**HOBART**

SERVICE TRAINING CENTER

**Service Manual**

HOBART GmbH
An *ITW*-Company

EFFICIENT – RELIABLE – INNOVATIVE

# SERVICE MANUAL

## CONVEYOR RACK TYPE DISHWASHER

# PROFI CN
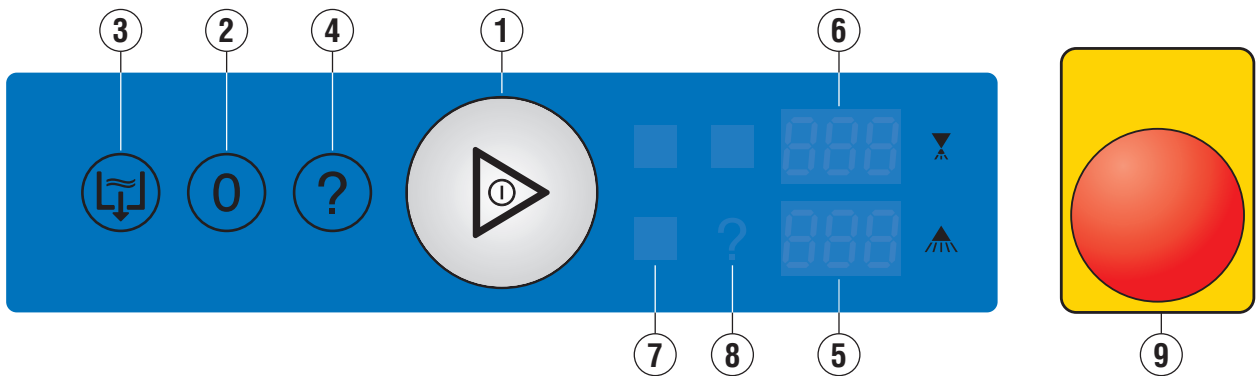
### STARTING FROM SERIAL NO. 8646 6001

**SERVICE**

This document is produced for internal use only.
The detailed settings and servicing must be carried out by service technicians qualified by HOBART.
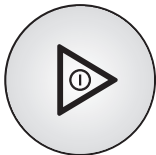Reproduction of this document is prohibited without the written permission of Hobart GmbH.

# CONTENTS

# 1    SMARTRONIC CONTROLS / CUSTOMER MENU



| 1 | **START** button | | **This button has several functions:** |

**Machine ON**
By pushing the button for approx. 3 seconds the dishwasher will be switched on.

**Conveyor ON**
When machine is ready for operation, the conveyor will be switched on by pushing the button.

**Conveyor speed selection**
When conveyor is switched on, conveyor speed may be changed by pushing the button.

**Machine OFF**
By pushing the button for approx. 5 seconds the dishwasher will be switched off. Exhaust and dryer will stop with short delay.

**After switch off, the machine is not voltage free!** At the upper display appears a point.

The color of the button changes depending on the **operating status**:

| GREEN | flashing | = | Machine fills and/or heats up |
|---|---|---|---|
| GREEN | | = | Machine is ready for operation (stand-by) |
| BLUE | | = | Wash cycle is running |
| BLUE | flashing | = | Machine draining / switch-off |
| RED | | = | Failure indication |
| GREEN / RED | alternately | = | Failure indication |
| BLUE / RED | alternately | = | Failure indication |
| GREEN / BLUE | alternately | = | Prewash draining / filling |

| 2 | **Conveyor OFF** button | By pushing this button the conveyor will be switched off. |
|---|---|---|

| 3 | **Drain** button |
|---|---|

**1 second** pushed:
The prewash tank and pumped rinse tank (if installed) will be emptied and automatically re-filled.
During the drain / fill cycle, the START button is flashing green/blue. As soon as the button changes to a green steady light, the machine is ready to operate.

**5 seconds** pushed:
Machine will be drained completely and switches off at the end of the cycle.

**After switch off, the machine is not voltage free!** At the upper display appears a point.

# SMARTRONIC CONTROLS / CUSTOMER MENU

**4 INFO** button ⟨**?**⟩    **1 second pushed:** Temperatures preview / operating hours counter.

| | |
|---|---|
| **F03** ▽ | The temperature indicator Rinse shows the selected measuring point, the temperature indicator Wash the actual temperature. |
| **45** △ | **Example:** Temperature probe prewash = F03 / actual temperature = 45°C |

The temperatures will be displayed one after the other by pushing the **INFO** button repeatedly.

**If installed:**

**F03** = prewash
**F04** = dryer
**F05** = wash 2
**F06** = wash 3
**F07** = separate fill booster
**F08** = demi booster or rinse temperature of manifold

| | |
|---|---|
| **C67** ▽ | After temperature values, the operating hours counters will be displayed by pushing the **INFO** button again. |
| **000** △ | Upper display = Counter<br>Lower display = Operating hours |

The counters are displayed one after the other by pushing the **INFO** button repeatedly.

**EXAMPLE:**      Wash = **1253** operating hours

| | | |
|---|---|---|
| **C67** = Wash | Thousands | **= 001** |
| **C68** = Wash | Values 1 to 999 hours | **= 253** |

| | |
|---|---|
| **C69** = Final rinse | Thousands |
| **C70** = Final rinse | Values 1 to 999 hours |

**If installed:**

| | |
|---|---|
| **C71** = Demi rinse | Thousands |
| **C72** = Demi rinse | Values 1 to 999 hours |

If **INFO** button is not pressed for **30 seconds**, displays will return to standard indication.

⟨**?**⟩    **3 seconds pushed:** Activation of customer menu (option), "**?**" indicator flashes.

Enabled options (Basic data U02, function set to "1") can be activated / deactivated via the customer menu.
The switching will be done by pushing the **START** button (to activate) or **Conveyor OFF** button (to deactivate).

Options are displayed one after the other by pushing the **INFO** button repeatedly.

| | | |
|---|---|---|
| **Additional Dryer** [1]:<br>**(S51)** | Upper indicator:<br>Lower indicator: | dr4<br>On = activated / OFF = deactivated |
| **Demi Rinse** [1]:<br>**(S52)** | Upper indicator:<br>Lower indicator: | r0<br>On = activated / OFF = deactivated |
| **Emergency Operation** [1]:<br>**(S53 = 1)** | Upper indicator:<br>Lower indicator: | EOP<br>On = activated / OFF = deactivated |
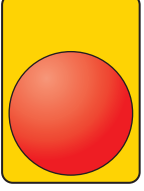
[1] *Starting from EEPROM revision c3.4*

## SMARTRONIC CONTROLS / CUSTOMER MENU

| 5 | **Display** | 65 ▼ | Temperature **Wash** (°C)<br>(decimal point illuminates = heating on) |
|---|---|---|---|
| 6 | **Display** | 85 ▲ | Temperature **Rinse** (°C)<br>(decimal point illuminates = heating on) |
| | | | With a machine malfunction, the temperature indicators display a code. |

| 7 | Indicator | ■ □ <br> ■ | **Conveyor speed** <br> Indicates the selected speed. | □ <br> ■ = slow | ■ <br> ■ = fast |
|---|---|---|---|---|---|

| 8 | Indicator | **?** | Flashing when customer menu is activated. |
|---|---|---|---|

| 9 | **Emergency Stop** button | | Switches the machine off.<br>Must be unlocked for operation |
|---|---|---|---|

# 2 INITIAL OPERATION

## 2.1 PREPARATION

– **Switch off main switch** and open shut-off valves at site.
– Remove lower front panel and switch on all circuit breakers and motor protection switches in the control box.
– Put the lower front panel in place and close inspection doors.
– Unlock the Emergency Stop button.
– **Switch on main switch – but not the machine.**
– Switch on site exhaust extraction (if installed).

## 2.2 BOOSTER FILL

This is necessary after setting the machine type (**U01**) and when the dishwasher has been initially installed. Also to be done when the booster has been drained (counter **C60** has to be set to "0").

### 2.2.1 RINSE BOOSTER

1. **Open the door.**

2. Push START button (flashes red). At the temperature indicators appears flashing $boF$ / $000$.
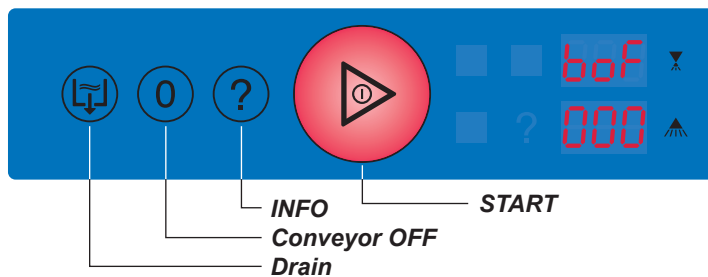


3. **Close the door.**

4. Push **Drain** button and **INFO** button simultaneously.
   The START button and temperature indicators change to a red steady light. The booster will be filled. After approx. 4 minutes filling will be stopped and $001$ is flashing at the lower indicator.

5. Open the door and check whether water is splashed out of rinse arm nozzles.
   **If not: Close the door.** Procedure will be repeated automatically.
   **If so:** Push **Drain** button and **INFO** button again with door open. The indicators switch off.

### 2.2.2 SEPARATE FILL BOOSTER OR DEMI BOOSTER (OPTIONS)

Setting: Separate fill booster ➔ S21 = 1 / Demi booster ➔ S40 & S33 = 1

**Machine must be switched off !**

1. **Open the door.**
   Push the **Drain**, **Conveyor OFF** and **INFO** button simultaneously until $E01$ / $--0$ is displayed.

2. **Close the door.** The lower indicator displays $--1$.

3. Push **Conveyor OFF** button repeatedly until the upper indicator shows
   either $A12$ = **separate fill booster**
   or $A34$ = **demi booster**

4. Push **START** button until $--1$ appears at the lower indicator.
   **Keep button pressed for approx. 2 minutes** until you can hear water flowing into the wash tank.
   **Do not activate other outputs !**

5. **Set switching function to 1 and save:**
   **Separate fill booster ➔ S31 = 1 / Demi booster ➔ S41 = 1.**
   Only then, the heating control for follow-up processes will be enabled (to prevent dry run of the heating elements). **See also chap. 6.2 Modification of Basic data U02.**

6. Open the door and close it again.

# 3   FUNCTIONAL DESCRIPTION

## 3.1   TANK FILL

### 3.1.1   GENERAL

All doors must be closed.

If the wash tanks are empty (float switch signal) filling will be started when the machine is switched on.

Dependent on model or site conditions, there are five selectable filling modes. Ex factory fill mode "2" is pre-adjusted as standard, even if no separate fill valve (**1Y2**) is built-in and no hot water connection is existent at site.

The machine tanks will be filled by the cascade principle, always starting from the wash or rinse zone of the AR segment.

The break tank fill level is controlled by float switch (**1B1 - normally closed**) and will be filled via fill valve (**1Y3**). With all fill modes, the break tank level control is running as an independent process.

When the machine is switched on and the break tank is filled, the rinse pump will be started for time period **C41** to re-fill the pressure booster in case of water loss (e.g. evaporation during standby).

### 3.1.2   FILLING VIA BOOSTER

**Fill mode "0" (S01 = 0)**  /  1 cold water connection on site

First the booster will be heated up to fill start temperature **F01/70°**. Then the rinse pump (**1M4**) starts and the tanks will be filled (optionally through the heat exchanger) via the final rinse pipes.

After the fill start temperature was reached, the temperature will be controlled by switch-on temperature **F02/82°C** and switch-off temperature **F03/85°C**.

If the temperature drops below value **F34/48°C**, filling will be stopped until fill start temperature **F01/70°** is reached again.

The wash tank heatings will be enabled by the respective float switch (**normally open** with empty tank).

When all wash tank float switches are actuated, the machine will be overfilled via adjustable time **C05**. The water level of the last wash tank must rise up to the overflow pipe, then filling will stop. If necessary, the time delay **C05** may be adjusted as required according to flow pressure on site.

**Refill:**
When the water level of a wash tank drops (float switch signal "empty"), the rinse pump will be startet directly, also if fill start temperature **F01/70°** is not reached. After refill (float switch signal "filled") the rinse pump (**1M4**) will continue to operate until time delay **C28** has expired.
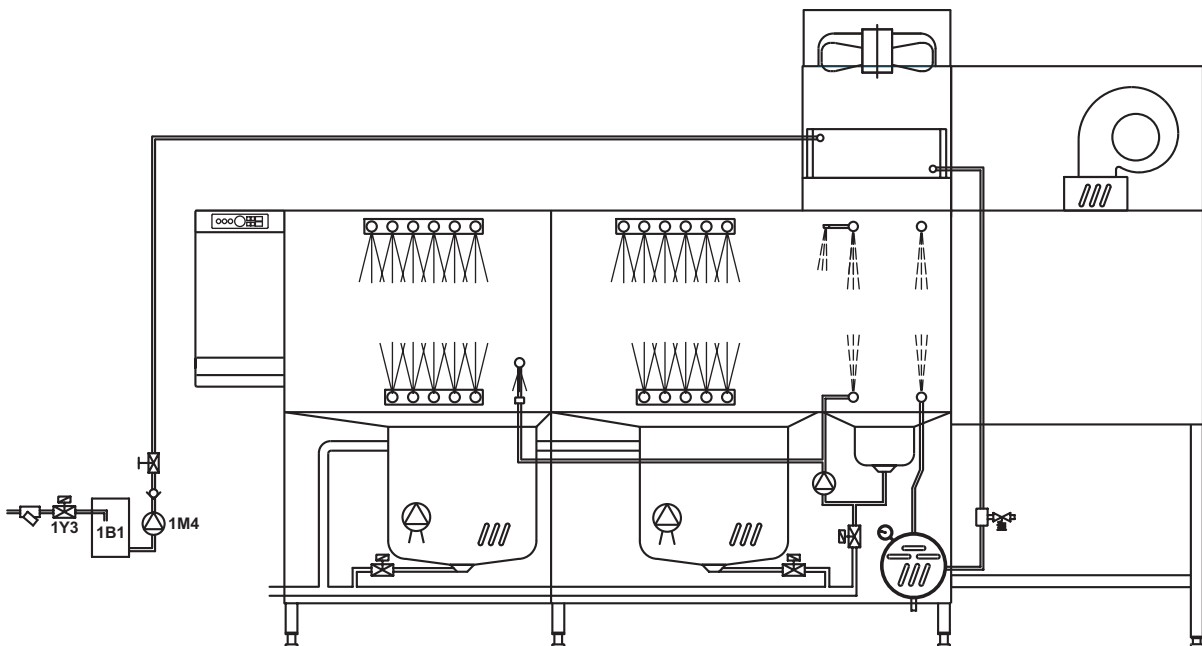
### 3.1.3   SEPARATE TANK FILL

**Fill mode "1" (S01 = 1)**  /  1 cold water and 1 hot water connection on site

If there is a "empty" signal of wash tank float switches, the separate fill valve (**1Y2**) will be actuated directly.

The wash tank heatings will be enabled by the respective float switch (**normally open** with empty tank).

When all wash tank float switches are actuated, the machine will be overfilled via the separate fill valve (**1Y2**) for adjustable time **C05**.
The water level of the last wash tank must rise up to the overflow pipe, then filling will stop. If necessary, the time delay **C05** may be adjusted as required according to flow pressure on site.

