Switch at exit

Here you have to enter, whether the sorter is equipped with a switch to recognize the condition of the exit gate.

2.11.23 Time for sprayer

If a sprayer is piloted it is for the time set here. The basis is 1/50 sec. 50 in this field means that the selected sprayer is piloted for 1 second. 25 pilots the selected sprayer for 0.5 seconds.

2.11.24 Re-opening time entry

The gate has to be closed within 5 s. If the final position is not reached within 5 s, the entrance is opened again for the time set here. Here, a reasonable setting is between 5 and 10 (corresponding to 0.5 to 1 s). This will shortly release a jammed animal so that it can back out of the closing area. If this time is too short, the animal cannot retreat, if it is too long, the animal can further reach the sorter and block the gate again.

2.11.25 Opening time exit

When opening the exit gate and TriSORT finds out that the weight is below "pig has left platform" (Weight ranges), the exit stays open for a longer time to ensure that the animal has really left the platform. A reasonable setting here is also 5-10, corresponding to 0.5 to 1 s).

2.11.26 Sprayer for group 1 - 10

– none
– sprayer 1
– sprayer 2

This setting selects per group if and which sprayer is supposed to be used for marking. Each sprayer is piloted for the duration set in "time for sprayer".

2.11.27 Alarm time

If a pig refuses to leave the weighing unit, the drive-out aid is operated. In case the pig is still standing inside the weighing unit after the alarm time 1 (in minutes) has run off, an alarm1 is set off. The alarm LED lightens and alarm relay 15 connects. In case the pig is still standing inside the weighing unit after alarm time 2 (in minutes) has run off, an alarm 2 is set off. Alarm relay no. 16 is connecting.

2.11.28 Hard alarm relay (NO/NC)

In this option you have to define whether the alarm relays for hard-alarm have to be normal closed (NC) or normal open (NO).

2.11.29 Soft alarm relay (NO/NC)

In this option you have to define whether the alarm relays for hard-alarm have to be normal closed (NC) or normal open (NO).

2.11.30 Emergency exit open

The emergency exit is an additional walk-through for the pigs and can be operated optionally. Entering 1 means, the emergency exit opens as soon as a soft-alarm is set off. Entering 2 means that the emergency exit opens during a hard-alarm. When entering 3, the emergency exit opens during both alarms.

2.11.31 Soft alarm entry closing attempts

Here you have to enter after how many unsuccessful attempts to close the entry gate a soft-alarm has to be set off (0=no alarm).

When this alarm is released, the computer additionally opens the exit door. That means, if the entrance door could not be closed because the entrance was blocked by too many pigs, a pig can always leave the sorter and the entrance door can be closed again after the next pig. The weighing process, however, is invalid.

2.11.32 Hard alarm closing attempts

Here you have to enter after how many unsuccessful attempts to close the entry gate a hard-alarm has to be set off (0=no alarm).

2.11.33 Gate max. sorts

In this option it has to be entered which gate has to be opened when the maximum number of sorted pigs has been achieved (see chapter Sorting Data).

2.11.34 Switch at sorting gate

If the sorter is equipped with switches to recognize the end-position of the sorting gate, a 1 has to be entered here.

2.11.35 Gate for learning phase

Here you may determine between which gates the sorter has to switch during the learning phase.

2.11.36 Cycle learning phase

Here you have to define the period for the sorting gate to change its position during the learning phase.

2.11.37 Sorting limits auto

If this function is activated, the "average weight yesterday" is compared to the "average weight today" upon status increase (at midnight) and the sorting limits of all groups are increased by this difference. This leads to a uniform utilisation of eating areas.

A prerequisite for this is, however, that the sorting limits at the beginning of sorting have relatively reasonable values matching the actual animals' weights.

2.11.38 Filter type

1=8Hz 8=0,05Hz

Please always select 1=8Hz. All other settings slow down weighing unnecessarily.

2.11.39 Filter frequency

1=8Hz 8=0,05Hz

Please always select 1=8Hz. All other settings slow down weighing unnecessarily.

2.11.40 Weighing preciseness

0=low 7=high

To achieve fast weighing of the highest possible precision, choose setting 1.

2.11.41 Autotrans to WetMIX/DryMATIC

In case an automatic data transfer to the feeding (DryMATIC or WetMIX) is desired, a 1 has to be entered into this option.

2.11.42 +/- limit in % for invalid weights

On the basis of this value, the computer verifies whether the weighing is valid. If, for example, two pigs step on the weighing platform at the same time, the weighing will be ignored.

The limit has to be entered in percent. The mean value of the day before is used as reference value. Example:

limit value = 50%

mean value day before =50 kg

All weighings that are larger than 75kg and smaller than 25kg will be ignored.

2.11.43 Learning mode

If a 1 is entered, the computer automatically switches to learning mode (mode 2) during the pause times.

Use the stoppkey STOP to leave the entry mask of the system data.

2.12 Input of Time / Date

The sorter is provided with a network failsafe clock. Time and date have to be entered only once in this menu.

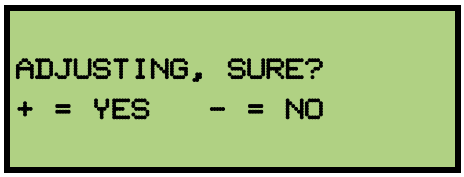
	The clock does not switch automatically to summer or winter time.

2.13 System test

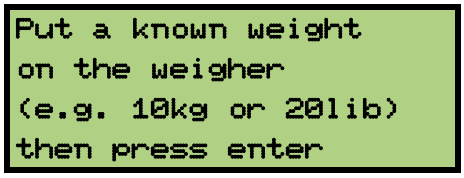
In this menu the function of all gates, the sprayers and the drive-out aid can be checked.

2.14 Scale adjustment

In this menu the weighing unit can be adjusted. This is necessary when installing the system. A change of the maximum weight for the weighing unit (SYSTEM DATA) also requires a new adjustment. When choosing this submenu a security query shows up first:

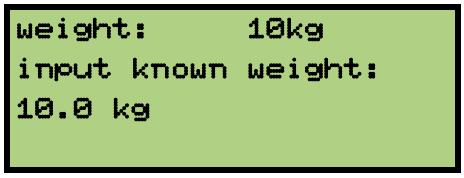


If you give your agreement here, an automatic tare of the weigher is effected first. Afterwards you are asked to load a defined weight to the unit.



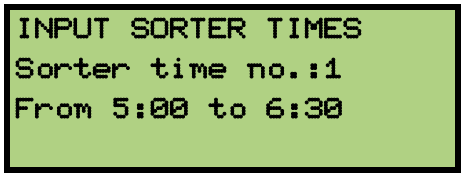
Place this weight in the middle of the unit and press the ENTER-key!

The weight is determined and you are asked to enter the weight value (if you used a 10 kg weight, you just have to press ENTER).



Afterwards the sorter automatically calculates the tare and the amplification and enters these values into the system data. The weigher adjustment is completed now. The program automatically returns to the main menu.

2.15 Input sorter times



If you want to run the sorter only at specific times of day, enter 10 times from what time until what time the sorter is active. In the meantime, the sorter is in pause mode. This means that the entrance and exit gates are open and the sorting gate is in position "left".

In the pause times, weighing does not take place. The animals can walk freely through the sorter.

If you want to use sorting times, all times not used have to be set to "from 00:00 to 00:00".

2.16 Delete history

The sorter saves the sorting results for a max. period of 500 days. With this menu item, the weighing results of the last 500 days are deleted.

2.17 Delete

All data can be deleted with this option. This is only necessary once when installing the system.

2.18 Entry examples - Step by Step

2.18.1 Example for 2-way sorting

The following text describes which data has to be entered in order to realize 2-way sorting. It is assumed that the sorter is in operating condition, the weighing platform is connected and that the data correspond to the initial settings (general deletion).

Step 1, what are the weight limits?

To begin with, we are going to determine the weight limits for the two sorting directions.

Example:

- All pigs below 35 kg are to be sorted to group 1
- All pigs between 35 and 55 kg are to be sorted to group 2
- All pigs from 55 to 75 kg are to be sorted to group 3
- All pigs with more than 75 kg to be sorted to group 4

These data have to be entered. To do this open the menu SORTING DATA.

1. First, you have to enter the weight limit for group 1 (35 kg), that means all pigs below 35 kg are sorted to group 1.
2. Then you have to enter the weight limit for group 2 (55kg), that means all pigs with a weight below 55 kg (down to 35kg) are sorted to group 2.
3. Then you have to enter the weight limit for group 3 (75kg), that means all pigs with a weight below 75 kg (down to 55kg) are sorted to group 3.
4. Then you have to enter the weight limit for group 4.

In this manner, up to 10 weight groups can be defined.