**Refill:** If water level drops (float switch signal "empty") the machine will be refilled as described above, but with time delay **C28**.
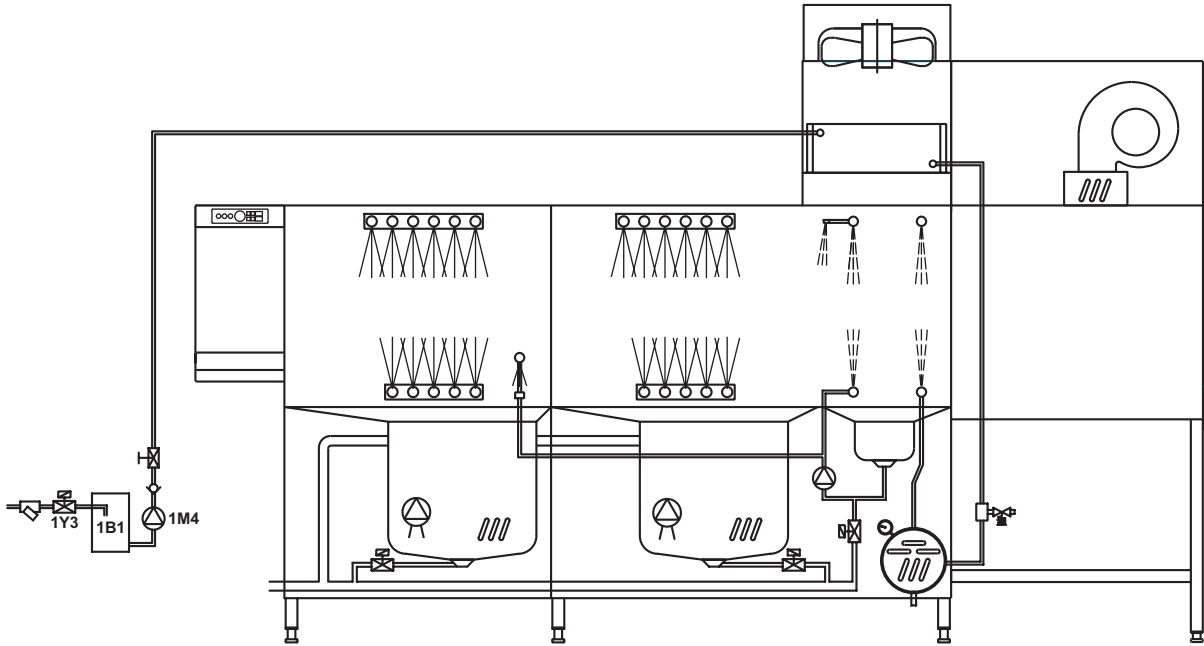


### 3.1.4   SEPARATE TANK FILL & FILLING VIA BOOSTER

**Fill mode "2" (S01 = 2)**  /  1 cold water and 1 hot water connection on site

This is a combination of fill modes "0" and "1", i.e. the tanks will be filled simultaneously via the separate fill valve and via booster (rinse pump).

**Refill:** If water level drops (float switch signal "**empty**") the machine will be refilled with time delay **C28**.

### 3.1.5   FILLING VIA BOOSTER, COLD WATER REFILL

**Fill mode "3" (S01 = 3)**  /  1 cold water connection on site

Machine will be filled in analogy to fill mode "0".

**Refill:** If water level drops (float switch signal "**empty**") the machine will be refilled with cold water via fill valve **1Y2**, with time delay **C28**.

### 3.1.6   FILLING VIA BOOSTER WITH BYPASS, COLD WATER REFILL

**Fill mode "4" (S01 = 4)**  /  1 cold water connection on site

As in the case of fill mode "0" and "3", there is only one cold water connection on site. To reduce filling time, additionally the valves (**1Y4**) and (**1Y5**) will be energized as soon as the fill start temperature **F01** is reached.

(**1Y4**) is used to bypass the built-in regulating valve which will increase the total flow rate. The tanks will be filled directly via (**1Y5**), by-passing the final rinse.

**Refill:** If water level drops (float switch signal "**empty**") the machine will be refilled with cold water via fill valve (**1Y2**), with time delay **C28**.

### 3.1.7 FILLING VIA SEPARATE FILL BOOSTER (OPTION)

**(S21 = 1)** & **(S01 = 1)**

At first the standard booster will be heated up to **F01/70°C**.

Then machine will be filled as described in 3.1.3 but the fill valve (**1Y2**) will not be energized until the separate fill booster has reached the fill start temperature **F23/70°C**.

As long as wash tank heatings are not enabled by the respective float switches, the outputs of both heating circuits of the separate fill booster will be activated during the fill operation. As soon as a tank heating is turned on, the second heating circuit of the fill booster will be deactivated.

If temperature drops below adjustable value **F34/48°C**, fill will be stopped until the fill start temperature **F23/70°C** is reached again.

**Refill:** If water level drops (float switch signal "**empty**") the machine will be refilled via the fill valve (**1Y2**) and fill booster, with time delay **C28**.

## 3.2 STAND-BY OPERATION

### 3.2.1 TEMPERATURES

When all wash tanks are filled and the temperatures **F02** and **F16** (see table below) are reached, the machine is ready for operation ("green" START button).
The temperatures will be regulated on **switch-on** and **switch-off** temperatures.

| | | | | | |
|------|------|-----------------------------|------|------|-------------------------------------------------|
| F01 | 1B2 | Booster – fill start temperature | F11 | 1B5 | Dryer – on |
| F02 | 1B2 | Booster – on | F12 | 1B5 | Dryer – off |
| F03 | 1B2 | Booster – off | F13 | 1B5 | Dryer – offset |
| F04 | 1B2 | Booster – offset | F14 | | Tank (AR) – lower "ready for operation" temperature |
| F05 | 1B3.2 | Tank (AR) – on | F15 | | Rinse – lower "ready for operation" temperature |
| F06 | 1B3.2 | Tank (AR) – off | F16 | | Tank (AR) – ready for operation temperature (filling) |
| F07 | 1B3.2 | Tank (AR) – offset | F23 | 1B8 | Fill booster – fill start temperature |
| F08 | 2B3.2 | Prewash tank – on | F24 | 1B8 | Fill booster – on |
| F09 | 2B3.2 | Prewash tank – off | F25 | 1B8 | Fill booster – off |
| F10 | 2B3.2 | Tank (E/L/S) – offset | F26 | 1B8 | Fill booster – offset |

## 3.3 WASH AND RINSE OPERATION

When the machine is switched on, filled and ready for operation, conveyor will be started by pushing the START button. Pushing the START button again will change the conveyor speed.

### 3.3.1 AUTOTIMER FUNCTION ENABLED

**(S12 = 1)**

When inactive, the autotimer switch (**1S1**) is closed.
As a rack enters the machine, the switch will be triggered by the autotimer lever (magnet) and the prewash (if installed), exhaust ventilator, wash pumps and dryer will be switched on.
When time **C08** is lapsed, all wash pumps switch off.

Dual rinse and final rinse will be activated time delayed via **C09**. The rinse time is given by **C10**.
After this time period the following functions will be switched off time delayed: dryer heating time **C11**, dryer ventilator time **C11 + C12**, exhaust ventilator time **C13**.

If the autotimer is not actuated within adjustable time **C07**, the conveyor will be stopped automatically and re-started by an autotimer signal.

**AUTOTIMER OPERATION – TIMING CHART WASH**

TIME **C07** ELAPSED WITHOUT AUTOTIMER OPERATION:
CONVEYOR STOP AND TIME DELAY STARTING HERE !

| Signal | Timing annotations |
|---|---|
| AUTOTIMER 1A1 / X13.3-4 | |
| [PRE] WASH 1A1 / X5.1-3 | WASH TIME **C08** |
| EXHAUST VENTILATOR 1A3 / X23.1-3 | EXHAUST DELAY TIME **C13** |
| WASH TANKS / PUMPS 2A1 / X9.1-3 | 250ms |
| DRYER BLOWER 1A3 / X23.1-3 | 500ms / DRYER DELAY TIME **C11+C12** |
| DRYER HEATING 1A3 / X23.1-3 | 750ms / **C11** **C12** |
| [WASH PUMPS] 2A1 / X4.1-3 | **C16** |
| [RINSE ACTUATOR] 1A1 / X13.11-12 | if S15 = 1 / if S15 = 2 |
| FINAL RINSE & [DUAL RINSE] 1A1/X1.1-3 & [1A1/X9.1-3] | RINSE START **C09** / RINSE TIME **C10** |
| [DEMI RINSE] 2A1/X13.9-10 | DEMI RINSE START **C14** / DEMI RINSE **C15** |

The adjustable autotimer times **C08**, **C09**, **C10**, **C14**, **C15** refer to the lowest speed (**speed 1**).
Due to the shorter through-put time of racks at higher conveyor speed, the autotimer times must also be reduced. When switching to a higher speed, the relevant times are multiplied by correction factor **C61** (**speed 2**) or **C62** (**speed 3**).

### 3.3.2 AUTOTIMER CONTROL

**(S35 = 1)**

If a rack is quickly pushed across the autotimer switch (**pulse <= C42**), the current rack position cannot be detected. Therefore wash and rinse will be activated directly to ensure a correct washing result.
When the auto timer signal does not drop after expiry of time C43, the error message "**Err 013**" will be generated.

## 3.4 DRAINING

### 3.4.1 PARTIAL DRAINING

By pushing the drain button for **1 second**, the drain valves of the prewash tank (**E = 2Y1**, **L/S/C = 1Y1**) and dual rinse tank (**6Y1**) will be activated for adjustable time **C29**.
After this time period the valves will close and the tanks are refilled depending on filling mode.

### 3.4.2. COMPLETE DRAINING

**Push the drain button for 5 seconds.**
The drain valves of the prewash tank ( **E** = (**2Y1**), **L/S/C** = (**1Y1**) ) and dual rinse tank (**6Y1**) will be activated for time **C29**, the drain valves of the wash tanks (**3Y1 - 5Y1**) for time **C30**.

During the drain cycle, wash pumps will be activated for a short time.

When times **C29** and **C30** are lapsed, the machine will be switched off.

**NOTE:**
Opening the doors does not stop the drain cycle, but the wash pumps will not be activated!
Complete machine draining can only be interrupted by pushing the START button for at least 5 seconds or via Emergency Stop (= control de-energized).

# 4 OPTIONS

## 4.1 MECHANICAL RINSE ACTUATOR

Setting of switching function **S15**:

**0** = Without mechanical rinse actuator.

**1** = The dual rinse pump and final rinse pump will only be activated within time period **C10** (optimization of rinse water consumption).

**2** = Demi rinse will only be activated within time period **C15**.

## 4.2 HEAT PUMP (CHP)

### 4.2.1 FILLING

If the switch-on lock is not activated by a previous On/Off operation, the compressor (**1M9**) will run for time **C19 / 5 seconds** after switching on the machine.

As soon as the water level reaches the float switch of the main wash tank (AR) and the switch-on delay time **C24** is lapsed, the compressor (**1M9**) and exhaust ventilator will be activated (provided there is no input signal "low pressure / high pressure failure").
Dryer blower and dryer heating will be activated. With reaching the switch-off temperature **F31/66°C**, the outputs will be deactivated.

The tank circulation pump (**3M3**) will start when the tank temperature **F33/56°C** (main wash tank) is reached and will stop after reaching the switch-off temperature **F31/66°C**.

After the water level in all (pre)wash tanks is reached, the wash pump (main wash tank) will run for time period **C20** when the fixed temperature threshold values are reached: **55°C**, **59°C**, **61°C**, **63°C**.
The tank circulation pump will be switched off during the wash pump is running and will restart depending on **F33/56°C**.

### 4.2.2 STAND-BY MODE

During stand-by mode, the (pre)wash pumps and exhaust will be switched on in intervals (adjustable via **C22**) for time period **C20**. (Wash cycle)

The compressor (**1M9**) and exhaust as well as tank circulating pump (only at temperatures **>= F33/56°C**) will be switched on when the temperature drops below **F32/64°C** (exception: high / low pressure failure). The named units operate until switch-off temperature **F31/66°C** has been reached.

### 4.2.3 WASH AND RINSE OPERATION

As soon as the main wash pump (AR) is switched on, the compressor will be forcibly started.

### 4.2.4 DRAIN CYCLE

When drain cycle is activated (partial or complete machine draining), the compressor and tank circulation pump will not be actuated.

### 4.2.5 COMPRESSOR LOCKOUT

**Fill, wash and rinse operation.**
When the compressor has been switched off, it will be locked for time period **C23/20 seconds**.

**4.2.6  HIGH PRESSURE / LOW PRESSURE CONTROL**

The pressure ratios in the evaporator circuit are permanently controlled by an external pressure switch.

HIGH PRESSURE FAULT (Input 2A1/X12.3)

In case of high-pressure fault, the compressor will be forcibly deactivated for time **C25 / 3 minutes**.
When this time period is lapsed the compressor will be restarted.

LOW PRESSURE FAULT (Input 2A1/X12.4)

In case of low-pressure fault, the compressor will also be forcibly deactivated for time **C25**.
When this time period is lapsed the compressor will be restarted.

TROUBLESHOOTING

The occurrence of faults will be recorded:

High-pressure fault        = counter **C63**
Low-pressure fault         = counter **C64**.

In the case of a counter overflow (**C63** or **C64 > 999**), counting starts again from zero.

High-pressure as well as low-pressure faults may occur **3 times max.** within time period **C26**.
The fourth time an error message will be displayed:

High-pressure fault        = **Err 010**
Low-pressure fault         = **Err 011**

To acknowledge the fault, the machine has to be switched off.

The occurrence of the error messages will be recorded by separate counter:

High-pressure alarms       = counter **C65**
Low-pressure alarms        = counter **C66**.

In the case of a counter overflow (**C65** or **C66 > 999**), counting starts again from zero.

# 5 SPECIFICATION OF CONTROL ELECTRONICS

**Part numbers: Control 897545-4 / Extension Board 897546-2 / Operation unit (BAE) 897540-2 / EEprom 897547-9**

## 5.1 PRINTED CIRCUIT BOARDS

**MAIN BOARD**

This PCB **897545-4** is based on 897545-1. Pay attention that the PCBs will not be confused when built in.
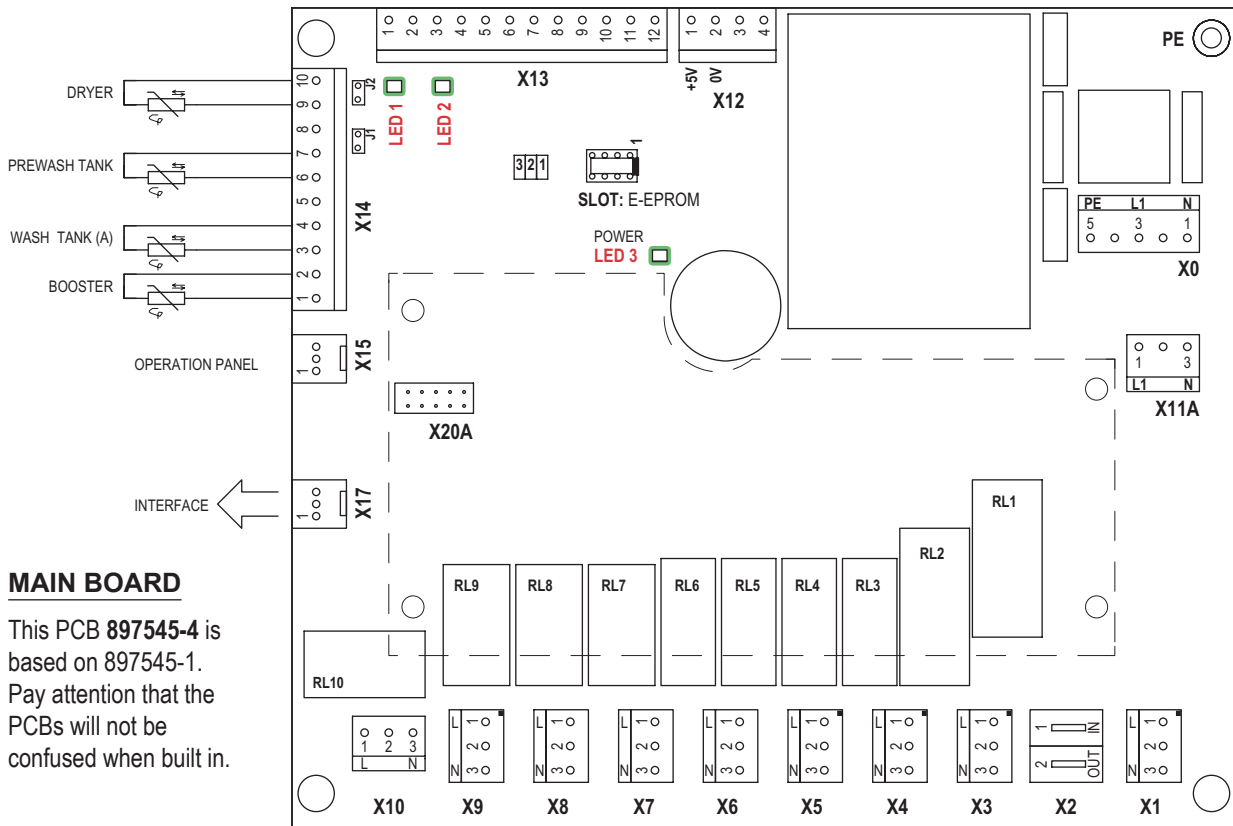
### 5.1.1 POWER SUPPLY

X 0:   230V AC (main board)
X11A:  to extension board (1A3 / 2A3)

### 5.1.2 DIGITAL OUTPUTS

There are 10 outputs, switched via relay:

4 x relay with contact (1S)   5A, 250V AC
4 x relay with contact (1S)   8A, 250V AC
2 x relay with contact (1S) 12A, 250V AC

All contacts are led via pin connector:

X1   = 230VAC        Relay output RL1, 12A   Relay is internally controlled via input X13.1-2.
X2   = potential-free  Relay output RL2, 12A
X3   = 230VAC        Relay output RL3, 5A    Relay is internally controlled via input X13.1-2.
X4   = 230VAC        Relay output RL4, 5A    Relay is internally controlled via input X13.1-2.
X5   = 230VAC        Relay output RL5, 5A    Relay is internally controlled via input X13.1-2.
X6   = 230VAC        Relay output RL6, 5A
X7   = 230VAC        Relay output RL7, 8A
X8   = 230VAC        Relay output RL8, 8A
X9   = 230VAC        Relay output RL9, 8A    Relay is internally controlled via input X13.1-2.
X10 = 230VAC        Relay output RL10, 8A

The outputs X1, X3 to X5 and X9 will be disconnected directly via the door switch.

X15:  Operation unit (BAE) connection
X16:  No function
X17:  CAN interface, bus connection with a second main board (slave)
X18:  No function

### 5.1.3 DIGITAL INPUTS

**6 digital inputs 12V DC on plug X13:**

**Input X13.1-2**
LED 1: ON = security circuit / door(s) closed

**Input X13.3-4**
LED 2: ON = autotimer switch not activated

**2 digital inputs 5V DC on plug X12:**

LED 3: flashing = voltage on,
processor running
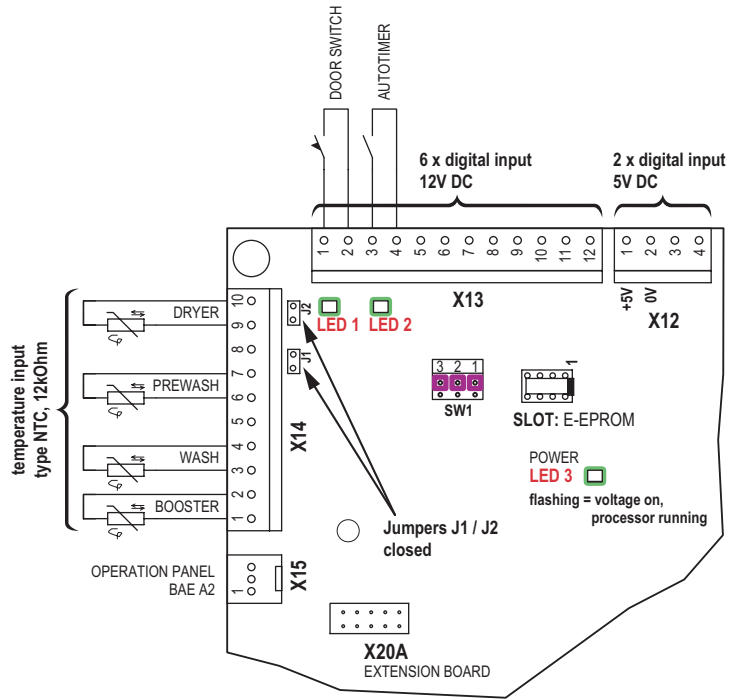
### 5.1.4 ANALOG INPUTS

**4 analog inputs NTC on plug X14:**

**Input X14.6-7**
Jumper 1 = prewash

**Input X14.9-10**
Jumper 2 = dryer

Jumpers closed = inputs activated.



### 5.1.5 TEMPERATURE SENSORS

The NCT (negative temperature coefficient) thermistors are temperature-dependent semiconductor resistors.

**Characteristic curve**

| T °C | 0 | 25 | 30 | 40 | 50 | 60 | 70 | 95 |
|------|-----|------|------|------|------|------|------|------|
| R kΩ | 36.50 | 12.00 | 9.93 | 6.75 | 4.67 | 3.29 | 2.73 | 1.11 |
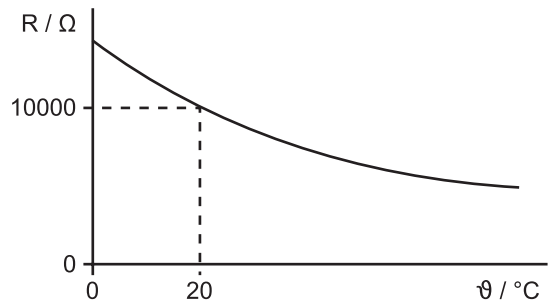


### 5.1.6 EXTENSION BOARD

If necessary an extension board (1A3) can be attached on the motherboard (1A1) by plug X20.

The extension board has 9 additional digital outputs:

7 x relay with contact (1S)  5A, 250V AC
2 x relay with contact (1S)  8A, 250V AC

All contacts are led via pin connector:

X21.6　　= 230VAC　　RL11, 5A
X21.7　　= 230VAC　　RL12, 5A
X21.8　　= 230VAC　　RL13, 5A
X21.9　　= 230VAC　　RL14, 5A
X22.1　　= 230VAC　　RL15, 8A
X23.1　　= 230VAC　　RL16, 8A
X24.1-2 = potential-free　RL17, 5A
X25.1-2 = potential-free　RL18, 5A
X26.1-2 = potential-free　RL19, 5A
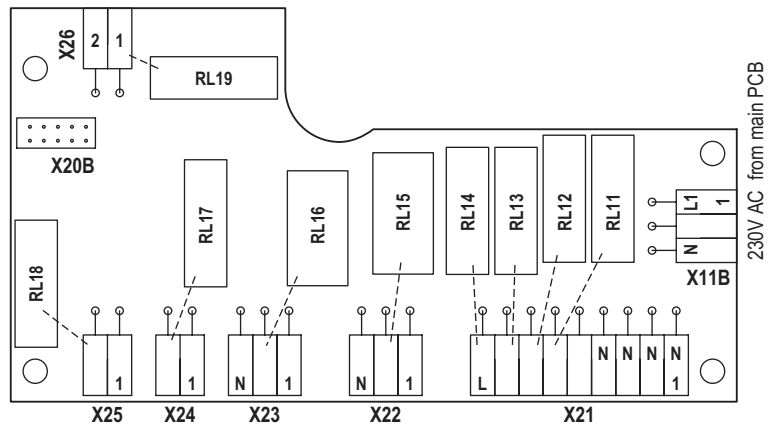
### 5.1.3 CONNECTION / ADDRESSING OF ADDITIONAL BOARDS
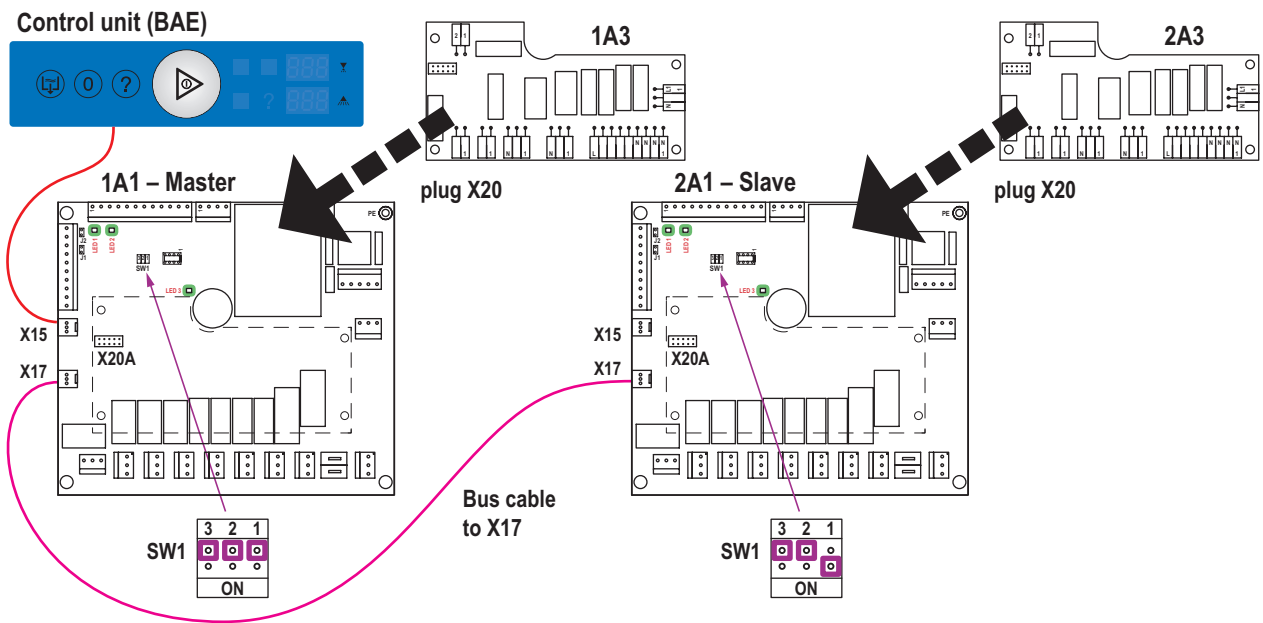


The printed circuit boards will be connected via bus cable and connectors X17.

The Addressing is done via the existing DIP switches (SW):
first PCB (master) = address 0, second PCB = address 1, third PCB = address 2, etc.

## 5.2 PROGRAM UPLOAD

After replacing the PCB or if a program update is to be installed, the program must be loaded from the EEPROM to the control:

1. Cut off power supply.
2. Plug in the EEPROM (make sure that the notches of the EEPROM and slot match).
3. Reconnect power supply. In case of different revision status, the program is automatically loaded into the memory (attention, also an old version).
   The progress is indicated in the upper display by L9, L8, L7, ... L0, the lower display indicates the Software Revision. At the end of upload, the display switches off.
4. Cut off power supply.
5. Remove EEPROM (the control works with or without plugged EEPROM).

**Proceed with point 13 if:**
– There is only one Control board.
– There are two Control boards (Master (1A1) and Slave (2A1)) and both controls were already running before.

**Proceed with point 6 if** the Slave control (2A1) has been replaced. In this case the new one must be handled like a master control.

6. Set all DIP switches of the Slave control to "0" = OFF.
7. Disconnect the BUS cable (1A1/ 2A1 – plug X17).
8. Connect the control unit (BAE) to the Slave control (2A1 – plug X15).
9. See point 2 to 5.
10. Reconnect the BUS cable (1A1/ 2A1 – plug X17).
11. Set DIP switches of the Slave control to "001" (see illustration above).
12. Connect the control unit (BAE) to the Master control (1A1 – plug X15).

13. Reconnect power supply.
14. Set machine type = menu U01 (see also page ).
    If necessary, change basic data = menu U02.

# 6  MACHINE CONFIGURATION

The configuration of the control is carried out via the menus machine type selection and basic data.

Machine Type Setting  = **U01** (indicated by the **RED** illuminated START button)
Depending on machine type and specification the corresponding program number with basic data will be loaded and saved.

Modification of Basic Data = **U02** (indicated by the **BLUE** illuminated START button)
Adjustment of parameters according to the requirements.

**TO ENTER THE CONFIGURATION MODE, PROCEED AS FOLLOWS:**

1. **Switch on main switch  – <u>but NOT the machine</u>.**
2. **Open the door.**



*INFO*        *START*
*Conveyor OFF*
*Drain*
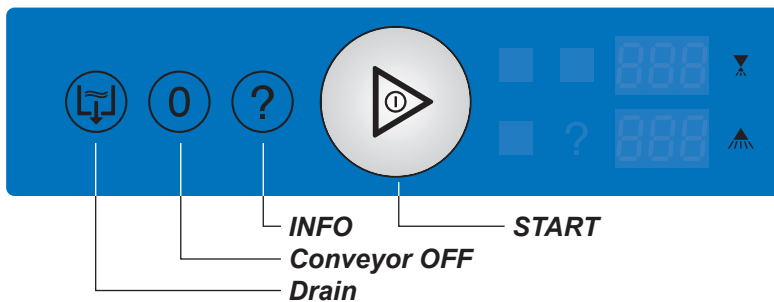
3. Push the **Conveyor OFF** and **INFO** button at the same time.
   Software release will be displayed short-time.

   After a few seconds the display changes automatically to "Machine type setting".

## 6.1  MACHINE TYPE SETTING – U01

4. Push the **START** button to enter the menu (indicated by the **RED** illuminated button).
   The actual program number will be displayed.

5. Set machine type* (e.g. 003) by pushing the **Drain** button repeatedly.
   *\* See machine type list on next page or parameter sheet (attached to the machine).*

6. Push the **START** button and keep pressed until the button switches off.
   The selected program with the basic data will be saved.

*THE CONFIGURATION MODE CAN BE INTERRUPTED AT ANY TIME BY CLOSING THE DOOR.*

### 6.1.1 MACHINE TYPE LIST

Starting from software revision c3.4 28/05/09, the following programs are available.

Additional options since rev. 3.4:
– emergency operation (standard)
– customer menu (option)
– demi rinse (option)

| Prog. No. U01 | Machine Type Tank(s) | Heat pump | Fill system |
|---|---|---|---|
| 001 | CN -A | | Filling via booster |
| 002 | CN -E-A | | Filling via booster |
| 003 | CN -L(-C)-A | | Filling via booster |
| 004 | CN -S-A | | Filling via booster |
| 005 | CN -A | | Separate tank fill |
| 006 | CN -E-A | | Separate tank fill |
| 007 | CN -L(-C)-A | | Separate tank fill |
| 008 | CN -S-A | | Separate tank fill |
| 009 | CN -A- | CHP | Filling via booster |
| 010 | CN -E-A- | CHP | Filling via booster |
| 011 | CN -L(-C)-A- | CHP | Filling via booster |
| 012 | CN -S-A- | CHP | Filling via booster |
| 013 | CN -A- | CHP | Separate tank fill |
| 014 | CN -E-A- | CHP | Separate tank fill |
| 015 | CN -L(-C)-A- | CHP | Separate tank fill |
| 016 | CN -S-A- | CHP | Separate tank fill |

The dryer has to be activated via parameter S05:  0 = without dryer  / 1 = with dryer

## 6.2 MODIFICATION OF BASIC DATA – U02

1. Enter the configuration mode as described on page 16 (point 1 to 3).

2. When U01 is displayed, select menu U02 by pushing the **Drain** button.

3. Push the **START** button to enter the menu (indicated by the **blue** illuminated button). The first parameter will be displayed.

4. Select parameter* (e.g. C05 - delay time tank fill) by pushing the **Drain** button repeatedly. Times / counters = C, temperatures = F and S = switching functions.
   *\* See parameter sheet (attached to the machine).*

5. Change value upwards (**+**) by pushing the **Conveyor OFF** button and downwards (**–**) by pushing the **INFO button**. Three points will appear.

6. To save the new value, push the START button and keep pressed until the points disappear.

*THE CONFIGURATION MODE CAN BE INTERRUPTED AT ANY TIME BY CLOSING THE DOOR.*

# 7 INPUT / OUTPUT TEST

## 7.1 TEST MODE / SERVICE DIAGNOSTIC MENU

In this mode the Inputs and Outputs of PCB can be controlled.

– Readout of the status of inputs and actual temperatures.
– Activation of output relays for fault analysis.

**Configuration of Inputs / Outputs see next page.**

**ATTENTION**
When testing the outputs, machine conditions will not be considered.
If, for example, the output of a booster heater is activated and the booster is not filled, the heating element will be destroyed.

**TO ENTER THE TEST MODE, PROCEED AS FOLLOWS:**

1. **Switch on main switch – but NOT the machine.**

2. **Open the door.**
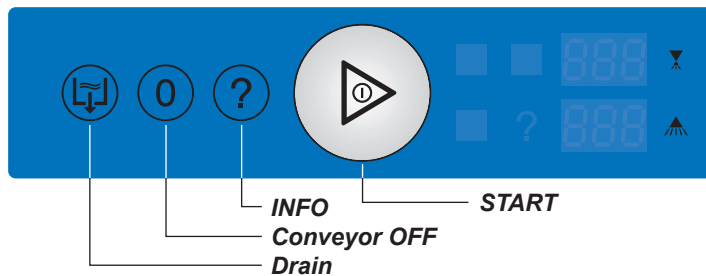


3. Push the **Drain**, **Conveyor OFF** and **INFO** button at the same time.
   The first tested input X13.1-2 will be displayed.