Now, the sorter is missing only one information: it needs to know in which direction the gates have to open for the individual groups. For our example, we will determine the following layout:

- group 1 - -> to the left
- group 2 - -> to the left
- group 3 - -> to the right
- group 4 - -> to the right

This information has to be entered in the menu SYSTEM DATA. Open the menu and scroll down to the tenth value "gate for goup 1". This value is already set to 1 (to the left).

The next value is the direction for group 2, which is also already set to 1 (to the left).

The next value after that (direction for group 3) thus has to be a 2 (to the right) which can be entered by means of the "Plus" + key.

Then the gate for group 4 has to be defined. As stated in above example, this also has to be a 2 (to the right) which can once again be entered by means of the Plus" + key.

Normally, the values for the gates have to be set only once and only have to be changed again in exceptional cases.

Now all relevant data for a 2-way sorting have been entered and the sorter should sort according to the values set in our example.

2.18.2 Example for the sorting-out of pigs ready-for-slaughter

Goal:

The heaviest pigs of a group are to be sorted out to a special area.

Example:

The goal is to sort out all pigs with more than 100kg. The area to which these pigs are sorted holds 20 pigs. The pigs are to be sorted out via the "central" gate.

If you would now simply start to sort out all pigs with more than 100 kg up until the desired quantity of 20 pigs is reached, is is possible that pigs with more than 100 kg still remain in the group. If the group has all in all 40 pigs that weigh more than 100 kg, it could even be possible that only the lightest of these 40 pigs are sorted out.

In order to avoid this problem, the computer sorts out according to the following scheme:

In the sorting data, the "starting weight for max. sorting" is set to 120 kg. The "maximum number of sorted pigs" is set to 20. The "time for weight reduction" is set to 30 minutes. The "end weight for selection" is set to 100kg.

The sorter will now try to sort out all pigs that are heavier than 120 kg. After 30 minutes, the starting weight is reduced by one kg. Now, all pigs with 119 kg or more are sorted out for 30 minutes.

The starting weight is reduced by 1 kg every 30 minutes, until the lower limit (100 kg) is reached.

Once the "maximum number of sorted pigs" is reached, the sorting phase ends.

This method allows to indeed sort out the heaviest pigs with 100 kg or more.

If the sorting period is to be terminated within a certain time, it has to be ensured that the time for the weight limit reduction is selected accordingly.

In our example, the lower limit of 100 kg is reached after 600 minutes (30min x 20 kg). It has to be ensured that, during selective sorting, no pigs accidentally enter the selection area. Make sure the gates are adjusted accordingly.

3 TriSORT PC version 2010

TriSORT sorting scale, as of version 100115f

3.1 Connection to a PC

Maximally 32 TriSORT can be connected to an IBM-compatible PC. The connection to a PC has the following advantages:

- The data for the sorters can be entered centrally
- To enter data at the screen is much more comfortable
- Historical data (growth curve) can be displayed graphically.

For the connection, the following conditions have to be fulfilled:

- The distance between PC and sorters must not be larger than 500 m.
- The PC has to be IBM-compatible with min. 500MHz and a free interface (Com1 or Com2). The operating system should be WINDOWS XP or WINDOWS 2000. Furthermore the operating programme TriSORT-PC has to be installed.
- For the connection between the sorters to the PC, a screened, twisted two-core cable is required. The cable must not be laid from every sorter to the PC, but from the PC to the first sorter, from there to the next sorter and so on.

For the connection the following requirements have to be met:

- The operating programme TriSORT-PC has to be installed
- Interface converter for PC operating programme.

Hardware:

– IBM compatible PC (from Pentium IV processor with at 1GHz or comparable)

– 10MB unallocated drive space

– Unassigned serial interface Com1,Com2 or USB*

  * for the USB-port connection you need a RS232/USB converter

– VGA graphics with min. 1024x786 pixels resolution

– CD Rom drive

– USB interface (for alarming)

OS:

– Windows XP / Win2000 / Windows Vista / Windows 7

3.2 Installing the software

The software comes on a CD.

1. Insert the CD into your CD-Rom drive. Auto-Start should start the installation process automatically. If this is not the case, go to the CD-Rom directory and start the programme by double-clicking on "TriSORT_SETUP.exe".
2. Select the desired language and follow the instructions of the installation programme.
3. After installation is completed you will find an icon on your desktop by means of which you can start the programme (double-click).

3.2.1 PC connection

The connection to a PC is either carried out by means of the serial interface Com1 or Com2 or by means of a USB interface.

see chapter ”PC system data”, page 58

3.3 TriSORT initial window

Sorter no. and name

At present, the TriSORT PC software can administer up to 32 stations. Allocation is carried out in the „PC system data“ window.

Symbol „HAND“

After clicking this button, some additional buttons are shown for carrying out a system test of individual components. See annex.

Text „sorting out“ above the sorting gate:

This shows into which group (1-10 or sorting out) the animal is sorted.

Condition

The current operating condition of the sorter.

Sorter is running (automatic operation)

Sorter in Pause (user)

Error (soft alarm! or/and hard alarm!), also see alarm record

Statistics

Statistic information on the previous weighings of the current day.

Sorting out

The „sorting out“ function is currently active. It also shows how many animals (of the planned number) have already been sorted out. Moreover, the average weight of the animals sorted out and the weight ranges are shown.

Stop sorter

It is possible to set the sorter to pause here. When the sorter is in the pause state, the entrance and exit gates are open and the sorting gate is directed towards „gate for alarm“ (see Sorter system data).

Continue

For continuing sorting after a pause caused by the user or an error.

Weight: (in the sorter picture)

The current weight on the TriSORT platform.

Buttons: (at the right side of the screen)

Select the different windows by means of clicking the mouse. The individual windows will still be explained further on.

Symbol in lower right corner of screen

A symbol flashing in green indicates a connection with the TriSORT station. When there is currently no connection, the symbol is crossed out in red. The connection can be re-established by clicking the „connect“ button appearing in this case.

If re-establishing the connection is not possible this way, this TriSORT station is possibly switched off or the network address is wrong.

Name of version

The software version is indicated below the symbol for the connection to the TriSORT station. In this example it is „TriSORT PC 080514_f“. It is absolutely necessary to take care that the EPROM version in the TriSORT control computer (Multimatic) is compatible with the PC version. This is shown by the letter („f“ in this case). This TriSORT PC version is consequently compatible with all EPROM versions with the letter „f“ after the combination of combination.

3.4 Window „Results“

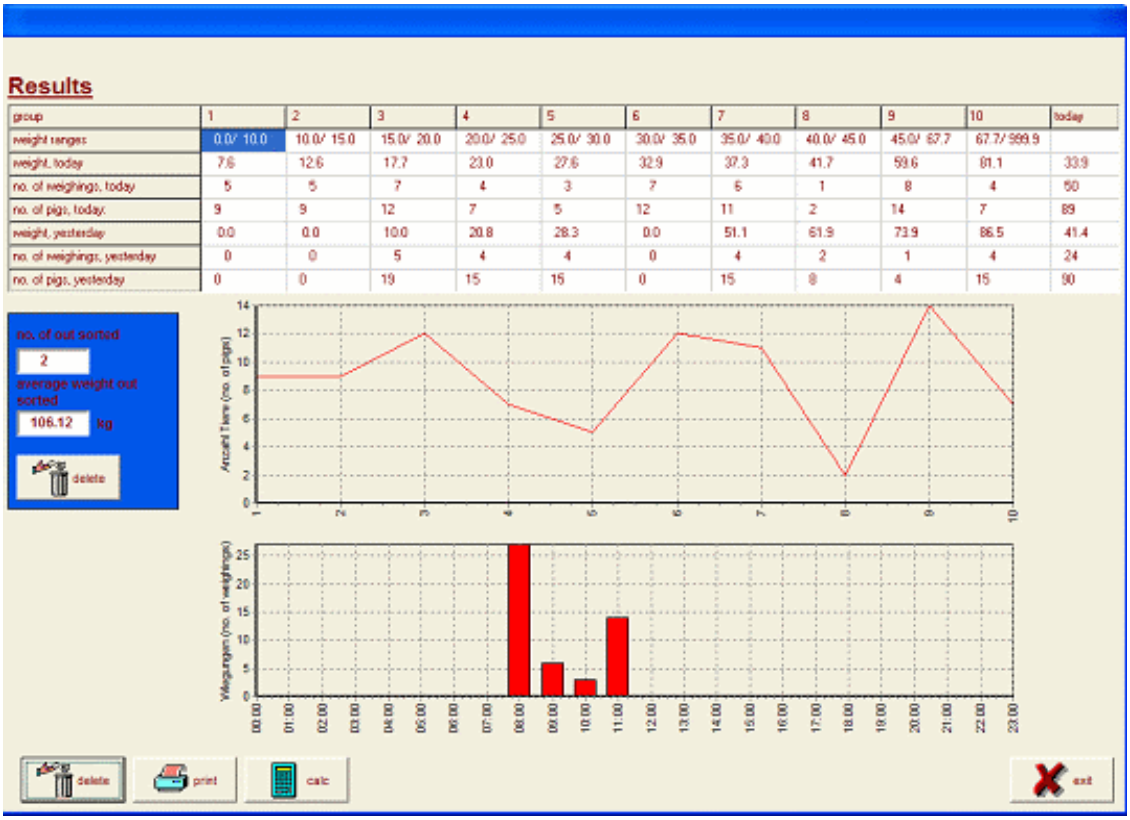


Table:

Horizontal: Groups 1-10

Vertical:

Weight ranges

Current setting of weight ranges (see also entries in the „Weight ranges “window)

Weight, today

The average weight of the respective group is shown here which has been evaluated for the current day.