4. **Close all doors.**
   When the security circuit (control input X13.1-2) is closed, the display will change to - - 1.
   (Conveyor jam switch 1S5 and motor protection switches may not be actuated.)

5. **Scan menu by pushing the Conveyor OFF button repeatedly.**

   First the inputs will be displayed one after the other.

6. After this the programmed temperature inputs will be tested.
   The selected temperature probe with the actual value is displayed

7. To test an output select the appropriate one with the **Conveyor OFF** button.
   **Doors must be closed**.

   By pushing the START button, the selected output will be activated
   (the relay will be closed).

8. After this push the **Conveyor OFF** button until "BAE" is displayed.
   Push the START button to start the operation unit (BAE) test.

*STARTING FROM "OUTPUT TEST" IT IS POSSIBLE TO QUIT THE TEST MODE BY OPENING THE DOORS.*

## 7.2 INPUT / OUTPUT TABLE

According to basic wiring diagram 01-294503-000e.

| | | | | |
|---|---|---|---|---|
| E01 | 1A1 | | X13/1-2 | Security circuit |
| E02 | 1A1 | | X13/3-4 | Autotimer |
| E03 | 1A1 | | X13/5-6 | Float switch main wash tank AR |
| E04 | 1A1 | | X13/7-8 | Float switch brewak tank |
| E05 | 1A1 | | X13/9-10 | Float switch prewash tank L/S/C |
| E06 | 1A1 | | X13/11-12 | Rinse switch AR |
| E07 | 1A1 | | X12/1-3 | Start / Stop |
| E08 | 1A1 | | X12/1-4 | Table end switch |
| E09 | 2A1 | | X13/1-2 | Security circuit 2 |
| E10 | 2A1 | | X13/3-4 | Reserve |
| E11 | 2A1 | | X13/5-6 | Reserve |
| E12 | 2A1 | | X13/7-8 | Reserve |
| E13 | 2A1 | | X13/9-10 | Korberkennung DEMI oder Automatische Füllung |
| E14 | 2A1 | | X13/11-12 | Motor protection switch compressor |
| E15 | 2A1 | | X12/1-3 | High pressure switch |
| E16 | 2A1 | | X12/1-4 | Low pressure switch |
| F01 | 1A1 | | X14/1-2 | Temperature probe booster |
| F02 | 1A1 | | X14/3-4 | Temperature probe main wash tank AR |
| F03 | 1A1 | | X14/6-7 | Temperature probe prewash tank L/S/C |
| F04 | 1A1 | | X14/9-10 | Temperature probe dryer |
| F05 | 2A1 | | X14/1-2 | Reserve |
| F06 | 2A1 | | X14/3-4 | Reserve |
| F07 | 2A1 | | X14/6-7 | Temperature probe fill booster |
| F08 | 2A1 | | X14/9-10 | NSF Temperature probe DEMI booster or manifold |
| A01 | 1A1 | RL1 | X1/1 | Rinse pump |
| A02 | 1A1 | RL2 | X2/2 | Booster heating |
| A03 | 1A1 | RL3 | X3/1 | Transport speed 2 |
| A04 | 1A1 | RL4 | X4/1 | Transport speed 1 |
| A05 | 1A1 | RL5 | X5/1 | Wash pumps AR/L/S/C/E |
| A06 | 1A1 | RL6 | X6/1 | Tank heating |
| A07 | 1A1 | RL7 | X7/1 | Exhaust |
| A08 | 1A1 | RL8 | X8/1-3 | Drain valve prewash and dual rinse  (partial draining) |
| A09 | 1A1 | RL9 | X9/1-3 | Dual rinse pump |
| A10 | 1A1 | RL10 | X10 / 1-3 | Drain valve main wash AR |
| A11 | 1A3 | RL11 | X21/1-6 | Fill valve 1Y3 |
| A12 | 1A3 | RL12 | X21/2-7 | Separate fill valve 1Y2 |
| A13 | 1A3 | RL13 | X21/8 | Reserve |
| A14 | 1A3 | RL14 | X21/9 | Reserve |
| A15 | 1A3 | RL15 | X22/1 | Dryer heating |
| A16 | 1A3 | RL16 | X23/1 | Dryer blower |
| A17 | 1A3 | RL17 | X24/1-2 | Voltage free contact 2 / Machine ON / XD.1 |
| A18 | 1A3 | RL18 | X25/1-2 | Voltage free contact 2 / Machine ON |
| A19 | 1A3 | RL19 | X26/1-2 | Voltage free contact 3 |
| A20 | 2A1 | RL20 | X1/1-3 | Reserve |
| A21 | 2A1 | RL21 | X2 /2 | Fill booster circuit 1 |
| A22 | 2A1 | RL22 | X3/1-3 | Reserve |
| A23 | 2A1 | RL23 | X4/1-3 | Reserve |
| A24 | 2A1 | RL24 | X5/1-3 | Reserve |
| A25 | 2A1 | RL25 | X6 /1 | Compressor HP |
| A26 | 2A1 | RL26 | X7/1 | Tank circulation pump |
| A27 | 2A1 | RL27 | X8/1-3 | Reserve |
| A28 | 2A1 | RL28 | X9/1-3 | Reserve |
| A29 | 2A1 | RL29 | X10/1-3 | Reserve |
| A30 | 2A3 | RL30 | X21/1-6 | Prewash heating L/S/C |
| A31 | 2A3 | RL31 | X21/2-7 | Reserve |
| A32 | 2A3 | RL32 | X21/8 | Fill booster circuit 2 |
| A33 | 2A3 | RL33 | X21/4-9 | Reserve |
| A34 | 2A3 | RL34 | X22/1-3 | Demi valve |
| A35 | 2A3 | RL35 | X23/1-3 | Demi booster heating |
| A36 | 2A3 | RL36 | X24/1-2 | Voltage free contact 4 / rack lock (lift magnet) |
| A37 | 2A3 | RL37 | X25/1-2 | Voltage free contact 5 |
| A38 | 2A3 | RL38 | X26/1-2 | Voltage free contact 6 |

### 7.2.1 FUNCTION OF THE "VOLTAGE FREE" CONTACTS

**1A3 – X24/1-2 Output**
activated with "machine ON"

**1A3 – X25/1-2 Output**
S22 = 0       activated with "transport ON"
S22 = 1       activated with "exhaust activ"
S22 = 2       activated with "machine ready for operation"
S22 = 3       activated with "fill or refill active"

**1A3 – X26/1-2 Output**
S23 = 0       activated with "exhaust ON"
S23 = 1       activated with "fault security circuit"
S23 = 2       activated with "machine ready for operation"
S23 = 3       activated w ith "fill or refill active"

**2A3 – X24/1-2 Output**
activated with "machine ON"

**2A3 – X25/1-2 Output**
not defined

**2A3 – X26/1-2 Output**
not defined

# 8 FAULTS

The START button is flashing (uncritical faults) or red illuminated (critical fault).

| ERROR CODE | FAULT DESCRIPTION / POSSIBLE CAUSE | | TO CLEAR THE FAULT: |
|---|---|---|---|
| Err 001 | Exceeded fill time 1Y3 | If the solenoid valve is activated the first time (after "machine" ON), filling will be controlled via adjustable time C01.<br>When this time has lapsed and the float switch 1B1 is not open, the error code will be displayed. | Machine OFF / ON |
| | No water flow into the break tank: | – Shut-off valve on site not open.<br>– Strainer on site clogged.<br>– Strainer or reduction before the solenoid valve clogged.<br>– Solenoid valve does not open. | |
| | No signal on control input: | – Float switch defective.<br>– Float switch not correctly installed. | |
| Err 002 | Exceeded fill time 1Y3 | After the float switch was actuated first-time (= break tank was filled), the switching hysteresis will be controlled via time C02.<br>When this time has lapsed and the float switch 1B1 is not open, the error code will be displayed. | Automatically |
| | | If error persists longer than C01, Err 001 will be generated and the START button changes to a red steady light. | Machine OFF / ON |
| | Not enough water supply: | – Site water pressure too low.<br>– Line strainer on site clogged.<br>– Shut-off valve on site not completely opened.<br>– Strainer or reduction before the solenoid valve clogged.<br>– Solenoid valve opens not completely. | |
| | To high water consumption: | – Rinse arm not in position.<br>– Rinse system leaky.<br>– Rinse arm support (o-ring) leaky.<br>– Missing rinse arm nozzle. | |
| Err 003 | Fill start temperature booster not reached | Temperature F01 not reached within time C37. | Machine OFF / ON or switch-over to Emergency operation |
| | Booster does not heat: | – Booster heating defective.<br>– Heating contactor defective. | |
| | | | |

| ERROR CODE | FAULT DESCRIPTION / POSSIBLE CAUSE | | TO CLEAR THE FAULT: |
|---|---|---|---|
| **Err 004** | Booster temperature below set value | If temperature is below value F15 for time period ≥ C06, the error code will be displayed. | Conveyor ON |
| | Not enough heating power: | – Curtains not in position.<br>– Missing phase at the power supply, motor protection switch or contactor.<br>– Heater defective.<br>– Bridge on the heater is missing. | |
| | To high water consumption: | – Rinse arm not in position.<br>– Rinse system leaky.<br>– Rinse arm support (o-ring) leaky.<br>– Missing rinse arm nozzle.<br>– Wrong diaphragm fitted or hand valve manipulated. | |
| **Err 005** | Exceeded fill time **Tanks** | If tank fill is not completed within time period C38 the error code will be displayed. | Machine OFF / ON |
| | Not enough water supply: | – Site water pressure too low.<br>– Line strainer on site clogged.<br>– Shut-off valve on site not completely open.<br>– Strainer or reduction before the solenoid valve clogged.<br>– Solenoid valve opens not completely. | |
| | Loss of tank water: | – Drain valve clogged.<br>– Gasket of drain valve defective. | |
| **Err 006** | AR tank temperature below set value | If temperature is below value F14 for time period ≥ C06, the error code will be displayed and the conveyor will be stopped. | Conveyor ON |
| | Not enough heating power: | – Curtains not in position.<br>– Wash arms not in position.<br>– Splash-over by washware.<br>– Missing phase at the power supply, motor protection switch or contactor.<br>– Heater defective.<br>– Bridge on the heater is missing. | |
| **Err 007** | Security circuit 1A1 interrupted | Input 1A1, X13/1-2 open. | Machine OFF / ON |
| | | – Doors open.<br>– Motor protection switch actuated.<br>– Conveyor jam switch actuated. | |
| **Err 008** | Security circuit 2A1 interrupted | Input 2A1, X13/1-2 open. | Machine OFF / ON |
| | | – Missing wire link. | |

| ERROR CODE | FAULT DESCRIPTION / POSSIBLE CAUSE | | TO CLEAR THE FAULT: |
|---|---|---|---|
| **Err 009** | Table end switch actuated | Input 1A1/X12.1-4 open. | Remove rack |
| | | – Table end switch defective. | |
| **Err 010** | Heat pump **CHP18** high pressure fault | The compressor has been switched off 4 times within time period C26. The occurrence of the error messages will be recorded by counter C65. | Machine OFF / ON |
| | | – Splash-over as curtains are not in position or missing.<br>– Splash-over as wash arms are not in position.<br>– Splash-over by washware (wrongly placed).<br>– Too much foam in the wash tank.<br>– Not enough water supply or temperature higher than 25°C.<br>– Tank circulation pump defective.<br>– Float switch defective or soiled.<br>– Drain valve clogged or gasket defective.<br>– Switch-off temperature of the AR-tank is set too high.<br>– Temperature probe defective or wrong Offset.<br>– Too much primary energy by dryer. | |
| **Err 011** | Heat pump **CHP18** Low pressure fault | The compressor has been switched off 4 times within time period C26. The occurrence of the error messages will be recorded by counter C66. | Machine OFF / ON |
| | | – Tank fill temperature below 45°C.<br>– Heat pump panels not in place.<br>– Exhaust fan defective.<br>– Refrigerant loss or obstruction in the refrigeration circuit.<br>– Heat exchanger soiled.<br>– Evaporator soiled. | |
| **Err 012** | Drain fault | When the time C39 is lapsed, all tanks must be drained (float switch signal "empty"). If not, the error code will be displayed. | Machine OFF / ON |
| | Water in the tank: | – Drain valve / drain system clogged.<br>– Drain valve defective. | |
| | No water in the tank: | – Float switch jammed.<br>– Float switch defective. | |
| **Err 013** | Fault – autotimer control | Time C43 has lapsed but the autotimer signal is still present. | Conveyor ON / Autotimer signal |
| | | – Open circuit.<br>– Autotimer actuator not in position.<br>– Magnet is missing.<br>– Switch defective. | |

| ERROR CODE | FAULT DESCRIPTION / POSSIBLE CAUSE | | TO CLEAR THE FAULT: |
|---|---|---|---|
| Err 014 | Fill start temperature not reached (separate fill booster) | Temperature F23 not reached within time C37. | Machine OFF / ON or switch-over to Emergency operation |
| | Fill booster does not heat: | – Booster heating defective.<br>– Heating contactor defective. | |
| Err 015 | Motor protection switch compressor (CHP) tripped | Input 2A1, X12/11-12 open. | Automatically after error correction |
| | Motor protection switch tripped: | – Too much refrigerant / pressure too high. | |
| | Motor protection switch not tripped: | – Auxiliary contactor / motor protection switch defective. | |
| Err 016 | Drain fault – prewash | If prewash is not drained (float switch signal "empty") within time period C46, the error code will be displayed. | Machine OFF / ON |
| | Water in the tank: | – Drain valve / drain system clogged.<br>– Drain valve defective. | |
| | No water in the tank: | – Float switch jammed.<br>– Float switch defective. | |
| Err 020 | Fault – CAN-bus | Communication error between the PCBs | Machine OFF / ON |
| Err 021 | Fault – K-line operation unit (BAE) | Communication error between the control board and operation unit (BAE). | Machine OFF / ON |
| Err 10x | Temperature probe defective. | x = number (1 to 8) of the corresponding temperature input. | Machine OFF / ON |
| | | – Short circuit.<br>– Open circuit. | |

## 01-296170-2/-3



**691927-1 (1E11)**
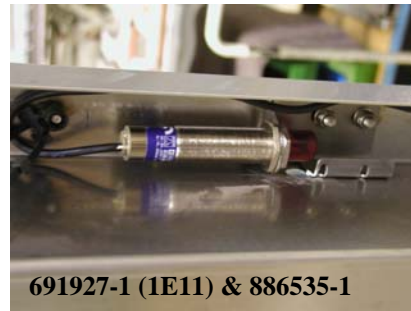


**691927-1 (1E11) & 886535-1**
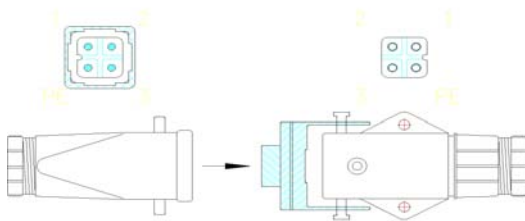


785090-3 / -5 &
691927-1 &
324304-3

785090-1 / -4 &
691928-2
324304-3

| Pin-Nr. | 691927-1 | |
|---------|----------|--------|
| 1 | bn | X17.12 |
| 2 | bu | X17.13 |
| 3 | | |
| PE | PE | |

**STECKVERBINDER SCHWENKTISCH**

**CONNECTOR FOR HINTCHED VERSIONS**
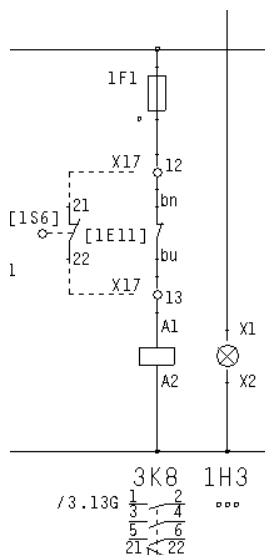


ANSCHLUSS TISCHENDSCHALTER:
KLEMME X17.12 (braune Ader) UND X17.13 (blaue Ader)

CONNECTION TABLE END SWITCH
TERMINAL X17.12 (brown wire) AND X17.13 (blue wire)

CONNEXION FIN DE TABLE
BORNE X17.12 (brun) ET X17.13 (bleu)

## 01-296170-2/-3
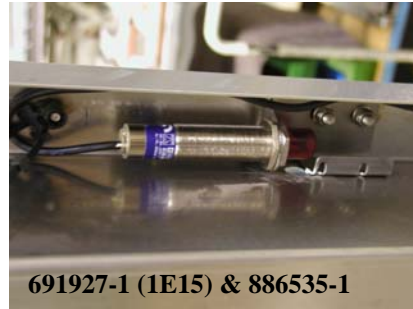


**691927-1 (1E15)**



**691927-1 (1E15) & 886535-1**
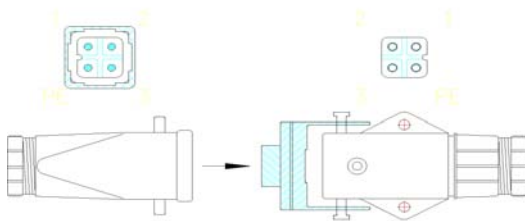


785090-3 / -5 &
691927-1 &
324304-3

785090-1 / -4  &
691928-2
324304-3

| Pin-Nr. | 691927-1 | |
|---|---|---|
| 1 | bn | X17.32 |
| 2 | bu | X17.33 |
| 3 | | |
| PE | PE | |
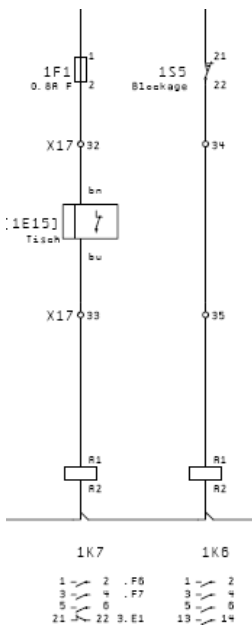
**STECKVERBINDER SCHWENKTISCH**

**CONNECTOR  FOR HINTCHED VERSIONS**



ANSCHLUSS TISCHENDSCHALTER:
KLEMME X17.32 (braune Ader) UND X17.33 (blaue Ader)

CONNECTION TABLE END SWITCH
TERMINAL X17.32 (brown wire) AND X17.33 (blue wire)

CONNEXION FIN DE TABLE
BORNE X17.32 (brun) ET X17.33 (bleu)

**HOBART**

## C-Line Technical Product Specification

| Product name: CS… / CN… / CP... | | Compiled by: J.L./A.B./W.N.(DFC/EPM) |
| --- | --- | --- |
| | | Date: 23.04.2009 |
| | | Edition: 4.0 |
| | | Changes: |

| Description | Specification (value & tolerance) | Comments/Remarks |
| --- | --- | --- |

**1. Product range**

**1.1 Product range**

| | See Product range volume | |
| --- | --- | --- |
| | See Product Box of boilding | |

**1.2 Machine configurations**

| | See configuration overview | |
| --- | --- | --- |

**2. Model Overview:**

| | CS (entry model) | CN (Profi) | CP (Premax) | |
| --- | --- | --- | --- | --- |
| 3 models: | | | | |
| 2 work directions | L/R and R/L | = | = | |
| usable conveyor width | 510 | = | = | |
| usable opening height | 440 | = | = | |
| **Modules** | | | | |
| Prewashes | E | E / L / S / C | E / L / S | |
| Washes | - | A, AN | A, AN | |
| Rinse module | - | R (650mm) | R (650mm) | |
| combined wash/rinse module | AR | AR | AR | |
| Straight dryers | D | DS / CDS | DS | |
| Corner dryers | | CDC91 / CDC181 / CDC181-C | CDC91 / CDC181 / CDC181-C | |

**3. Product Description:**

| | | | | |
| --- | --- | --- | --- | --- |
| **Dimensions of modules:** | | | | |
| Prewash E: d x w x h [mm] | 770x500x1475 | = | = | |
| Prewash L: d x w x h [mm] | 770x650x1475 | = | = | |
| Prewash S: d x w x h [mm] | 770x900x1475 | = | = | identical with wash A |
| Wash A: d x w x h [mm] | 770x900x1475 | = | = | identical with prewash S |
| Wash AN: d x w x h [mm] | 770x1350x1475 | = | = | AN zone; identical with wash AR |
| Wash AR: d x w x h [mm] | 770x1350x1475 | = | = | |
| Dryer D: d x w x h [mm] | 770x650x1960 | = | = | |
| Dryer CDS: d x w x h [mm] | 770x850x1960 | = | = | |
| Dryer CDC: d x w x h [mm] | 770x850x900 | = | = | 1 Module |
| Sep. rinse module | 770x650x1475 | = | = | |
| Demi module | 770x500x1475 | = | = | 500 or 650 length (AN) |
| **Controls:** | | | | |
| Easytronic | Std Feature | No | No | |
| Smarttronic | No | Std Feature | No | |
| Protronic | No | Option | Std Feature | |
| Total height adjustable [mm] | ± 25mm | = | = | |
| Machine height with opened doors | 2050 | = | = | |
| Floor clearance | 150mm | = | = | |

**4. Modules:**

| | | | | |
| --- | --- | --- | --- | --- |
| **E-prewash:** | | | | |
| Framework | 1.4301; 2mm | = | = | |
| Hood | 1.4301; 1,25mm | = | = | |
| Water volume: | | | | |
| wash system design: | See matrix Tank & washsysten | | | |
| wash tubes | 1.4301; ø25,2x0,6mm | = | = | |
| Nozzle desin | Concave V-Shape slot | = | = | |
| End caps | PPH | = | = | |
| Manifold | 1.4301; ø25,2x0,6mm | = | = | |
| Strainer | | | | |
| area [dm²] | 27,4 | = | = | |
| hole-ø [mm] | 3,1 | = | = | |
| open surface [%] | 43,1 | = | = | |
| Pump | | | | |
| Flow rate: | See matrix Tank & washsysten | | | |
| Housing | Hostacom G3 N01 | = | = | |
| Impeller | Hostacom G3 N01; ø72 | = | = | |
| **C, L, S, A, AR/AN Modules:** | | | | |
| Framework | 1.4301; 2mm | = | = | |
| Hood | 1.4301; 1,25mm | = | = | |
| Door pillar | 1.4301; 1mm | = | = | |
| Tank | deep drawn; 1.4301; 1mm | = | = | |
| Water volume: | | | | |
| wash system design: | See matrix Tank & washsysten | | | |
| wash tubes | 1.4301; ø43mm; 0,8mm | = | = | |
| Nozzle design | Concave pressed in Shape 8 | = | = | |
| End caps | PP (Borealis GB 364 WG) | = | = | |
| Distributor | 1.4301; 50x70mm; 1mm | = | = | |
| Manifold | 1.4301; 80mm; 1mm | = | = | |
| Strainer | | | | |
| area [dm²] | 18,5 | = | = | |
| hole-ø [mm] | 3,1 | = | = | |
| open surface [%] | 43,1 | = | = | |
| Strainer basked volume [l] (S,A,AR,AN) | 2,43 | = | = | |
| Strainer basked volume [l] (C, S) | 1,2 | = | = | |
| Pump | | | | |
| Flow rate: | See matrix Tank & washsysten | | | |
| Housing | 1.4301; 2mm | = | = | |
| Impeller | 1.4301 | = | = | |
| Tankheating | See matrix Tankheating | | | |
| El. Heaters | 1.4876 (2.4858 Option); ø8,5mm | = | = | |
| Steam & HW. Heater | 1.4571; ø22x1mm | = | = | |
| Surface [m²] | 0,554m² | = | = | |
| Volume [l] | 2,5 | = | = | |

| Description | Specification (value & tolerance) | | | Comments/Remarks |
|---|---|---|---|---|
| **Rinse Modules:** | | | = | |
| Framework | 1.4301; 2mm | = | = | |
| Hood | 1.4301; 1,25mm | = | = | |
| Door pillar | 1.4301; 1mm | = | = | |
| | | | | |
| **Pump Rinse system:** | | | | |
| Water volume: | | See matrix Tank & washsysten | | |
| Post wash system design: | | | | |
| wash tubes | 1.4301; ø25,2x0,6mm | = | = | |
| Nozzle Design | Concave V-Shape slot | = | = | |
| End caps | PPH | = | = | |
| Manifold | 1.4301; ø25,2x0,6mm; | = | = | |
| Pump | | | | |
| Flow rate: | | See matrix Tank & washsysten | | |
| Housing | Hostacom G3 N01 | = | = | |
| Impeller | Hostacom G3 N01; ø60 | = | = | |
| Strainer | | | | |
| area [mm] | 3,9 | = | 11,35 | |
| hole-ø [mm] | 1,6 | = | = | |
| open surface [%] | 29 | = | See matrix Tankheating | |
| Tankheating | n.a. | n.a. | | |
| El. Heaters | n.a. | n.a. | 1.4876; ø8,5mm | |
| Steam & HW. Heater | n.a. | n.a. | 1.4571; ø15x1mm | |
| Surface [m²] | n.a. | n.a. | 0,2m² | |
| Volume [l] | n.a. | n.a. | 1,4 | |
| | | | | |
| **Fresh water rinse system:** | Presurized rinse system | | = | |
| Rinse temperature | >= 80℃ | = | 60 - 65℃ | |
| rinse system design: | | See matrix Rinse system | | |
| rinse pipes | 1.4301; ø25,2mm; 0,6mm | = | = | |
| Nozzle Design | High quality screen shape | = | = | |
| End caps | PPH | = | = | |
| Manifold | 1.4301; ø25,2x0,6mm; | = | = | |
| Pump: | | | | |
| Flow rate: | | See matrix Rinse system | | |
| Housing | PP 30% GF | = | = | |
| Impeller | PA 30% GF | = | = | |
| Booster: | Round pressure booster | = | = | |
| Material | 1.4571; 1,25mm; | = | = | |
| Booster heating | | See matrix Rinse system | | |
| Water volume: [l] | 11,64 | = | = | |
| Insulation | PU-Foam w. splash guard sealing | = | = | |
| El. Heaters | 1.4876; ø8,5mm | = | = | |
| Steam & HW. Heater | n.a | n.a | 1.4571; ø22x1mm | |
| surface [m²] | n.a | n.a | 0,547 | |
| volume [l] | n.a | n.a | 2,5 | |
| | | | | |
| **Dryer:** | | | | |
| Hood | 1.4301; 1,25mm | = | = | |
| Performance & parameters | | See matrix Dryer | | |
| **Heating elements:** | | | | |
| El. Heaters | 1.4876 | = | = | |
| Steam & HW. Heater | n.a. | 1.4571 | = | |
| | | | | |
| **Drive system:** | | | | |
| Motor (min. 27 Nm) | 0,09 kW; 10,7/min (50hz) A | 0,15 kW; 14,5 / 9,6 /min (50hz) A | 0,2 kW; 35 /min (50hz) | |
| | 0,09 kW; 13,4/min (50hz) E-A | 0,15 kW; 18 / 12 /min (50hz) E-A | | |
| | 0,15 kW; 14,5 / 9,6 /min (50hz) A | 0,15 kW; 24 / 16 /min (50hz) L-A | | |
| | 0,15 kW; 18 / 12 /min (50hz) E-A | 0,15 kW; 24 / 16 /min (50hz) C-A | | |
| | | 0,15 kW; 29 / 19 /min (50hz) S-A | | |
| | | 0,2 kW; 35 /min (50hz) A-A | | |
| | | | | |
| **Doors:** | | | | |
| surface temperature [℃] | < 30℃ | = | = | |
| Outer door | 1.4301-o; 1mm | = | = | |
| Inner door | 1.4301-o; 1mm | = | = | |
| Insulation | Styrodur "2500 C"; 40mm | = | = | |
| Door handle | 1.4301-o; 2mm | = | = | |
| Magnet | Material: HF 24/16 (Ferrit) | = | = | |
| Reed switch | 12-250V, (AC/DC); IP67 | = | = | |
| | | | | |
| Add. Parts for sliding doors | | | | |
| Guide bar | C-profile; 1.4301; 1mm | = | = | |
| Slide bar | Hostalen GUR 4150 (PE-UHMW) | = | = | |
| Door spring | 1.4310; 0,45 - 0,55mm; Gesanir | = | = | |
| Door spring axle | DIN 671; 1.4305; ø10mm | = | = | |
| Door spring roller | PPN G3 N01 | = | = | |
| | | | | |
| Add. Parts for side hinged doors | n.a. | | | |
| Hinge plate | n.a. | 1.4301; 6mm | = | |
| Hinge bolt | n.a. | 1.4301; ø6mm | = | |
| Bearingbush | n.a. | bronze | = | |
| | | | | |
| **Panels:** | | | | |
| Side panels | 1.4301-o; 1mm | = | = | |
| Rear panels | 1.4301-o; 1mm | = | = | |
| | | | | |
| **Transport system:** | | | | |
| Hook | 1.4301-o; 3mm | = | = | |
| Axle | 14301; ø 20mm | = | = | |
| Sealing | radial shaft seal | = | = | |
| Ball bearing | SST | = | = | |
| | | | | |
| 5.  **Temperatures:** | | See matrix Tankheating | | |
| | | | | |
| 6.  **Control units:** | | | | |
| | | | | |
| **Wash Tank:** | | | | |
| Temperature: | controlled & displayed (option) | controlled & displayed | controlled & displayed | |
| Level: | controlled | = | = | |
| | | | | |
| **Pumped Rinse:** | | | | |
| Temperature: | n.a | n.a | controlled & displayed | |
| Level: | n.a | n.a | controlled | |
| | | | | |
| **Rinse:** | | | | |
| Temperature: | controlled & displayed (option) | controlled & displayed | controlled & displayed | |
| | | | | |
| **Dryer:** | | | | |
| Temperature: | controlled | controlled & displayed | = | |

# TECHNICAL Data C-Line

| Description | Specification (value & tolerance) | | | Comments/Remarks |
|---|---|---|---|---|
| **7.** **Assembly units:** | | | | |
| | | | | |
| **Heat recovery:** | See matrix Heat recovery | | | |
| | | | | |
| **Drain system:** | | | | |
| Pipework | PP, EPDM | = | = | |
| Drain valve | El. Magnetic Flap valve | = | = | |
| | | | | |
| **Fill system:** | | | | |
| Shut off valve | optional | optional | optional | |
| Filter | Line filter; mesh size 0,22mm | = | = | |
| Fill valve | El. Magnetic Flap valve | = | = | |
| Pipework | EPDM | = | = | |
| | | | | |
| **Steam heating:** | | | | |
| Shut off valve | n.a | 1 1/4 " DN25 | = | |
| Filter | n.a | Line filter; mesh size 0,22mm | = | |
| Steam valve | n.a | El. Magnetic piston valve | = | |
| Pipework steam | n.a | 1.4301 | = | |
| Pipework condensate | n.a | 1.4301 | = | |
| Steam trap | n.a | brass/ SST DN15 | = | |
| | | | | |
| **8.** **Plate capacity:** | See matrix Rack capacity | | | |
| | | | | |
| **9.** **Life Time Requirements:** | | | | |
| | | | | |
| 8 to 12 years, 6 hrs/day x 300 days: Minimum 20.000 operating hours | = | = | = | |
| | | | | |
| **10.** **Quality Requirements:** | | | | |
| | | | | |
| Reduce warranty index below … | 1,00% | = | = | |
| Q-Targets / expectations: no breakdowns within the first …(for 98% of sold units) | 2 years | = | = | |
| | | | | |
| **11.** **Installation-/Surrounding requirements:** | | | | |
| | | | | |
| **Fresh water connection:** | | | | |
| Fresh water connection … parallel external screw thread | 3/4" | = | = | |
| Fresh water conditions | 12 - 25℃; 0-3°d; 80-150 µS/cm | = | = | |
| required flow rate and flow pressure (at the point of installation) | 900 l/h; 1,5 bar | = | = | |
| | | | | |
| **Fill water connection max. 60℃:** | | | | |
| Fill water connection … parallel external screw thread | 3/4" | = | = | |
| Fill water conditions | 50 - 65℃; 0-7°d; | = | = | |
| required flow rate and flow pressure (at the point of installation) | 900 l/h; 1,5 bar | = | = | |
| | | | | |
| **Drain connection:** | | | | |
| Syphon provided by customer | DN 50 | = | = | |
| | | | | |
| **Electrical connection:** | | | | |
| one central connention in control box; distribution inside | | | | |
| | | | | |
| **12.** **Standards:** | | | | |
| | | | | |
| CE, GS, DVGW | Built according regulation | Built according regulation | Built according regulation | |
| Maschinenrichtlinie (Machinery-Directive) | 98/37/EG | = | = | |
| EMV-Richtlinie (EMC Directive) | 89/336/EWG | = | = | |
| Niederspannungsrichtlinie (Low voltage Directive) | 73/23/EWG | = | = | |
| Sicherheit von elektrischen Geräten (Safety of electrical appliances) | EN 60335-1 | = | = | |
| Besondere Anforderungen an Tranportspülmaschinen (Particular requirements for conveyor dishwasher) | EN 50416 | = | = | |
| Sicherheit von Maschinen (Safety of machinery) | EN 292 | = | = | |
| Fachgrundnorm Störaussendung (Generic emission standard) | EN 50081-1 | = | = | |
| Fachgrundnorm Störfestigkeit (Generic immunity standard) | EN 50082-2 | = | = | |
| Elektrische Ausrüstung von Industriemaschinen (Electrical equipment of industrial machines) | | EN 60204-1  only CN-X-A-A | = | |
| | | | | |
| **13.** **Packing/Logistics:** | | | | |
| | | | | |
| Packing for German Austrian Switzerland | Rollers & Foil | = | = | |
| Packing for Far east | Crate with cardboard | = | = | |
| Intercompany, HFI | Crate with foil | = | = | |
| Others | Regarding FAO & IPPC-Standards | = | = | |
| | | | | |
| **14.** **Paper&Documents:** | | | | |
| | | | | |
| Warranty | 2 Years | 2 Years | 2 Years | |
| Installation manual | | | | |
| Operation manual | | | | |
| Wiring diagram | | | | |
| | | | | |
| **15.** **Service:** | | | | see add. serviceability specification for details |
| | | | | |
| Service documentation | Spare part catalog, user manual, sercice manual | = | = | |
| Definition of spare parts | recommended Spare part list | = | = | |
| | | | | |
| **16.** **Approval/Product Safety:** | | | | |
| | | | | |
| Electrical safety | | | | |
| Mechanical safety | | | | |
| EN 378 (only heatpumps) | | | | |
| Hygiene | DIN 10510 | DIN 10510 | Hygiene certificate | |
| | | | | |
| **17.** **Manufacturing requirements:** | | | | see add. manufacturing specification for details |
| | | | | |
| Standard parts which are already used at manufacturing plant | | | | |
| Use of standard screws and clamps | | | | |
| Minimize welding, except spot welding | | | | |
| Self testing and programming control unit | No | Yes | Yes | |
| | | | | |
| **18.** **Financials / Timing :** | | | | |
| | | | | |
| Volume plan | | | | see marketing specification for details |
| Product cost | | | | see separate cost monitor |
| Invest status | | | | see separate cost monitor |
| Implementation date April 2009 | | | | |