No. of weighings, today

This shows the number of weighings of this group which have been registered for the current day.

No. of pigs, today

Theoretical value. Calculated on the basis of the number of animals moved in and the number of weighings per group. All animals moved in (that have been entered in the Weight ranges menu) are divided on a pro rata basis of the number of today's weighings per group.

Weight, yesterday

Here, the average weight of the respective group is shown which has been evaluated for the day before.

No. of weighings, yesterday

This shows the number of weighings of this group that have been registered yesterday.

No. of pigs, yesterday

Theoretical value. Calculated on the basis of the number of animals moved in and the number of weighings per group. All animals moved in (that have been entered in the Weight ranges menu) are divided on a pro rata basis of the number of yesterday's weighings per group.

Curve

Graphic representation of the values from the table.

Bar diagram

It shows how many weighings were carried out at which time. This diagram does not have any influence on the function and data of the TriSORT system. It is only for information purposes for the customer.

„Delete“ button: (bottom left)

Deleting all results of „today “

„Print“ button

Printing all sorting results on the PC's standard printer.

„Calc“ button

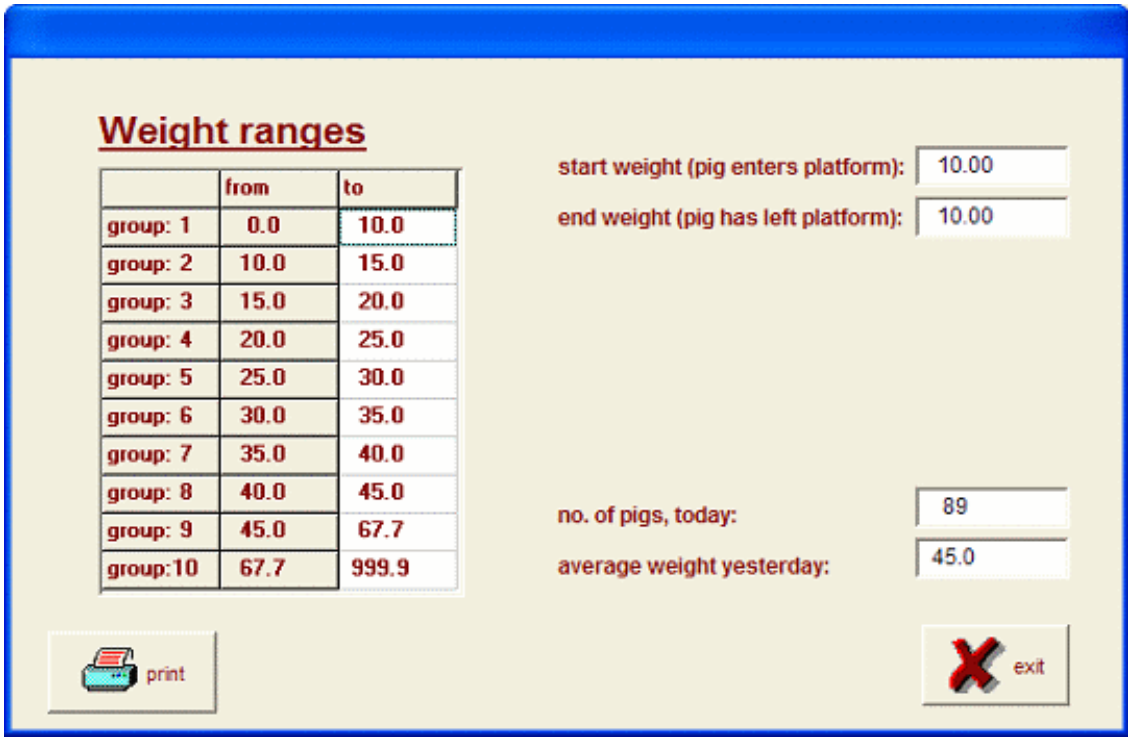
After modification of the weight ranges, weighings can be arranged anew by clicking this button. When changing the weight ranges in the „Weight ranges“ window, upon closing the window the software asks whether the results are supposed to be rearranged. When clicking „yes“, weighings are immediately arranged anew. When clicking „No“, they will not be rearranged. This can also be done later on manually by means of this button.

"Sorted out" information window: (blue window)

Here, animals already sorted out are added and the average weight of animals sorted out is indicated.

If you want to delete the previous values, click the „delete“ button. The sorting procedure itself is not interrupted by this. To interrupt it, set the number of animals to „0“in the „Sorted out“ window.

3.5 Window „Weight ranges“



Group 1-10

Please enter the weight ranges here. Groups can be freely allocated. Only the first and last weights are determined: Group 1 ALWAYS starts at 0.0kg and group 10 ALWAYS goes up to 999.0kg.

When the function „Sorting weights auto“ (in Sorter system data) is supposed to be used, weight ranges have to be reasonably below and above the animals' average weight. This allows using the eating areas more uniformly, preventing congestion of the eating area by too many animals.

If the function „Sorting weights auto“ is activated, the average weight of yesterday is compared to the average weight of today always at midnight (status increase), and the difference is added to all groups’ weights. This leads to a uniform utilisation of all eating areas.

Start weight (pig enters platform)

When TriSORT registers a weight larger than this weight, the weighing and sorting procedure starts. Weights below this value are ignored.

End weight (pig has left platform)

If the exit gate is open and the scale registers a weight below this value, the exit is closed again, the scale is tared anew, the entrance is opened and waiting for the next animal.

No. of pigs, today

Number of pigs that have access to this TriSORT station. This value has to be entered once open starting the sorting procedure. This allows statistical calculations.

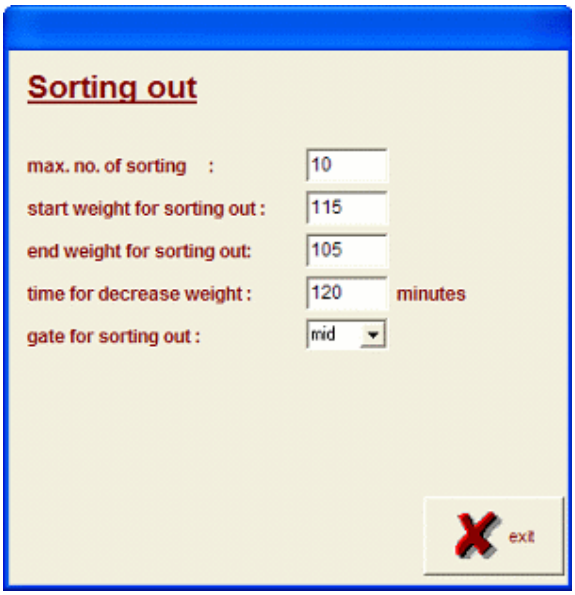
Average weight yesterday

The TriSORT computer shows the average weight of all yesterday’s weighings.

„Print“ button

Weight ranges will be printed on the PC's standard printer by clicking this button.

3.6 Window „Sorting out“



This window requires entries for sorting out animals. The current state of the sorting procedure is additionally indicated in the initial window under „Sorting out“.

Max. no. of sorting

Enter here, how many animals are supposed to be sorted out.

Start weight for sorting out

The sorter starts sorting out of animals at this weight.

End weight for sorting out

The sorter does not sort out animals below this weight.

Time for decrease weight

After this time has passed, the start weight is reduced by 1 kg respectively until the end weight or until the desired number of animals has been sorted out.

Gate for sorting out

Choose here, through which gate the animals sorted out are supposed to leave the sorter. If a gate has been selected that is used already for sorting (sorting for feeding), the software gives a message. The gates have to be respectively adapted in „Sorter system data“ then.

Sorting example with the data from the above-mentioned example

10 animals are supposed to be sorted out that are above 115kg, but not below 105kg. The gate to the (separate!) sorting area in this example is „centre “.

The TriSORT computer waits 120 minutes for animals of a weight of 115 kg or more. If an animal of this weight category enters the weight platform, it is sorted out through the gate „centre“ and the number is reduced from 10 to 9.

After 120 minutes, the start weight is reduced by 1 kg. TriSORT now waits 120 minutes for animals of a weight of 114 kg or more. If one (or several) animals of this weight range enter the scale, they will also be sorted out through the „centre“ gate and the number is reduced accordingly.