# TECHNICAL Data C-Line

## Box of building

| | | |
|---|---|---|
| Useable width [mm] | 510 | **Standard** (green) |
| Useable heigth [mm] | 440 | **Option** (yellow) |
| | | **Not available** (red) |

| Category | Option/Machine type | CS-A | CS-E-A | CN-A | CN-E-A | CN-L-A | CN-S-A | CN-E-S-A | CN-S-A-A | CN-E-S-A-A | CP-L-A | CP-S-A | CP-E-S-A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Controls** | Easytronic (el. mech.) | green | green | red | red | red | red | red | red | red | red | red | red |
| | Smarttronic | red | red | green | green | green | green | red | red | red | red | red | red |
| | Protronic | red | red | yellow | yellow | yellow | yellow | green | green | green | green | green | green |
| **Drive** | 1 Speed Drive | green | green | red | red | red | red | red | red | red | red | red | red |
| | 2 Speed Drive | yellow | yellow | green | green | green | green | red | red | red | red | red | red |
| | 3 Speed Drive | red | red | red | red | red | red | green | green | green | green | green | green |
| **Heating** | Electrical Heating | green | green | green | green | green | green | green | green | green | green | green | green |
| | Steam/Hot Water Heating | red | red | yellow | yellow | yellow | yellow | yellow | yellow | yellow | yellow | yellow | yellow |
| **Rinse** | Mono-Rinse | green | green | green | green | green | green | red | red | red | red | red | red |
| | Dual-Rinse | yellow | yellow | yellow | yellow | yellow | yellow | green | green | green | red | red | red |
| | Triple-Rinse | red | red | yellow | yellow | yellow | yellow | yellow | yellow | yellow | red | red | red |
| | Premax-Rinse | red | red | red | red | red | red | red | red | red | green | green | green |
| **Controlbox** | in Font of tank | green | green | green | green | green | green | red | red | red | red | red | red |
| | in Font of dryer | red | red | red | red | red | red | green | green | green | green | green | green |
| **Dryer** | D-dryer | yellow | yellow | red | red | red | red | red | red | red | red | red | red |
| | CDS-dryer | red | red | yellow | yellow | yellow | yellow | yellow | yellow | yellow | red | red | red |
| | DS-dryer | red | red | yellow | yellow | yellow | yellow | yellow | yellow | yellow | red | red | red |
| | CDC-dryer | red | red | yellow | yellow | yellow | yellow | yellow | yellow | yellow | green | green | green |
| **Exhaust** | No exhaust | green | green | red | red | red | red | red | red | red | red | red | red |
| | Exhaust w.o. heat recovery | yellow | yellow | green | green | green | green | green | green | green | red | red | red |
| | Exhaust with heat recovery | yellow | yellow | yellow | yellow | yellow | yellow | yellow | yellow | yellow | green | green | green |
| | Heat pump | red | red | yellow | yellow | yellow | yellow | yellow | yellow | yellow | yellow | yellow | yellow |
| **Filling** | Filling via booster | green | green | green | green | green | green | green | green | green | red | red | red |
| | Sep. tank filling | yellow | yellow | yellow | yellow | yellow | yellow | yellow | yellow | yellow | green | green | green |
| | **Total length*/\*\*** | **1350** | **1850** | **1350*** | **1850*** | **2000*** | **2250*** | **2750*** | **3150*** | **3650*** | **2000\*\*** | **2250\*\*** | **2750\*\*** |

| Consumption | | CS-A | CS-E-A | CN-A | CN-E-A | CN-L-A | CN-S-A | CN-E-S-A | CN-S-A-A | CN-E-S-A-A | CP-L-A | CP-S-A | CP-E-S-A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fresh water | 230 | 240 | 230 | 240 | 260 | 260 | 260 | 330 | 330 | 160 | 190 | 220 |
| | Fill water | 110 | 120 | 110 | 120 | 165 | 215 | 225 | 320 | 335 | 180 | 230 | 240 |
| | Energy (kW/h) | 31 | 31,5 | 28 | 28 | 32 | 33,5 | 33,5 | 44,5 | 44,5 | 30,5 | 31,5 | 32,5 |

| Throughput | | CS-A | CS-E-A | CN-A | CN-E-A | CN-L-A | CN-S-A | CN-E-S-A | CN-S-A-A | CN-E-S-A-A | CP-L-A | CP-S-A | CP-E-S-A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Racks/hour | Speed 1 | 80 | 100 | 80 | 100 | 120 | 150 | 120 | 120 | 120 | 120 | 120 | 150 |
| | Speed 2 | (120) | (150) | 120 | 150 | 180 | 220 | 180 | 190 | 210 | 180 | 190 | 200 |
| | Speed 3 | | | | | | | 250 | 280 | 320 | 240 | 300 | 320 |

**\* + Entry Hood 300 mm**

**\*\* + Entry Hood 300 mm/ switchbox in front of dryer (without dryer +450 mm)**

# TECHNICAL Data C-Line

# C-Line Rack capacity / h

**HOBART**

| | | DIN 10510 | | | | |
|---|---|---|---|---|---|---|
| | | interpretation incl prehood | | interpretation excl prehood | | |
| | | contact length* | speed | contact length* | speed | **IC pricelist** |
| **CS** | **- mono** | no hood | | 1250 | 75 | 80 (80/120) |
| | **- dual** | | | 1250 | 75 | 100 (100/150) |
| | **E-A mono** | | | 1750 | 105 | 80 (80/120) |
| | **E-A dual** | | | 1750 | 105 | 100 (100/150) |
| **CN** | **A** | 1550 | 93 | 1250 | 75 | 80 / 120 |
| | **E-A** | 2050 | 123 | 1750 | 105 | 100 / 150 |
| | **L-A** | 2200 | 132 | 1900 | 114 | 120 / 180 |
| | **C-A** | 2450 | 147 | 2150 | 129 | 120 / 180 |
| | **S-A** | 2450 | 147 | 2150 | 129 | 150 / 220 |
| | **E-S-A** | 2950 | 177 | 2650 | 159 | 120 / 180 / 250 |
| | **L-A-A** | 3100 | 186 | 2800 | 168 | 120 / 180 / 260 |
| | **S-A-A** | 3350 | 201 | 3050 | 183 | 120 / 190 / 280 |
| | **E-S-A-A** | 3850 | 231 | 3550 | 213 | 120 / 210 / 320 |

*using low cost 2 speed motor* (A)
*using low cost 2 speed motor* (E-A)
*using low cost 2 speed motor* (L-A)
*using low cost 2 speed motor* (C-A)
*using low cost 2 speed motor* (S-A)
*using motor with frequency converter* (E-S-A)
*using motor with frequency converter* (L-A-A)
*using motor with frequency converter* (S-A-A)
*using motor with frequency converter* (E-S-A-A)

| | | hygienic result according DIN 10510 | | |
|---|---|---|---|---|
| **CP** | **L-A** | | | **120 / 180 / 240** |
| | **S-A** | | | **120 / 190 / 300** |
| | **E-S-A** | | | **150 / 200 / 320** |

*using motor with frequency converter*

*length of zone minus 100 mm for the final rinse*

# TECHNICAL Data C-Line

**HOBART**

## Data Sheet C-line

| Rack capacity / h | | | Conveyor Speed *** (m/min.) | Water consumption (l/h) | El. Consumptions / (Loads) **** [kW/h; (kW)] | | Recommended choice of models | Total length L (in mm) | Conv. motor (kW) | Prewash | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| min. | acc. DIN 10510 ** | max. | | | with C12 / C20: | with CHP-18: (ZR 48) | | | | Pump loading (kW) | Pump loading (kW) | Pump capacity (l/min.) | Tank volume (l) |
| | 80 | - | 0,67 | 230 | 31,0 (33,8) | n.a. | CS-A | 1350 | 0,09 | - | - | - | - |
| | 100 | - | 0,83 | 240 | 31,0 (34,1) | n.a. | CS-E-A | 1850 | 0,09 | - | 0,27 | 20 | 10 |
| | 80 | 120 | 0,67 | 230 | 28,0 (31,5) | 20,0 (24,7) | CN-A | 1350 | 0,15 | - | - | - | - |
| | 100 | 150 | 0,83 | 240 | 28,0 (31,8) | 19,0 (24,9) | CN-E-A | 1850 | 0,15 | - | 0,27 | 20 | 10 |
| | 120 | 180 | 1,00 | 260 | 32,0 (36,0) | 22,0 (29,2) | CN-L-A | 2000 | 0,15 | - | 1,5 | 350 | 55 |
| | 120 | 180 | 1,00 | 260 | 32,0 (36,0) | 22,0 (29,2) | CN-C-A | 2375 | 0,15 | - | 1,5 | 350 | 55 |
| | 150 | 220 | 1,25 | 260 | 33,5 (36,7) | 23,5 (29,9) | CN-S-A | 2250 | 0,15 | - | 2,2 | 550 | 105 |
| 120 | 180 | 240 | 1,50 | 160 | 30,5 (36,0) | 22,0 (29,2) | CP-L-A | 2000 | 0,2 | - | 1,5 | 350 | 55 |
| 120 | 180 | 250 | 1,50 | 260 | 33,5 (38,5) | 24,0 (31,6) | CN-E-S-A | 2750 | 0,2 | 0,27 | 2,2 | 20 + 550 | 10 + 105 |
| 120 | 180 | 260 | 1,50 | 330 | 43,0 #WERT! | 33,5 (40,9) | CN-L-A-A | 2950 | 0,2 | - | 1,5 | 350 | 55 |
| 120 | 190 | 280 | 1,58 | 330 | 44,5 #WERT! | 35,0 (41,6) | CN-S-A-A | 3150 | 0,2 | - | 2,2 | 550 | 105 |
| 120 | 190 | 300 | 1,58 | 190 | 31,5 (35,2) | 22,0 (29,9) | CP-S-A | 2250 | 0,2 | - | 2,2 | 550 | 105 |
| 150 | 200 | 320 | 1,67 | 190 | 32,5 (38,5) | 23,0 (31,6) | CP-E-S-A | 2750 | 0,2 | 0,27 | 2,2 | 20 + 550 | 10 + 105 |
| 120 | 210 | 320 | 1,75 | 330 | 44,5 #WERT! | 35,0 (41,6) | CN-E-S-A-A | 3650 | 0,2 | 0,27 | 2,2 | 20 + 550 | 10 + 105 |

\* Rack size 500x500mm

\*\* Capacity according DIN with 2 minutes contact time.

\*\*\* According DIN 10510

\*\*\*\* Values ±10%; Room conditions acc. VDI 2052;
   Warm water supply for tank fill, Cold water (15℃) for rinse

## Data Sheet C-line

**HOBART**

| Main Wash | | | | | | Dual / Triple-rinse * | | | | | | | Dryer (D, CDS) | | | Heat Pump | Control |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pump loading (kW) | Pump loading (kW) | Pump capacity (l/min.) | Tank volume (l) | Tankheating with CHP-18 (kW) | Tankheating without CHP-18 (kW) | Rinse pump (kW) | Heating pumped rinse (kW) | Revol. Pump (kW) | Tank volume (l) | Booster Standard (kW)** | Booster C 12/20 (kW)** | Booster CHP (kW)** | Fan (kW) | Air circul. (m³/h) | Heating (kW) | Heat Pump Loading (kW) | Control Loading (kW) |
| - | 1,5 | 350 | 105 | - | 12 | 0,55 | n.a. | 0,24 | | 21 | 15 | n.a. | 0,50 | 2200 | 3 | -- | 0,5 |
| - | 1,5 | 350 | 105 | - | 12 | 0,55 | n.a. | 0,24 | 5 | 21 | 15 | n.a. | 0,5 | 510 | 3 | -- | 0,5 |
| - | 2,2 | 550 | 105 | 4,5 | 12 | 0,55 | n.a. | 0,24 | 5 | 21 | 12 | 9 | 0,5 | 510 | 3 | 3,7 | 1 |
| - | 2,2 | 550 | 105 | 4,5 | 12 | 0,55 | n.a. | 0,24 | 5 | 21 | 12 | 9 | 0,5 | 510 | 3 | 3,7 | 1 |
| - | 2,2 | 550 | 105 | 4,5 | 12 | 0,55 | n.a. | 0,24 | 5 | 24 | 15 | 12 | 0,5 | 510 | 3 | 3,7 | 1 |
| - | 2,2 | 550 | 105 | 4,5 | 12 | 0,55 | n.a. | 0,24 | 5 | 24 | 15 | 12 | 0,5 | 510 | 3 | 3,7 | 1 |
| - | 2,2 | 550 | 105 | 4,5 | 12 | 0,55 | n.a. | 0,24 | 5 | 24 | 15 | 12 | 0,5 | 510 | 3 | 3,7 | 1 |
| - | 2,2 | 550 | 105 | 4,5*** | 9 | 0,55 | 10,5 | 0,24 | 20 | n.a. | 4,5 | 4,5 | 0,5 | 510 | 3 | 3,7 | 1 |
| - | 2,2 | 550 | 105 | 4,5 | 12 | 0,55 | n.a. | 0,24 | 5 | 24 | 15 | 12 | 0,5 | 510 | 4,5 | 3,7 | 1 |
| 2,2 | 2,2 | 550 + 550 | 105 + 105 | 6 + 0 | 9 + 9 | 0,55 | n.a. | 0,24 | 5 | 30 | 18 | 15 | 0,5 | 510 | 4,5 | 3,7 | 1 |
| 2,2 | 2,2 | 550 + 550 | 105 + 105 | 6 + 0 | 9 + 9 | 0,55 | n.a. | 0,24 | 5 | 30 | 18 | 15 | 0,5 | 510 | 4,5 | 3,7 | 1 |
| - | 2,2 | 550 | 105 | 4,5*** | 9 | 0,55 | 10,5 | 0,24 | 20 | n.a. | 4,5 | 4,5 | 0,5 | 510 | 4,5 | 3,7 | 1 |
| - | 2,2 | 550 | 105 | 4,5*** | 9 | 0,55 | 10,5 | 0,24 | 20 | n.a. | 6 | 4,5 | 0,5 | 510 | 4,5 | 3,7 | 1 |
| 2,2 | 2,2 | 550 + 550 | 105 + 105 | 6 + 0 | 9 + 9 | 0,55 | n.a. | 0,24 | 5 | 30 | 18 | 15 | 0,5 | 510 | 4,5 | 3,7 | 1 |

**\* mono rinse water consumption page rinse system**

**\*\* Cold water supply (15°C) for rinse.**

**\*\*\* interlocked with booster heating**

**HOBART**

## Tank & washsysten

| | | | CS | | CN | | | | CP | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | E | A | E | L | S | A | E | L | S | A | PR |
| Tankvolume [l] | | | 10 | 105 | 10 | 55 | 105 | 105 | 10 | 55 | 105 | 105 | 20 |
| Flow rate [l/min.] | Profi | | **20** | **350** | **20** | **350** | **550** | **550** | **20** | **350** | **550** | **550** | **12** |
| Pump | Power P1 | [kW] | 0,27 | 1,5 | 0,27 | 1,5 | 2,2 | 2,2 | 0,27 | 1,5 | 2,2 | 2,2 | 0,24 |
| | number of revolutions | [rpm] | 2850 | 2850 | 2850 | 2850 | 2850 | 2850 | 2850 | 2850 | 2850 | 2850 | 2850 |
| | delivery height | [m] | | | | | | | | | | | |
| | Protection class | | IP55 | IP55 | IP55 | IP55 | IP55 | IP55 | IP55 | IP55 | IP55 | IP55 | IP55 |
| | Connected load P1 | [kW] | | | | | | | | | | | |
| | Impeller (diameter) | [mm] | | | | | | | | | | | |
| Number of arms | Upper | | **1** | **4** | **1** | **4** | **6** | **6** | **1** | **4** | **6** | **6** | **1** |
| Standard | Lower | | **1** | **3** | **1** | **3** | **5** | **5** | **1** | **3** | **5** | **5** | **1** |
| Wash pressure (on | Upper | [bar] | **0,4** | **0,4** | **0,4** | **0,40** | **0,39** | **0,39** | **0,4** | **0,40** | **0,39** | **0,39** | **0,4** |
| nozzle) Profi | Lower | [bar] | **0,3** | **0,3** | **0,3** | **0,36** | **0,37** | **0,37** | **0,3** | **0,36** | **0,37** | **0,37** | **0,3** |
| Nozzles per wash | | | **4** | **5** | **4** | **5** | **5** | **5** | **4** | **5** | **5** | **5** | **4** |
| Nozzles per wash | | | **8** | **35** | **8** | **35** | **55** | **55** | **8** | **35** | **55** | **55** | **8** |

# TECHNICAL Data C-Line

## Tankheating

**HOBART**

### CS

| | | | E | A | Booster WW 50°C | Booster without C | Booster with C |
|---|---|---|---|---|---|---|---|
| **A** | Electrical load | [kW] | - | 12 | 12 | 21 | 15 |
| | Steam load | [kg/h] | - | - | - | - | - |
| | Temperatures | [°C] | - | 60 - 62 | 80 - 85 | | |
| **E-A** | Electrical load | [kW] | - | 12 | 12 | 21 | 15 |
| | Steam load | [kg/h] | - | - | - | - | - |
| | Temperatures | [°C] | 45 - 50 | 60 - 62 | 80 - 85 | | |
| **L-A** | Electrical load | [kW] | - | - | - | - | - |
| | Steam load | [kg/h] | - | - | - | - | - |
| | Temperatures | [°C] | - | - | - | - | - |
| **S-A** | Electrical load | [kW] | - | - | - | - | - |
| | Steam load | [kg/h] | - | - | - | - | - |
| | Temperatures | [°C] | - | - | - | - | - |
| **E-S-A** | Electrical load | [kW] | - | - | - | - | - |
| | Steam load | [kg/h] | - | - | - | - | - |
| | Temperatures | [°C] | - | - | - | - | - |
| **L-A-A** | Electrical load | [kW] | - | - | - | - | - |
| | Steam load | [kg/h] | - | - | - | - | - |
| | Temperatures | [°C] | - | - | - | - | - |
| **S-A-A** | Electrical load | [kW] | - | - | - | - | - |
| | Steam load | [kg/h] | - | - | - | - | - |
| | Temperatures | [°C] | - | - | - | - | - |
| **E-S-A-A** | Electrical load | [kW] | - | - | - | - | - |
| | Steam load | [kg/h] | - | - | - | - | - |
| | Temperatures | [°C] | - | - | - | - | - |

### CN without CHP-18

| | | | E | L | S | Tank 1 | Tank 2 | Booster WW 50°C | Booster without C | Booster with C |
|---|---|---|---|---|---|---|---|---|---|---|
| **A** | Electrical load | [kW] | - | - | - | 12 | - | 12 | 21 | 12 |
| | Steam load | [kg/h] | - | - | - | 20,6 | - | 20,6 | 36,1 | 20,6 |
| | Temperatures | [°C] | - | - | - | 60 - 62 | - | 80 - 85 | | |
| **E-A** | Electrical load | [kW] | - | - | - | 12 | - | 12 | 21 | 12 |
| | Steam load | [kg/h] | - | - | - | 20,6 | - | 20,6 | 36,1 | 20,6 |
| | Temperatures | [°C] | 45 - 50 | - | - | 60 - 62 | - | 80 - 85 | | |
| **L-A** | Electrical load | [kW] | - | - | - | 12 | - | 12 | 24 | 15 |
| | Steam load | [kg/h] | - | - | - | 20,6 | - | 20,6 | 41,3 | 25,8 |
| | Temperatures | [°C] | - | 45 - 50 | - | 60 - 62 | - | 80 - 85 | | |
| **S-A** | Electrical load | [kW] | - | - | - | 12 | - | 12 | 24 | 15 |
| | Steam load | [kg/h] | - | - | - | 20,6 | - | 20,6 | 41,3 | 25,8 |
| | Temperatures | [°C] | - | - | 45 - 50 | 60 - 62 | - | 80 - 85 | | |
| **E-S-A** | Electrical load | [kW] | - | - | - | 12 | - | 12 | 24 | 15 |
| | Steam load | [kg/h] | - | - | - | 20,6 | - | 20,6 | 41,3 | 25,8 |
| | Temperatures | [°C] | 45 - 50 | - | 50 - 55 | 60 - 62 | - | 80 - 85 | | |
| **L-A-A** | Electrical load | [kW] | - | - | - | 9 | 9 | 15 | 30 | 18 |
| | Steam load | [kg/h] | - | - | - | 15,5 | 15,5 | 25,8 | 51,6 | 31,0 |
| | Temperatures | [°C] | - | 45 - 50 | - | 60 - 62 | 60 - 64 | 80 - 85 | | |
| **S-A-A** | Electrical load | [kW] | - | - | - | 9 | 9 | 15 | 30 | 18 |
| | Steam load | [kg/h] | - | - | - | 15,5 | 15,5 | 25,8 | 51,6 | 31,0 |
| | Temperatures | [°C] | - | - | 45 - 50 | 60 - 62 | 60 - 64 | 80 - 85 | | |
| **E-S-A-A** | Electrical load | [kW] | - | - | - | 9 | 9 | 15 | 30 | 18 |
| | Steam load | [kg/h] | - | - | - | 15,5 | 15,5 | 25,8 | 51,6 | 31,0 |
| | Temperatures | [°C] | 45 - 50 | - | 45 - 50 | 60 - 62 | 60 - 64 | 80 - 85 | | |

### CP without CHP-18

| | | | E | L | S | Tank 1 | PR | Booster with C |
|---|---|---|---|---|---|---|---|---|
| **A** | Electrical load | [kW] | - | - | - | - | - | - |
| | Steam load | [kg/h] | - | - | - | - | - | - |
| | Temperatures | [°C] | - | - | - | - | - | - |
| **E-A** | Electrical load | [kW] | - | - | - | - | - | - |
| | Steam load | [kg/h] | - | - | - | - | - | - |
| | Temperatures | [°C] | - | - | - | - | - | - |
| **L-A** | Electrical load | [kW] | - | - | - | 9 | 10,5 | 4,5 |
| | Steam load | [kg/h] | - | - | - | 15,5 | 18,1 | 7,7 |
| | Temperatures | [°C] | - | 45 - 50 | - | 63-67 | 70-80 | 62-65 |
| **S-A** | Electrical load | [kW] | - | - | - | 9 | 10,5 | 4,5 |
| | Steam load | [kg/h] | - | - | - | 15,5 | 18,1 | 7,7 |
| | Temperatures | [°C] | - | - | 45 - 50 | 63-67 | 70-80 | 62-65 |
| **E-S-A** | Electrical load | [kW] | - | - | - | 9 | 10,5 | 6 |
| | Steam load | [kg/h] | - | - | - | 15,5 | 18,1 | 10,3 |
| | Temperatures | [°C] | 45 - 50 | - | 50 - 55 | 63-67 | 70-80 | 62-65 |
| **L-A-A** | Electrical load | [kW] | - | - | - | - | - | - |
| | Steam load | [kg/h] | - | - | - | - | - | - |
| | Temperatures | [°C] | - | - | - | - | - | - |
| **S-A-A** | Electrical load | [kW] | - | - | - | - | - | - |
| | Steam load | [kg/h] | - | - | - | - | - | - |
| | Temperatures | [°C] | - | - | - | - | - | - |
| **E-S-A-A** | Electrical load | [kW] | - | - | - | - | - | - |
| | Steam load | [kg/h] | - | - | - | - | - | - |
| | Temperatures | [°C] | - | - | - | - | - | - |

### CN with CHP-18

| | | | E | L | S | Tank 1 | Tank 2 | Booster with CHP |
|---|---|---|---|---|---|---|---|---|
| **A** | Electrical load | [kW] | - | - | - | 4,5 | - | 9 |
| | Steam load | [kg/h] | - | - | - | - | - | - |
| | Temperatures | [°C] | - | - | - | 60 - 62 | - | 80 - 85 |
| **E-A** | Electrical load | [kW] | - | - | - | 4,5 | - | 9 |
| | Steam load | [kg/h] | - | - | - | - | - | - |
| | Temperatures | [°C] | 45 - 50 | - | - | 60 - 62 | - | 80 - 85 |
| **L-A** | Electrical load | [kW] | - | - | - | 4,5 | - | 12 |
| | Steam load | [kg/h] | - | - | - | - | - | - |
| | Temperatures | [°C] | - | 45 - 50 | - | 60 - 62 | - | 80 - 85 |
| **S-A** | Electrical load | [kW] | - | - | - | 4,5 | - | 12 |
| | Steam load | [kg/h] | - | - | - | - | - | - |
| | Temperatures | [°C] | - | - | 45 - 50 | 60 - 62 | - | 80 - 85 |
| **E-S-A** | Electrical load | [kW] | - | - | - | 4,5 | - | 12 |
| | Steam load | [kg/h] | - | - | - | - | - | - |
| | Temperatures | [°C] | 45 - 50 | - | 50 - 55 | 60 - 62 | - | 80 - 85 |
| **L-A-A** | Electrical load | [kW] | - | - | - | 6 | 4,5 | 15 |
| | Steam load | [kg/h] | - | - | - | - | - | - |
| | Temperatures | [°C] | - | 45 - 50 | - | 60 - 62 | 60 - 64 | 80 - 85 |
| **S-A-A** | Electrical load | [kW] | - | - | - | 6 | 4,5 | 15 |
| | Steam load | [kg/h] | - | - | - | - | - | - |
| | Temperatures | [°C] | - | - | 45 - 50 | 60 - 62 | 60 - 64 | 80 - 85 |
| **E-S-A-A** | Electrical load | [kW] | - | - | - | 6 | 4,5 | 15 |
| | Steam load | [kg/h] | - | - | - | - | - | - |
| | Temperatures | [°C] | 45 - 50 | - | 45 - 50 | 60 - 62 | 60 - 64 | 80 - 85 |

### CP with CHP-18

| | | | E | L | S | Tank 1 | PR | Booster with CHP |
|---|---|---|---|---|---|---|---|---|
| **A** | Electrical load | [kW] | - | - | - | - | - | - |
| | Steam load | [kg/h] | - | - | - | - | - | - |
| | Temperatures | [°C] | - | - | - | - | - | - |
| **E-A** | Electrical load | [kW] | - | - | - | - | - | - |
| | Steam load | [kg/h] | - | - | - | - | - | - |
| | Temperatures | [°C] | - | - | - | - | - | - |
| **L-A** | Electrical load | [kW] | - | - | - | 4,5 | 10,5 | 4,5 |
| | Steam load | [kg/h] | - | - | - | - | 18,1 | - |
| | Temperatures | [°C] | - | 45 - 50 | - | 63-67 | 70-80 | 62-65 |
| **S-A** | Electrical load | [kW] | - | - | - | 4,5 | 10,5 | 4,5 |
| | Steam load | [kg/h] | - | - | - | - | 18,1 | - |
| | Temperatures | [°C] | - | - | 45 - 50 | 63-67 | 70-80 | 62-65 |
| **E-S-A** | Electrical load | [kW] | - | - | - | 4,5 | 10,5 | 4,5 |
| | Steam load | [kg/h] | - | - | - | - | 18,1 | - |
| | Temperatures | [°C] | 45 - 50 | - | 50 - 55 | 63-67 | 70-80 | 62-65 |
| **L-A-A** | Electrical load | [kW] | - | - | - | - | - | - |
| | Steam load | [kg/h] | - | - | - | - | - | - |
| | Temperatures | [°C] | - | - | - | - | - | - |
| **S-A-A** | Electrical load | [kW] | - | - | - | - | - | - |
| | Steam load | [kg/h] | - | - | - | - | - | - |
| | Temperatures | [°C] | - | - | - | - | - | - |
| **E-S-A-A** | Electrical load | [kW] | - | - | - | - | - | - |
| | Steam load | [kg/h] | - | - | - | - | - | - |
| | Temperatures | [°C] | - | - | - | - | - | - |

4,5 kW with CHP
interlocked with booster heating

## Rinse system

**HOBART**

### CS

| | | A | E-A |
|---|---|---|---|
| Flow rate [l/h] | Mono | 260 | 260 |
| Booster pressure [bar] | Mono | 0,32 | 0,32 |
| Flow rate [l/h] | Dual | 230 | 240 |
| Booster pressure [bar] | Triple | 0,28 | 0,30 |
| Tank regeneration [l/h] | Dual Rinse | 230 | 240 |
| Tank regeneration [l/h] | Triple Rinse | n.a. | n.a. |
| Number of nozzles/arm | Upper | 4 | 4 |
| Number of nozzles/arm | Lower | 4 | 4 |
| Number of nozzles/arm | Side-rinse | n.a. | n.a. |

### CN

| | | A | E-A | L-A | S-A | E-S-A | L-A-A | S-A-A | E-S-A-A |
|---|---|---|---|---|---|---|---|---|---|
| Flow rate [l/h] | Mono | 260 | 260 | 260 | 260 | n.a. | n.a. | n.a. | n.a. |
| Booster pressure [bar] | Mono | 0,32 | 0,32 | 0,32 | 0,32 | n.a. | n.a. | n.a. | n.a. |
| Flow rate [l/h] | Dual | 230 | 240 | 260 | 260 | 260 | 330 | 330 | 330 |
| Booster pressure [bar] | Triple | 0,28 | 0,30 | 0,32 | 0,32 | 0,32 | 0,48 | 0,48 | 0,48 |
| Tank regeneration [l/h] | Dual Rinse | 230 | 240 | 260 | 260 | 260 | --- | --- | --- |
| Tank regeneration [l/h] | Triple Rinse | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 |
| Number of nozzles/arm | Upper | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Number of nozzles/arm | Lower | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Number of nozzles/arm | Side-rinse | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |

### CP

| | | L-A | | | | empty space | glass | S-A | | | | empty space | glass | | ECO | 1 | 2 | 3 | empty space | glass |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ECO | 1 | 2 | 3 | | | ECO | 1 | 2 | 3 | | | | | | | | | |
| Flow rate [l/h] | Dual | 140 | 150 | 160 | 190 | 0 | 190 | 140 | 150 | 190 | 220 | 0 | 220 | | 140 | 150 | 220 | 250 | 0 | 250 |
| Tank regeneration [l/h] | Triple Rinse | | | 75 | | | | | | 75 | | | | | | | 75 | | | |
| Number of nozzles/arm | Upper | | | 4 | | | | | | 4 | | | | | | | 4 | | | |
| Number of nozzles/arm | Lower | | | 5 | | | | | | 5 | | | | | | | 5 | | | |
| Number of nozzles/arm | Side-rinse | | | 6 | | | | | | 6 | | | | | | | 6 | | | |

# TECHNICAL Data C-Line

## Dryer

| | | CS | CN | | | CP | | |
|---|---|---|---|---|---|---|---|---|
| **HOBART** | | D | CDS | CDC | DS | CDS | CDC | DS |
| **Dryer length [mm]** | | 650 | 850 | 900 | 850 | 850 | 900 | 850 |
| | | | | | | | | |
| **Dryer heat consumption** | | | | | | | | |
| Electrical consumption | [kW] | 3 | 3 | 4,5 | 4,5 | 4,5 | 4,5 | 4,5 |
| Steam consumption | [kg/h] | n.a. | 5,16 | 7,74 | 7,74 | 7,74 | 7,74 | 7,74 |
| HW consumption | [kJ/h] | n.a. | 10800 | 16200 | 16200 | 16200 | 16200 | 16200 |
| **El. Heater** | | | | | | | | |
| Connected load | [kW] | 3 | 3 | 4,5 | 4,5 | 4,5 | 4,5 | 4,5 |
| surface load | [W/cm²] | | | | | | | |
| | | | | | | | | |
| **Steam & HW heater** | | | | | | | | |
| surface | [m²] | n.a. | 6,3 | 6,3 | 6,3 | 6,3 | 6,3 | 6,3 |
| volume | [dm³] | n.a. | 1,0 | 1,0 | 1,0 | 1,0 | 1,0 | 1,0 |
| | | | | | | | | |
| **Dryer air** | | | | | | | | |
| Air temperature | [°C] | 50-55 | 50-55 | 50-55 | 50-55 | 50-55 | 50-55 | 50 -55 |
| relative humidity | [%] | 20-30 | 20-30 | 20-30 | 20-30 | 20-30 | 20-30 | 20-30 |
| Air revolution | [m³/h] | 510 | 510 | 510 | 510 | 510 | 510 | 510 |
| | | | | | | | | |
| **Blower** | | | | | | | | |
| Power P2 | [kW] | | | | | | | |
| el. Consumption | [kW] | 0,5 | 0,5 | 0,5 | 0,5 | 0,5 | 0,5 | 0,5 |
| number of revolutions | [rpm] | 1340 | 1340 | 1340 | 1340 | 1340 | 1340 | 1340 |
| Pressure | [Pa] | | | | | | | |
| Protection class | [IP] | 54 | 54 | 54 | 54 | 54 | 54 | 54 |
| Connected load P1 | [kW] | 0,5 | 0,5 | 0,5 | 0,5 | 0,5 | 0,5 | 0,5 |
| | | | | | | | | |
| **Air jet** | | | | | | | | |
| **Upper nozzles** | | | | | | | | |
| Number | | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Air speed | [m/s] | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| **Lower nozzles** | | | | | | | | |
| Number | | - | - | - | - | - | - | - |
| Air speed | [m/s] | - | - | - | - | - | - | - |
| **Side nozzles** | | | | | | | | |
| Number | | - | - | - | - | - | - | - |
| Air speed | [m/s] | - | - | - | - | - | - | - |

## Without Heat recovery

HOBART

| | | CS | | CN | | | | | | | | CP | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Machine size** | | A | E-A | A | E-A | L-A | S-A | E-S-A | L-A-A | S-A-A | E-S-A-A | L-A | S-A | E-S-A |
| **Fan** | | | | | | | | | | | | | | |
| Flow rate | [m³/h] | | 600 | | | | 380 | | | | | | | n.a. |
| Power P1 | [kW] | | 0,4 | | | | 0,5 | | | | | | | n.a. |
| number of revolutions | [rpm] | | | | | | | | | | | | | n.a. |
| Pressure | [Pa] | 0 | 0 | | | | 0 | | | | | | | n.a. |
| Protection class | | IP 54 | IP 54 | | | | IP 54 | | | | | | | n.a. |
| **Exhaust air** | | | | | | | | | | | | | | |
| Temperature | [°C] | | 45 | | | | 45 | | | | | | | n.a. |
| Rel. Humidity | [% rF] | | 95 | | | | 95 | | | | | | | n.a. |
| Humidity ratio | [l/h] | | 39,4 | | | | 25 | | | | | | | |
| **Installation exhaust volume** | [m³/h] | | 800 | | | | 600 | | | | | | | n.a. |

## Heat recovery

| | | CS | | CN | | | | | | | | CP | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Machine size** | | A | E-A | A | E-A | L-A | S-A | E-S-A | L-A-A | S-A-A | E-S-A-A | L-A | S-A | E-S-A |
| Fins | | Al; Vinyl-covered | | | | | | | | | | | | |
| Pipes Std/Option | | Copper / 1.4301 | | | | | | | | | | | | |
| Surface | [m²] | **12,5** | | | | | **20** | | | | | | **20** | |
| Water volume | [l] | 2,1 | | | | | 2,8 | | | | | | 2,8 | |
| Watertemp. Secondary | [°C] (primary 12°C) | 35 | | 40 | 40 | 40 | 40 | 40 | 42 | 4 2 | 42 | 51 | 51 | 51 |
| Energy saving | [kW] | 6,2 | 7 | 6,5 | 7,5 | 8,5 | 8,5 | 8,5 | 11,5 | 11,5 | 11,5 | 7,3 | 8,5 | 10 |
| **Fan** | | | | | | | | | | | | | | |
| Flow rate | [m³/h] | | 600 | | | | 380 | | | | | | 380 | |
| Power P1 | [kW] | | 0,4 | | | | 0,5 | | | | | | 0,5 | |
| number of revolutions | [rpm] | | | | | | | | | | | | | |
| Pressure | [Pa] | 0 | 0 | | | | 0 | | | | | | 0 | |
| Protection class | | IP 54 | IP 54 | | | | IP 54 | | | | | | IP 54 | |
| **Exhaust air** | | | | | | | | | | | | | | |
| Temperature | [°C] | | 33 | | | | 35 | | | | | | 38 | |
| Rel. Humidity | [% rF] | | 90 - 98 | | | | 88-92 | | | | | | 92-95 | |
| Humidity ratio | [l/h] | | 21 | | | | 14 | | | | | | 17,3 | |
| **Installation exhaust volume** | [m³/h] | | 800 | | | | 600 | | | | | | 600 | |

## CHP

| | | CS | CN | | | | | | | | CP | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Machine size** | | | A | E-A | L-A | S-A | E-S-A | L-A-A | S-A-A | E-S-A-A | L-A | S-A | E-S-A |
| Watertemp. Secondary | [°C] (primary 12°C) | | 45 | 45 | 45 | 45 | 45 | 42 | 4 2 | 42 | 57 | 57 | 57 |
| Energy saving | [kW] | | 7,7 | 8,9 | 10 | 10 | 10 | 11,5 | 11,5 | 11,5 | 8,4 | 10 | 11,5 |
| **Fan** | | | | | | | | | | | | | |
| Flow rate | [m³/h] | **n.a.** | | | | 350 | | | | | | 350 | |
| Power P1 | [kW] | | | | | 0,5 | | | | | | 0,5 | |
| number of revolutions | [rpm] | | | | | | | | | | | | |
| Pressure | [Pa] | 0 | | | | 0 | | | | | | 0 | |
| Protection class | | IP 54 | | | | IP 54 | | | | | | IP 54 | |
| **Exhaust air** | | | | | | | | | | | | | |
| Temperature | [°C] | | | | before Fan 10,5 / after Fan 20 | | | | | | | 20 | |
| Rel. Humidity | [% rF] | | | | | 55-60 | | | | | | 65-70 | |
| Humidity ratio | [l/h] | | | | | 3,6 | | | | | | 4 | |
| **Installation exhaust volume** | [m³/h] | | | | | n.a. | | | | | | n.a. | |

# TECHNICAL Data C-Line

## Heat radiation C-Line

HOBART

### without dryer

| Model | Variant | drain water | direct exhaust | wash-ware | other heat radiat. total | other heat radiat. lat. | other heat radiat. sens. |
|---|---|---|---|---|---|---|---|
| CS-A | without | 12,9 | 16,2 | 5,2 | 4,1 | 1,2 | 2,9 |
| CS-A | with C12 | 12,9 | 9,3 | 5,2 | 4,1 | 1,2 | 2,9 |
| CS E-A | without | 10,6 | 16,2 | 6,5 | 4,5 | 1,4 | 3,2 |
| CS E-A | with C12 | 10,6 | 9,3 | 6,5 | 4,5 | 1,4 | 3,2 |
| CNA | without | 12,9 | 16,2 | 5,2 | 4,3 | 1,3 | 3,0 |
| CNA | with C20 | 12,9 | 7,2 | 5,2 | 4,3 | 1,3 | 3,0 |
| CNA | with CHP | 12,9 | -1,2 | 5,2 | 3,6 | 0,6 | 3,0 |
| CN E-A | without | 10,6 | 16,2 | 6,5 | 4,7 | 1,4 | 3,3 |
| CN E-A | with C20 | 10,6 | 7,2 | 6,5 | 4,7 | 1,4 | 3,3 |
| CN E-A | with CHP | 10,6 | -1,2 | 6,5 | 4,0 | 0,7 | 3,3 |
| CN L-A | without | 11,5 | 16,2 | 7,8 | 5,1 | 1,5 | 3,6 |
| CN L-A | with C20 | 11,5 | 7,2 | 7,8 | 5,1 | 1,5 | 3,6 |
| CN L-A | with CHP | 11,5 | -1,2 | 7,8 | 4,4 | 0,8 | 3,6 |
| CN S-A | without | 11,5 | 16,2 | 9,7 | 5,3 | 1,6 | 3,7 |
| CN S-A | with C20 | 11,5 | 7,2 | 9,7 | 5,3 | 1,6 | 3,7 |
| CN S-A | with CHP | 11,5 | -1,2 | 9,7 | 4,6 | 0,9 | 3,7 |
| CN E-S-A | without | 10,0 | 16,2 | 10,9 | 5,5 | 1,7 | 3,9 |
| CN E-S-A | with C20 | 10,0 | 7,2 | 10,9 | 5,5 | 1,7 | 3,9 |
| CN E-S-A | with CHP | 10,0 | -1,2 | 10,9 | 4,8 | 1,0 | 3,9 |
| CN L-A-A | without | 14,6 | 16,2 | 10,9 | 5,6 | 1,7 | 3,9 |
| CN L-A-A | with C20 | 14,6 | 7,2 | 10,9 | 5,6 | 1,7 | 3,9 |
| CN L-A-A | with CHP | 14,6 | -1,2 | 10,9 | 4,9 | 1,0 | 3,9 |
| CN S-A-A | without | 14,6 | 16,2 | 11,5 | 5,8 | 1,7 | 4,1 |
| CN S-A-A | with C20 | 14,6 | 7,2 | 11,5 | 5,8 | 1,7 | 4,1 |
| CN S-A-A | with CHP | 14,6 | -1,2 | 11,5 | 5,1 | 1,0 | 4,1 |
| CN E-S-A-A | without | 12,7 | 16,2 | 12,7 | 6,1 | 1,8 | 4,3 |
| CN E-S-A-A | with C20 | 12,7 | 7,2 | 12,7 | 6,1 | 1,8 | 4,3 |
| CN E-S-A-A | with CHP | 12,7 | -1,2 | 12,7 | 5,4 | 1,1 | 4,3 |
| CP L-A | with C20 | | | | | | |
| CP L-A | with CHP | | | | | | |
| CP S-A | with C20 | | | | | | |
| CP S-A | with CHP | | | | | | |
| CP E-S-A | with C20 | | | | | | |
| CP E-S-A | with CHP | | | | | | |

### with dryer (calculated with 3 kW / A-A and CP with 4,5 kW)

| Model | Variant | drain water | direct exhaust | wash-ware | other heat radiat. total | other heat radiat. lat. | other heat radiat. sens. |
|---|---|---|---|---|---|---|---|
| CS-A | without | 12,9 | 16,2 | 4,3 | 4,3 | 1,3 | 3,0 |
| CS-A | with C12 | 9,3 | 9,3 | 4,3 | 4,3 | 1,3 | 3,0 |
| CS E-A | without | 10,6 | 16,2 | 5,4 | 4,7 | 1,4 | 3,3 |
| CS E-A | with C12 | 10,6 | 9,3 | 5,4 | 4,7 | 1,4 | 3,3 |
| CNA | without | 12,9 | 16,2 | 4,3 | 4,5 | 1,4 | 3,2 |
| CNA | with C20 | 12,9 | 7,2 | 4,3 | 4,5 | 1,4 | 3,2 |
| CNA | with CHP | 12,9 | -1,2 | 4,3 | 3,8 | 0,6 | 3,2 |
| CN E-A | without | 10,6 | 16,2 | 5,4 | 4,9 | 1,5 | 3,4 |
| CN E-A | with C20 | 10,6 | 7,2 | 5,4 | 4,9 | 1,5 | 3,4 |
| CN E-A | with CHP | 10,6 | -1,2 | 5,4 | 4,2 | 0,8 | 3,4 |
| CN L-A | without | 11,5 | 16,2 | 6,5 | 5,3 | 1,6 | 3,7 |
| CN L-A | with C20 | 11,5 | 7,2 | 6,5 | 5,3 | 1,6 | 3,7 |
| CN L-A | with CHP | 11,5 | -1,2 | 6,5 | 4,6 | 0,9 | 3,7 |
| CN S-A | without | 11,5 | 16,2 | 8,1 | 5,5 | 1,7 | 3,9 |
| CN S-A | with C20 | 11,5 | 7,2 | 8,1 | 5,5 | 1,7 | 3,9 |
| CN S-A | with CHP | 11,5 | -1,2 | 8,1 | 4,8 | 1,0 | 3,9 |
| CN E-S-A | without | 10,0 | 16,2 | 9,7 | 5,7 | 1,7 | 4,0 |
| CN E-S-A | with C20 | 10,0 | 7,2 | 9,7 | 5,7 | 1,7 | 4,0 |
| CN E-S-A | with CHP | 10,0 | -1,2 | 9,7 | 5,0 | 1,0 | 4,0 |
| CN L-A-A | without | 14,6 | 16,2 | 9,7 | 6,3 | 1,9 | 4,4 |
| CN L-A-A | with C20 | 14,6 | 7,2 | 9,7 | 6,3 | 1,9 | 4,4 |
| CN L-A-A | with CHP | 14,6 | -1,2 | 9,7 | 5,6 | 1,2 | 4,4 |
| CN S-A-A | without | 14,6 | 16,2 | 10,3 | 6,5 | 2,0 | 4,6 |
| CN S-A-A | with C20 | 14,6 | 7,2 | 10,3 | 6,5 | 2,0 | 4,6 |
| CN S-A-A | with CHP | 14,6 | -1,2 | 10,3 | 5,8 | 1,3 | 4,6 |
| CN E-S-A-A | without | 12,7 | 16,2 | 11,3 | 6,8 | 2,0 | 4,8 |
| CN E-S-A-A | with C20 | 12,7 | 7,2 | 11,3 | 6,8 | 2,0 | 4,8 |
| CN E-S-A-A | with CHP | 12,7 | -1,2 | 11,3 | 6,1 | 1,3 | 4,8 |
| CP L-A | with C20 | 7,1 | 7,2 | 9,7 | 5,9 | 1,8 | 4,1 |
| CP L-A | with CHP | 7,1 | -1,2 | 9,7 | 5,2 | 1,1 | 4,1 |
| CP S-A | with C20 | 8,4 | 7,2 | 10,3 | 6,1 | 1,8 | 4,3 |
| CP S-A | with CHP | 8,4 | -1,2 | 10,3 | 5,4 | 1,1 | 4,3 |
| CP E-S-A | with C20 | 8,5 | 7,2 | 10,8 | 6,5 | 2,0 | 4,6 |
| CP E-S-A | with CHP | 8,5 | -1,2 | 10,8 | 5,8 | 1,3 | 4,6 |

(All figures kW)

**Conditions:**
Room 25°C / 60%rh
Cold water 12°C
Full loaded
450g/Plate

**NOTES**