If the desired number of 10 animals has been sorted out, the sorting function is finished. When the end weight is reached, only animals of more than 105 kg are waited for. Weight is not further reduced. But animals of more than 105 kg will be sorted out until the desired number is reached.

After finishing sorting out, the sorter goes back to its regular sorting operation.

Note:

It is also possible to sort out the smallest animals of a group. For this purpose, enter a start weight of e.g. 50 kg and an end weight of 70 kg. This will lead to sorting out the small animals.

Start and end weight must never be identical!

3.7 Window „Preview sorting out“

The functions in the „Preview sorting out“ window allow calculations regarding finishing. They are explained in the following:

No. of days for daily gain

This number of days (counting backwards from today) is taken for calculation. At least two days have to be entered here, the standard value is 4.

No. of pigs

Number of pigs

Weight

Weight of pigs (target weight)

Average weight (is indicated by the computer)

Precise average weight of animals according to forecast

Days

When the desired number of animals has reached the desired weight or when it is supposed to be reached.

Daily gain kg/day

Is calculated by the computer. Can however be modified.

Description of preview sorting out

When using the TriSORT sorting scale, the actual animals' weights and thus the daily weight gains are known. These values allow calculating some further variables.

For this purpose, first enter the daily gains of how many past days are supposed to be taken for calculation. Standard value as described above, are 4 days.

When you have modified the value 4 (standard value), the „calculator“ below the box „daily gain“ has to be clicked. This allows new calculation of the daily gain which is then displayed. You can also enter a daily weight gain manually as an option.

Please take into consideration that the decimal separator has to be a „point“!

Now you can carry out the following calculations:

1. „When do I have 10 animals of a weight of at least 115 kg? “

After entering 10 animals and the target weight of 115 kg and after clicking the „calculator“ below „Days“, the computer calculates after clicking the „calculator“ below „Days“, after how many days 10 animals weigh at least 115 kg.

2. „Which weight do the 10 heaviest animals have in 7 days? “

After entering 10 animals and the target time of 7 days and after clicking the "calculator" below "Weight", the computer calculates that in 7 days the 10 heaviest animals will be heavier than 50 kg. The actual average weight of these 10 animals is then 54.021 kg (grey number "Average weight").

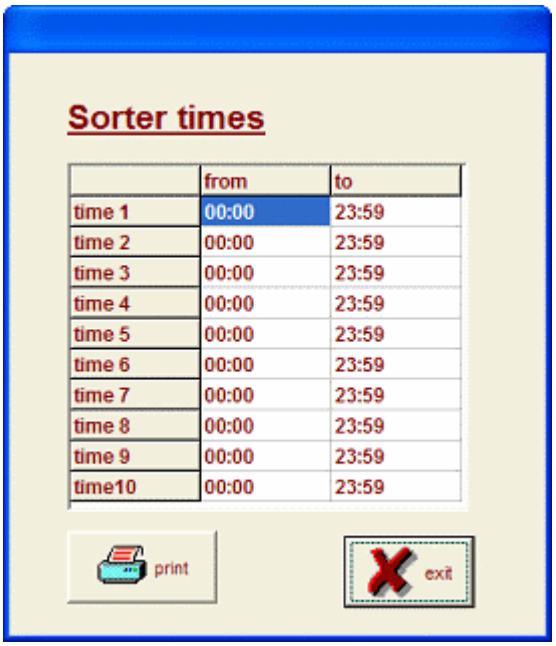
3. "How many animals of a weight of at least 110 kg do I have in 10 days? "

After entering 10 days and 110 kg and after clicking the "calculator", the computer calculates that 23 animals will then weigh at least 110 kg.

Note:

This preview is meant as an orientation guide for marketing animals. We cannot assume liability for the precision of the calculation.

3.8 Window "Sorter times"

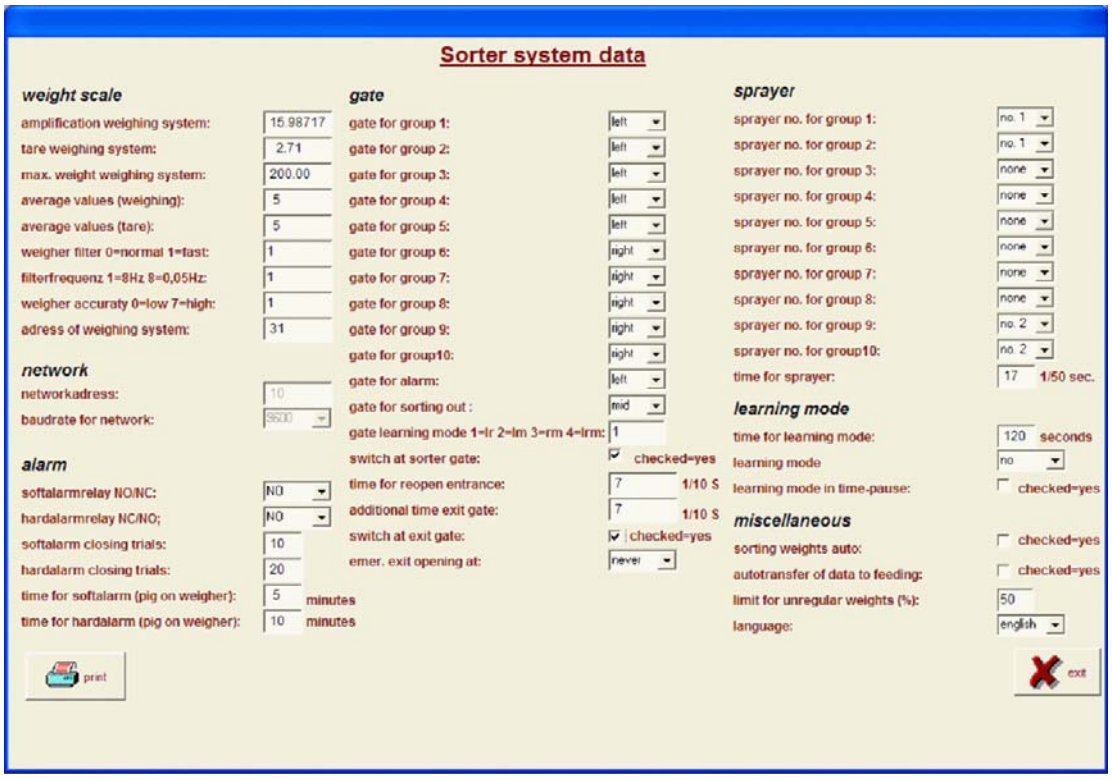


If you want to run the sorter only at specific times of day, enter 10 times from what time until what time the sorter is active. In the meantime, the sorter is in pause mode. This means that the entrance and exit gates are open and the sorting gate is in position "left".

In the pause times, weighing does not take place. The animals can walk freely through the sorter.

If you want to use sorting times, all times not used have to be set to "from 00:00 to 00:00".

3.9 Window "Sorter system data"



This window allows the required basic entries for operation. Many entries only have to be done once upon taking into operation, others have to be adapted e.g. before housing a new group of animals.

3.9.1 Weight scale

Amplification weighing system

The TriSORT computer calculates and enters this value upon alignment of the weighing system. It should not be modified manually, since the scales can then no longer operate precisely.

Tare weighing system

The TriSORT Computer calculates this value upon alignment of the weighing system and upon taring. It is then stored automatically. It should not be modified manually as is the case with amplification.

Max. weight weighing system

Here, the maximum charge of the scale is entered.

Average values (weighing)

During operation, the software calculates average values.

Since the number of weighings of the weigh box is >1000 / sec., it already calculates approx. 100 average values / sec. internally. The TriSORT software then evaluates the average value from 5 values each and draws on it for weight evaluation.

Average values (tare)

During taring, the software evaluates average values.

Since the number of weighings of the weigh box is >1000 / sec., it already calculates approx. 100 average values / sec. internally. The TriSORT software then evaluates the average value from 5 values each and draws on it for weight evaluation.

Weigher filter

0=normal 1=fast

Here, the fast filter should always be selected. This allows the fastest possible weighing with sufficient precision.

Filter frequency

1=8Hz 8=0,05Hz

Please always select 1=8Hz. All other settings slow down weighing unnecessarily.

Weigher accuracy

0=low 7=high

To achieve fast weighing of the highest possible precision, choose setting 1.

Address of weighing system

Here, you have to enter the address of weighing electronics (weigh box). In most cases, it is address 31 (delivery status of weigh boxes).

3.9.2 Network

Network address

This is the address of the sorter in the network. The TriSORT PC software can administer up to 32 TriSORT stations. For this purpose, each station has to have its own address. Each address (No.) can only be assigned once in the network! After entering the address, the TriSORT computer (Multimatic) has to be restarted (switched on and off). The address becomes valid only after that.

Baudrate for network

Set the baudrate to 9600 baud.

3.9.3 Alarm

Soft alarm relay NO/NC

Choose here, whether the alarm for soft alarm is supposed to work for a normally closed contact (NC) or a normally open contact (NO). Since the relay only has a closing contact, it is always triggered if set to NC and it drops out in case of alarm. The advantage of the NC setting is that the alarm contact is also emitted if power supply is in a failure.

Hard alarm relay NO/NC

Choose here, whether the alarm for hard alarm is supposed to work for a normally closed contact (NC) or a normally open contact (NO). Since the relay only has a closing contact, it is always triggered if set to NC and it drops out in case of alarm. The advantage of the NC setting is that the alarm contact is also emitted if power supply is in a failure.

Soft alarm closing trials

If the entrance gate is closing and the sorting gate changes its position, it has to reach its final position within a predetermined time (approx. 5 sec). This time is requested by means of a limit switch. If this limit switch is not reached within the time span, the gate opens again and tries once more to reach the final position. After the number of trials entered, a soft alarm is emitted but trying continues.

Hard alarm closing trials

"Hard alarm closing trials" is operated as the soft alarm, is however released by a different number of trials.

Therefore, the number of trials for the hard alarm should be twice as high as for the soft alarm.

Time for soft alarm (pig on weigher)

If an animal does not leave the scale (the weight "pig has left platform" from the Weight ranges has not been reached), a soft alarm is emitted after this time.

Moreover, the entrance gate is opened and the sorting gate is switched to "gate for alarm".

The reason is that the following animal can push away the remaining animal from the scale or that the animal can leave the scale backwards.

Time for hard alarm (pig on weigher)

The "time for hard alarm" reacts as the "time for soft alarm", but according to its own time schedule. Therefore, the time for hard alarm should be selected twice as long as for the soft alarm.

3.9.4 Gates

Gate for group 1

left right mid

The animals of group 1 will be sorted in the preset direction. The groups will be set in "Weight ranges".

Gate for group 2:

left right mid

The animals of group 2 will be sorted in the preset direction. The groups will be set in "Weight ranges".

Gate for group 3

left right mid

The animals of group 3 will be sorted in the preset direction. The groups will be set in "Weight ranges".

Gate for group 4

left right mid

The animals of group 4 will be sorted in the preset direction. The groups will be set in "Weight ranges".

Gate for group 5

left right mid

The animals of group 5 will be sorted in the preset direction. The groups will be set in "Weight ranges".

Gate for group 6

left right mid

The animals of group 6 will be sorted in the preset direction. The groups will be set in "Weight ranges".

Gate for group 7

left right mid

The animals of group 7 will be sorted in the preset direction. The groups will be set in "Weight ranges".

Gate for group 8

left right mid

The animals of group 8 will be sorted in the preset direction. The groups will be set in "Weight ranges".

Gate for group 9

left right mid

The animals of group 9 will be sorted in the preset direction. The groups will be set in "Weight ranges".

Gate for group 10

left right mid

The animals of group 10 will be sorted in the preset direction. The groups will be set in "Weight ranges".

Gate for alarm

left right mid

If the alarm "pig on weigher" occurs or the sorter is presently in the "Pause" mode, the sorting gate is switched in this direction.

Gate for sorting out

left right mid

If the function "sorting out" is used, the animals are sorted in this direction. The direction can be changed here or directly in the "Sorting out" window.

Gate learning mode

1=LR 2=LM 3=RM 4=LRM

If the learning mode is activated, the sorting gates are switched back and forth corresponding to this setting.

Further information regarding the learning mode please find on the following pages under the heading "Learning mode".

Switch at sorter gate

checked=yes

If limit switches are located at the sorting gate (or at the sorting gates), check the box. This avoids that animals can be jammed in the sorting gates for a longer time. If the final position is not reached upon switching between directions, the gate opens and tries to reach the final position again. See also "Soft alarm closing trials" or "Hard alarm closing trials".

Time for reopen entrance

The gate has to be closed within 5 s. If the final position is not reached within 5 s, the entrance is opened again for the time set here. Here, a reasonable setting is between 5 and 10 (corresponding to 0.5 to 1 s). This will shortly release a jammed animal so that it can back out of the closing area. If this time is too short, the animal cannot retreat, if it is too long, the animal can further reach the sorter and block the gate again.

The maximum time of 5 s is fixed in the software and cannot be modified.

Additional time exit gate

When opening the exit gate and TriSORT finds out that the weight is below "pig has left platform" (Weight ranges), the exit stays open for a longer time to ensure that the animal has really left the platform. A reasonable setting here is also 5-10, corresponding to 0.5 to 1 s).

Switch at exit gate

checked=yes

This box must be checked if the exit gate has a limit switch.

This ensures that the software "knows" that it has to survey the position "Exit gate closed" via the entrance.

Emer. exit opening at

never soft alarm hard alarm soft+hard alarm

If a soft alarm or hard alarm is pending, TriSORT can switch this exit to open an emergency opening. This might be reasonable if it is not ensured that an employee removes a possibly occurring error and animals would otherwise possibly be undersupplied. Take into consideration that the animals can then walk freely through the eating areas and the resting area and a possible sorting that took place before is cancelled.

3.9.5 Sprayer for group 1 - 10

None sprayer no. 1 sprayer no. 2

This setting selects per group if and which sprayer is supposed to be used for marking. Each sprayer is piloted for the duration set in "time for sprayer".

Time for sprayer: 1/50 sec.

If a sprayer is piloted it is for the time set here. The basis is 1/50 sec. 50 in this field means that the selected sprayer is piloted for 1 second. 25 pilots the selected sprayer for 0.5 seconds.

3.9.6 Learning mode

To accustom the animals to the sorter, first make the sorter operate in learning mode. This way, the animals learn how to go through the sorter and will not be intimidated by the system. There are several settings necessary for this procedure:

Time for learning mode

Bei aktivierter Anlernphase schaltet das Sortiertor entsprechend dieser Zeit zwischen den Toren hin- und her.

Außerdem muss gewählt werden zwischen welchen Sortiertoren während der Anlernphase hin- und her geschaltet werden soll. Siehe hierzu Kapitel "Tore" in den Anlagedaten.

Sowohl das Ein- wie auch das Ausgangstor stehen im Anlernmodus dauernd in Position "offen".

Learning mode

No Time+Animal Only time

The learning mode has the following three modes:

1. No: The learning mode is switched off. TriSORT is in the sorting mode. Attention: This setting might possibly be overwritten by the value "Learning mode in time-pause"!
2. Time+Animal: The sorting gate switches from one position to the next corresponding to the entered time. This only happens, however, if an animal has entered the scale. This avoids switching back and forth between the gates if no animals are entering the scale. Of course, this setting reduces the noise level at quiet times and the wear and tear of mechanic parts.
3. Only time: After the entered time, the sorting gate switches from one position to the other, no matter if an animal has entered the platform or not.

Learning mode in time-pause

Checked=yes

If the sorter is set to "Learning mode", the sorting gates is set to "Alarm" (Sorter system data) in the pauses (times when the sorter is not active, window "Sorter times"). If the learning mode is supposed to be continued during the time pause, check the box here.

3.9.7 Miscellaneous

Sorting weights auto

Checked=yes

If this function is activated, the "average weight yesterday" is compared to the "average weight today" upon status increase (at midnight) and the sorting limits of all groups are increased by this difference. This leads to a uniform utilisation of eating areas.

A prerequisite for this is, however, that the sorting limits at the beginning of sorting have relatively reasonable values matching the actual animals' weights.

Autotransfer of data to feeding

Checked=yes

If the sorter is connected to a WetMIX or DryMATIC, check this box. This means that the data are transferred to the feeding system at night and the animals are fed according to their actual weight. Moreover there are certain moving functions that are carried out automatically. See the instructions regarding WetMIX or DryMATIC.

Limit for unregular weights

If an animal is below or above this "average value yesterday" by this percentage, this weight is ignored since probably 2 or more animals are on the scale. A reasonable entry is 50.

Language

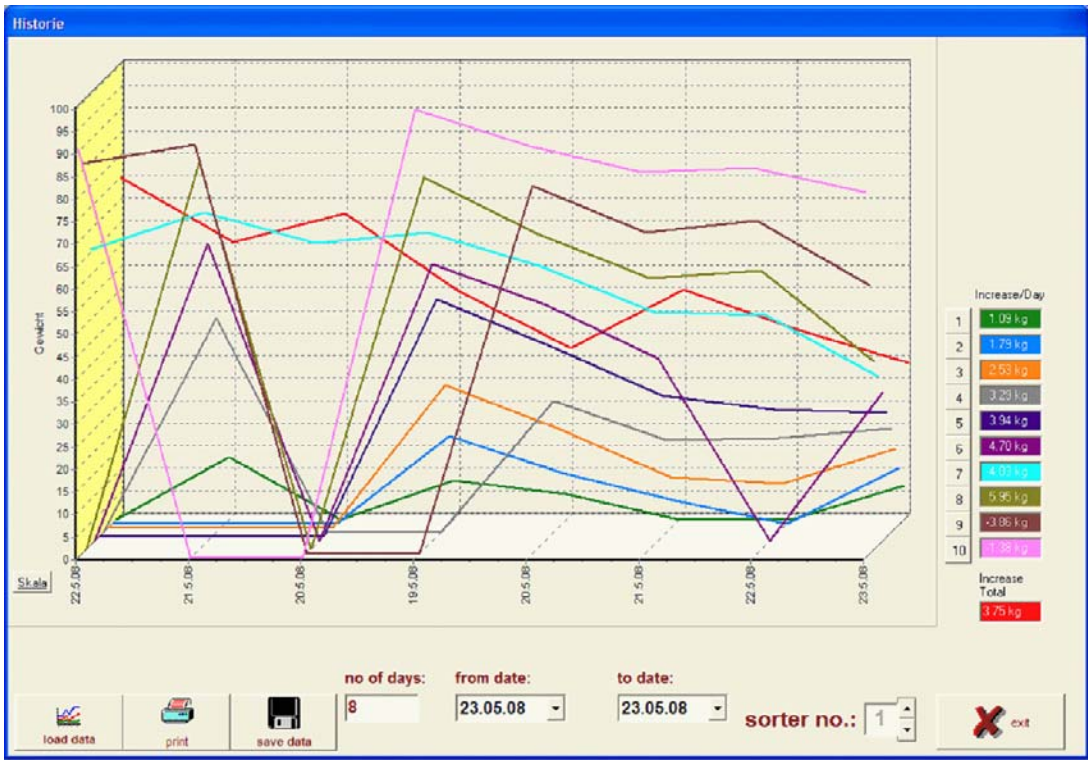
The TriSORT software on the TriSORT computer currently "speaks" the following languages:

– German
– English
– French
– Danish

Button "Print"

This button causes the Sorter system data to be printed out on the standard printer.

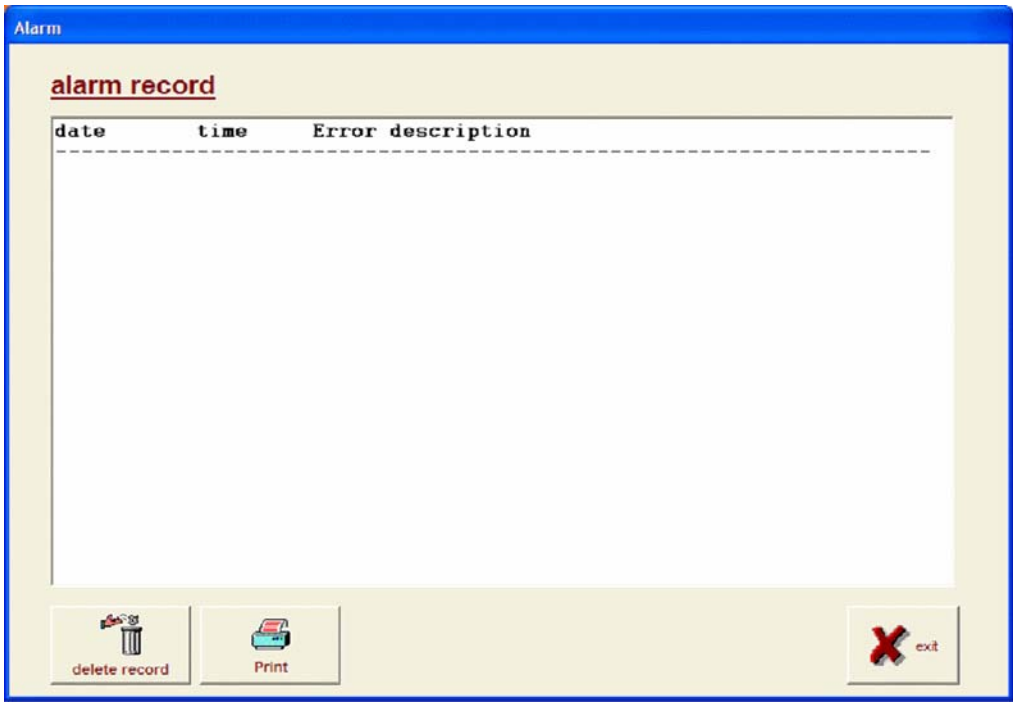
3.10 Window "Historie"



This window allows showing the weight progress of the different groups. Switch on or off the graphs for the individual groups by clicking figures 1-10 on the right hand side. The group's average is depicted in red and cannot be suppressed.

It is possible to have a certain section of the finishing period indicated via "from date to date" or via "no. of days" to indicate the desired number of days from today backwards. It is possible to print out the figures (not the graphics) by means of the "Print" button or export the data via "save data" in *.CSV format to further process them by means of MS Excel.

3.11 Window "Alarm record"



The alarm record indicates soft alarms and hard alarms. The following alarm messages can occur with TriSORT:

No. 1: Pig stays on scale Soft alarm

See "Sorter system data - Alarm" for the reason for this alarm

No. 2: Pig stays on scale Hard alarm

See "Sorter system data - Alarm" for the reason for this alarm

No. 3: Entrance cannot be closed Soft alarm

See "Sorter system data - Alarm" for the reason for this alarm

No. 4: Entrance cannot be closed Hard alarm

See "Sorter system data - Alarm" for the reason for this alarm

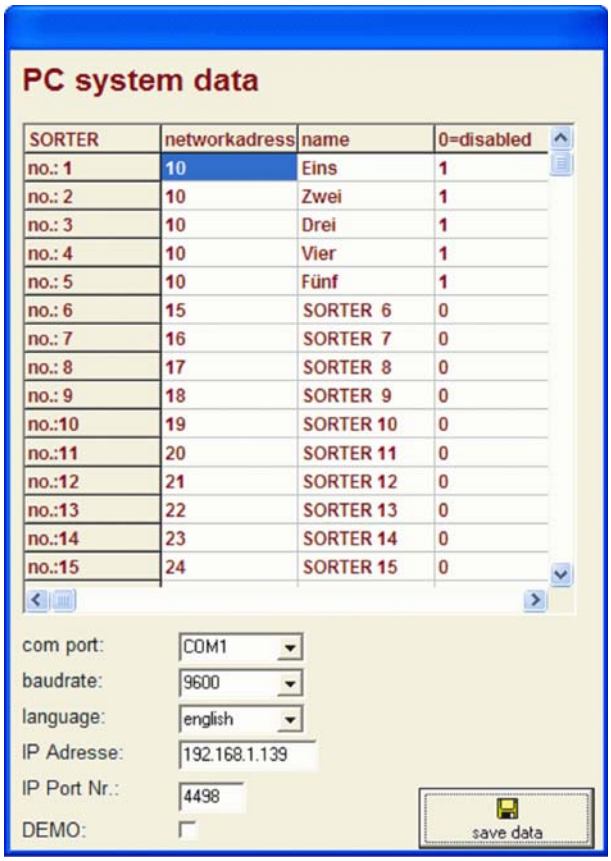
No. 5: Sorter gate cannot be moved

See "Sorter system data - Alarm" for the reason for this alarm

No. 6: Weighing system (scale could not be read 5 times, continued trials ...)

If this message occurs more frequently or regularly, please contact the after-sales service. There could be a malfunction or loose contact. If you find this entry in the alarm record and the scale does not indicate anything or only wrong values, please also contact the after-sales service.

3.12 PC system data



3.12.1 Sorter no.

The software can administer up to 32 sorters. Each sorter in the network has to have a unique address that must only occur once.

3.12.2 Network address

This network address is required for communication between the TriSORT PC software and the sorters.

	Enter only network addresses greater than 10 or equal 10.

3.12.3 Name

Each sorter can be given a separate name to avoid accidental modification of the wrong sorter.

3.12.4 0=deactivated

If a sorter is temporarily not used and is switched off, it should be deactivated.

3.12.5 Com Port

Here you can enter to which serial connection the TriSORT stations are connected. Note: the TriSORT stations cannot be connected directly to the serial (COM) Port. A RS232/RS485 adapter is mandatory.

In order to use the PC USB interface for the TriSORT staion, an additional RS232 to USB converter is required. If you use a RS232 to USB converter you have to check which COM interface was allocated to the USB converter by Windows. This can be done as follows:

1. To open the Windows Geräte-Manager select "Ausführen" in the Windows Start Menu and enter "devmgmt.msc".

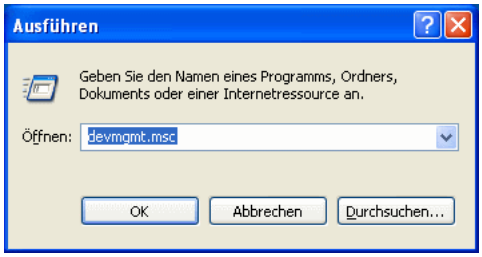


Figure 3-1: Enter "devmgmt.msc" to open the Geräte-Manager

2. The Geräte-Manager shows which COM interface is allocated to the RS232 to USB converter. In our example, it is COM3.

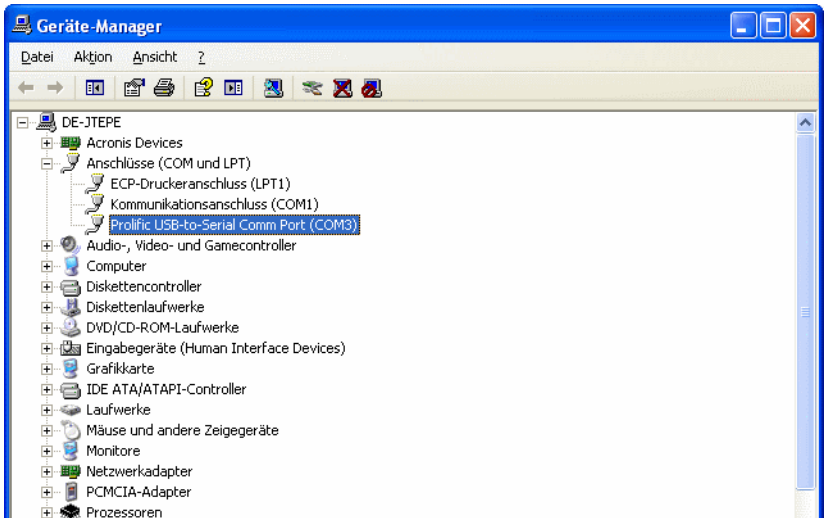


Figure 3-2: Windows Geräte-Manager

3.12.6 Baudrate

The baudrate for all TriSORT devices always is 9600 baud. If another value is entered, it is no longer possible to establish a connection to the stations.

3.12.7 Language

The TriSORT PC software currently "speaks"

– german
– english
– danish
– french
– japanese

3.12.8 IP adress

This setting can only be selected if the TriSORT stations are connected to a WetMIX or DryMATIC system and the feeding system is connected to the PC via Ethernet. For this purpose, further settings are required in the system settings of the Windows PC and the system data of the feeding system which you can take from the instructions regarding WetMIX or DryMATIC.

3.12.9 IP Port No.

The port of the above-mentioned Ethernet connection always has to be 4498 and must no be modified.

3.12.10 Demo

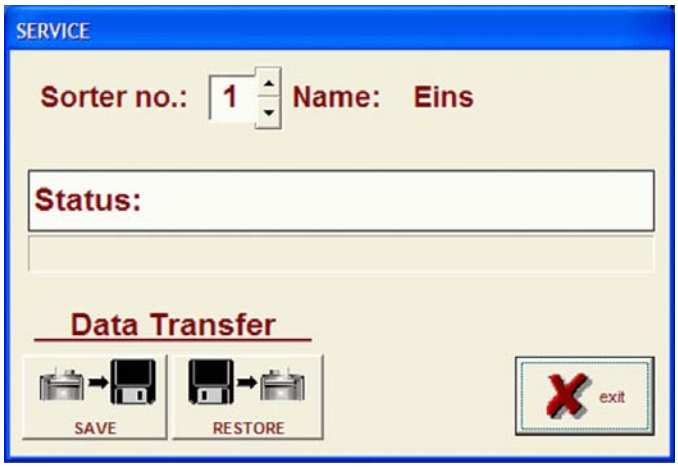
Checked=YES

If the TriSORT PC software is supposed to be operated in demo mode, this box has to be checked. If you want to operate TriSORT stations with this software it must not be checked.

3.12.11 Save data

If you want to leave this window it is necessary to save data. Then the window is closed and data are taken over.

3.13 Window "Service"



This window allows saving data from the TriSORT stations on PC. This is useful if you want to update the software of the stations or as backup for "just in case".

When clicking "Save", data are saved on hard disc after entering the file name.

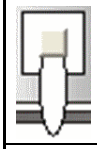
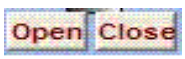
When clicking "Restore", select a backup file on hard disc and send it back to the sorter.

Attention: Before saving or backup of a file there has to be a connection with the sorter! After a file backup it might be necessary to adapt some data (especially net work addresses!)

3.14 Window "Initial state" with system test activated

After clicking the button with the hand symbol, further buttons occur regarding the individual functions of the sorter.

The following outputs can be activated from this window:

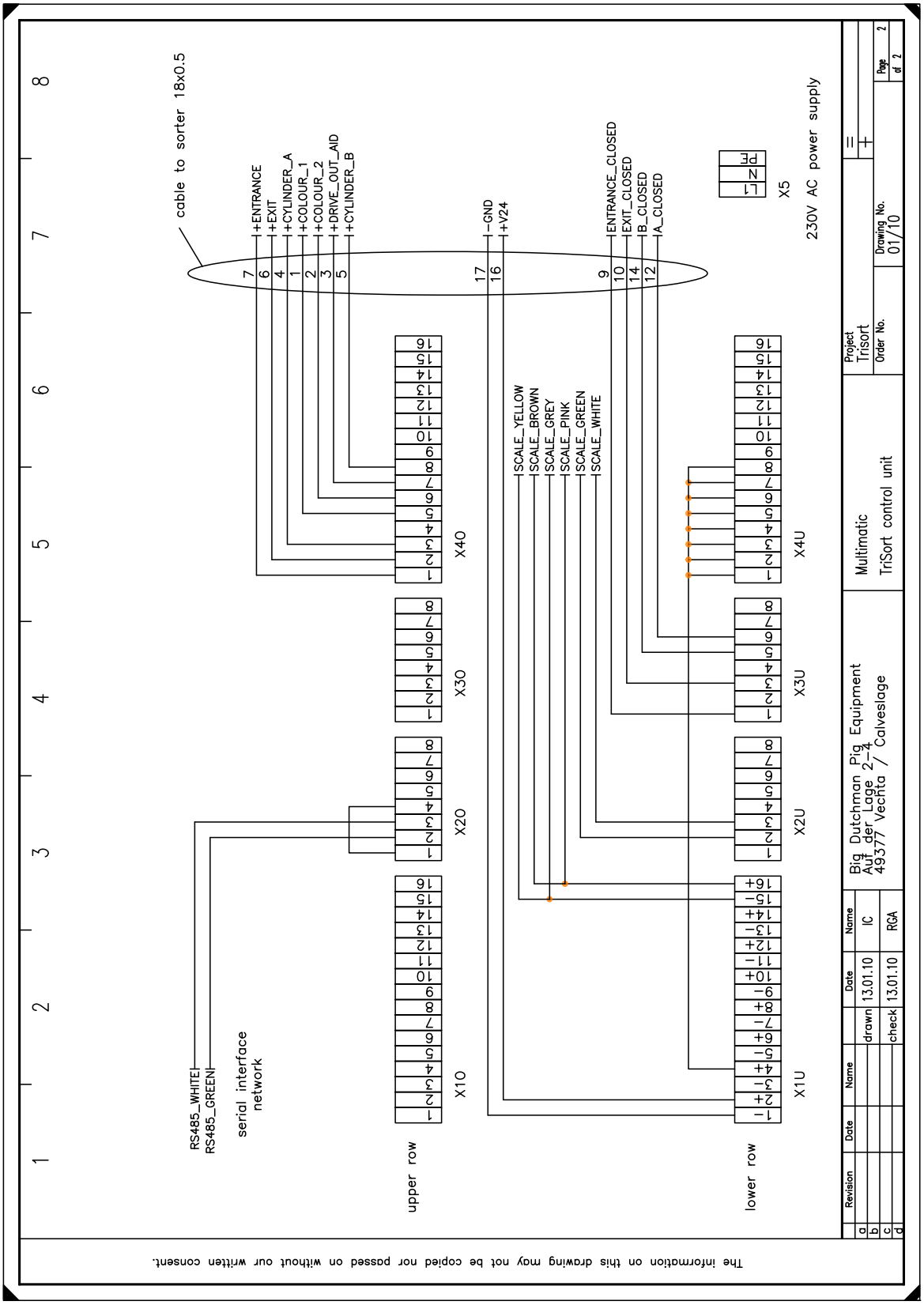
	"green button"	sprayer 1
	"pink button"	sprayer 2
	symbol below hand button	drive out aid
	buttons OPEN / CLOSED below entrance gate	open or close entrance gate
	buttons OPEN / CLOSED below exit	open or close exit gate
	directional buttons below sorting gate	switches the sorting gate in directionLEFT, RIGHT or MID

4 Electrical connection

Installations and work on the electric components/structural groups may only be carried out by qualified personnel according to electro-technical regulations (e.g. EN 60204, DIN VDE 0100/0113/0160).

Dangerous electric tensions are bare in case of open control equipment. Please be aware of the danger and keep workers of other professions away from the danger zone !

– 110/230V 50-60Hz re-pluggable
– power consumption max. 50VA


cable to sorter 18x0.5
+ENTRANCE
+EXIT
+CYLINDER_A
+COLOUR_1
+COLOUR_2
+DRIVE_OUT_AID
+CYLINDER_B
-GND
+V24
ENTRANCE_CLOSED
EXIT_CLOSED
B_CLOSED
A_CLOSED
X5
230V AC power supply
SCALE_YELLOW
SCALE_BROWN
SCALE_GREY
SCALE_PINK
SCALE_GREEN
SCALE_WHITE
RS485_WHITE
RS485_GREEN
serial interface network
upper row
lower row
X10
X20
X30
X40
X1U
X2U
X3U
X4U
Big Dutchman Pig Equipment
Auf der Lage 2-4
49377 Vechta / Calveslage
Multimatic
TriSort control unit
Project
TriSort
Order No.
Drawing No.
01/10
Revision
Date
Name
drawn
check
13.01.10
RGA
IC
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Weighing box v 2.2
RS485 and CAN-bus

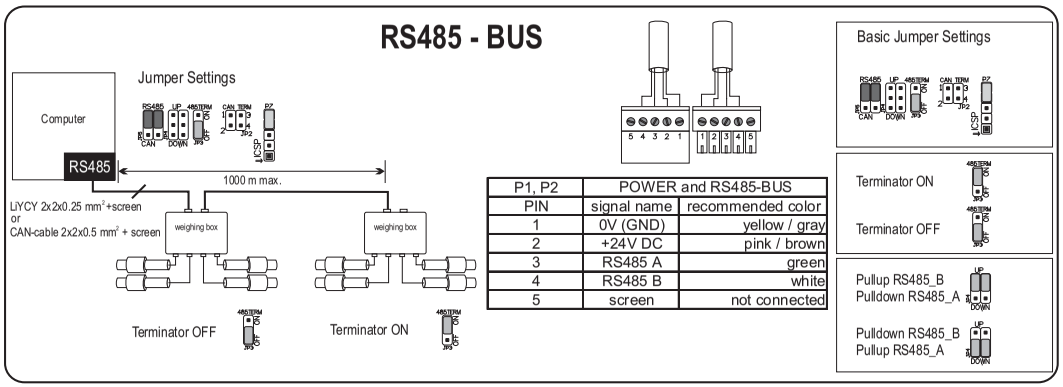
Code No. 20-00-3101

Technical data

The weighing box measures the values of the load cells, converts them into digital signals and transfers them to the feeding computer by means of CAN-bus or RS485. Maximally 4 load cells can be connected.

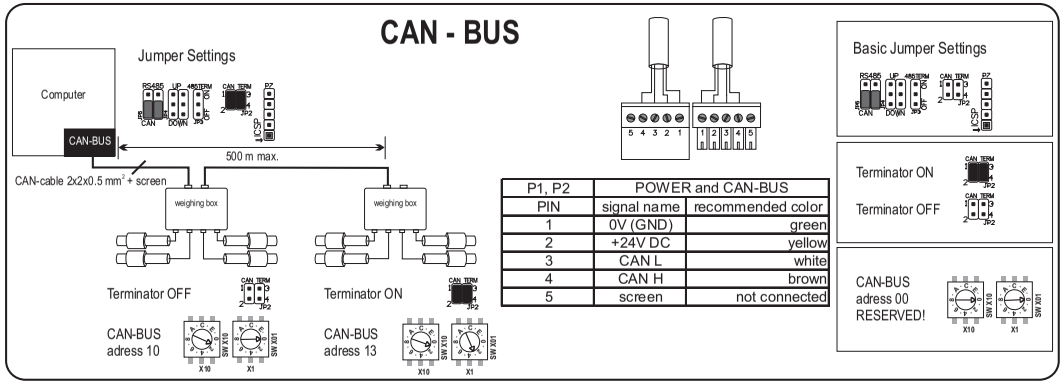
Dimensions (W x L x H)	125 mm x 126 mm x 57mm
Protection class accord. to EN60529	IP66
Supply voltage range	18 - 36 VDC
Current consumtion	max. 0,2 A
Power consumption	max. 5 W
Weight	0,515 kg
Serial Bus	RS485 or CAN-Bus
No. of load cells	1 to 4
Ambient temperature, min.	0 °C
Ambient temperature, max.	40 °C
Housing fixing	4 mm holes
Housing material	Aluminium AlSi12

RS485 - BUS



P1, P2	POWER and RS485-BUS	
PIN	signal name	recommended color
1	0V (GND)	yellow / gray
2	+24V DC	pink / brown
3	RS485 A	green
4	RS485 B	white
5	screen	not connected

CAN - BUS



P1, P2	POWER and CAN-BUS	
PIN	signal name	recommended color
1	0V (GND)	green
2	+24V DC	yellow
3	CAN L	white
4	CAN H	brown
5	screen	not connected

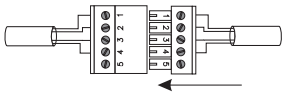
Explanations

Self-test
- the self-test allows for a local diagnosis
- only the supply voltage has to be applied
- the test result is indicated by means of the four LEDs
- the address switch has to be set to 00

Trouble-shooting
The power LED (D20) is not lit!
No supply voltage or device not connected correctly
Measure polarity!

No communication:
Does the network connection have the correct polarity?
Does the bus terminate at both ends?
For CAN-bus: blinking RX TX?
Communication YES but no weighing results. Are the load cells connected correctly?

An individual participant can be separated from the bus by directly connecting the two connectors which enter the box from above.



Indicators

① Power LED
Green power LED

④ CAN-bus activity LEDs
The CAN-bus LEDs indicate activity on the CAN-bus.
The TX LED is lit when data is sent.
The RX LED is lit when data is received.

⑨ Status LEDs
The status LEDs indicate the operating status of the assembly group.

LED0(D16-green) shows the function of the assembly group.
Blinking: CAN mode ready.
Lit: RS485 mode ready.
Off: assembly group not ready.

LED1(D17-yellow) indicates the CAN-bus status.
Not lit: prelnit (assembly group not yet initialized)
Lit: operational (assembly group ready)

LED2(D18-red) indicates CAN-bus error
Not lit: CAN-bus OK
Blinking: CAN-bus error

LED3(D19-red) indicates weighing bus error
Not lit: weighing bus OK
Lit: weighing bus error

Test mode:
For the self-test the address switch has to be set to 00.
The LEDs indicate the result of the self-test.
All 4 LEDs lit: assembly group OK
LED 0,1 and 2 are lit: during the self-test, the address of the weighing electronics was changed. Upon re-start, the new address is used. To activate a re-start, the power supply to the weighing box has to be interrupted.

LED: blinks during weighing in CAN-mode.

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Technical details are subject to change 12/2009

Configuration and Settings

③ JUMPER

Standard settings upon delivery	Standard settings for CAN-BUS	Standard settings for RS485-BUS
	Terminator ON	Terminator ON
	Terminator OFF	Terminator OFF
		Pullup RS485_B Pulldown RS485_A
		Pulldown RS485_B Pullup RS485_A

⑤ CAN-bus adress

The address of the CAN-bus is by means of rotary switches (hexadecimal).

Use X10 to set the 1. nibble
Use X01 to set the 2. nibble
Addresses may range from 0x01 to 0x7F.
The 0x00 digit is reserved for the self-test function.

⑥ RESET

If the two contacts are connected, the CPU initiates a reset.

⑦ ICSP

Pins 4 and 5 of this connector strip are used to select the RS485 mode. If both pins are connected the RS485 mode is active, if they are not connected the CAN-bus mode is active. This connection is also used to program the CPU.

Connection diagram

① Power LED
② Power and bus connection
③ Jumper
④ CAN-bus activity LEDs
⑤ CAN-bus adress
⑥ RESET
⑦ ICSP programming interface
⑧ Load cell connectors
⑨ Status LEDs

Connections

② Voltage supply and bus connection

Terminal assignment:

P1, P2	Power and RS485-BUS		Power and CAN-BUS	
PIN	signal name	recommended color	signal name	recommended color
1	0V (GND)	yellow / grey	0V (GND)	green
2	+24V DC	pink / brown	+24V DC	yellow
3	RS485 A	green	CAN L	white
4	RS485 B	white	CAN H	brown
5	screen	not connected	screen	not connected

⑧ Load cell connection

Terminal assignment:

P3, P4, P5, P6	HOWEMA load cell SENSY 4500	Big Dutchman load cell SB-A	HBM load cell
PIN	signal name	color	color
1	+ IN		
2	+ SENSE	pink / brown	red
3	- OUT	white	white
4	+ OUT	green	green
5	- IN		red
6	-SENSE	yellow / grey	black
7	SCREEN	screen	screen
			yellow / grey

W