

Assembly and operating instructions

STARCLEAN® Scraper control system 94-C04-...

**for 1 to 2 STARCLEAN® - conveyor belt scraper systems
with STARCLEAN® - motorization sets with up to 4 linear drives**

for automatic controlling

- the Scraper positions (Engage and Disengage)
- the tensioning of the polyurethane segments of primary scraper

**depending on the operating mode, such as
Belt running direction and interval operation**

as well as early notifications

- of worn / soon to be worn PU scraper segments
 - to the belt status (optional).

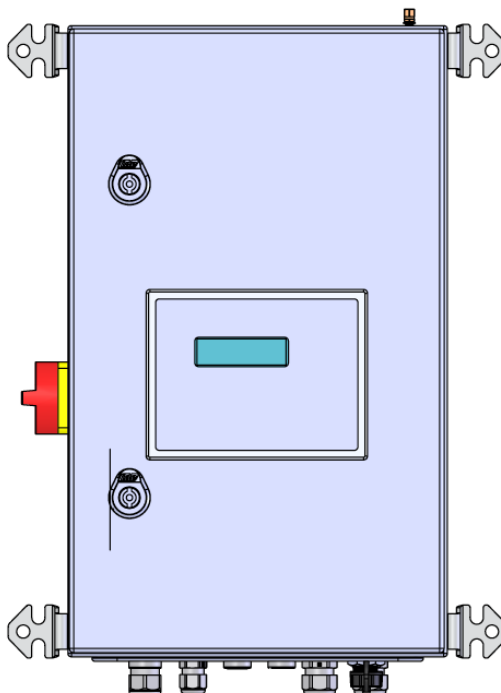


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1 Important safety information and notes

1.1 Manufacturer, Copyright

Manufacturer:

Schulte Strathaus GmbH & Co KG
Runtestraße 42
D-59457 Werl - GERMANY

Tel.: 0049 (0) 2922 9775 0
E-mail: info@schulte-strathaus.de

Copyright:

Reprinting, copying, or passing on these assembly and operating instructions to third parties, including storage and use on optical and electronic data carriers, is only permitted with the written consent of the manufacturer, except for personal use for the purpose of training and/or operation.

1.2 Scope of the assembly and operating instructions

These installation and operating instructions (Part No.: 95-MA-94-C04-...) apply to all STARCLEAN® control units of the 94-C04-... series. irrespective of which of the components belonging to the series and described below (number of sensors, mounting equipment and accessories) are used.

Keep these mounting and operating instructions together with the machine documentation for future reference and make them accessible to mounting and operating personnel!

IMPORTANT

This manual is only valid in connection with the STARCLEAN® - scraper systems, the STARCLEAN® - motorization sets, the STARCLEAN® - measuring rollers type 94-MD-MR-... and the STARCLEAN® - sensor modules type 94-MD-SM-.....

For installation, always refer to the instructions for the respective STARCLEAN® conveyor belt scrapers, the STARCLEAN® motorization sets, the STARCLEAN® measuring roller 94-MD-MR-... and the optional STARCLEAN® sensor modules 94-MD-SM-.... should be consulted.

1.3 Legend: (Meaning of the symbols)

IMPORTANT

To ensure a safe working environment, you must follow all the safety rules listed here as well as the owner's standards and regulations and the legal requirements of the authorities.
Follow the Lockout/Tagout procedures to unlock the conveyor before performing any work.

The following symbols and terms may be used in this manual:



Warning of a danger zone / Read especially carefully!



Do not switch on/provide that the conveyor belt system cannot be switched on during installation!



Warning of explosive atmosphere



DANGER

Danger: Imminent danger resulting in serious injury or death.



WARNING

Warning: Hazards or unsafe practices that may result in personal injury.



CAUTION

Caution: Hazards or unsafe practices that may result in product or property damage.

IMPORTANT

Important: Instructions that must be followed to ensure proper installation/operation of the unit.

NOTE

Note: General statements to assist the reader

1.4 General safety instructions



- These operating instructions are intended for qualified personnel trained by the manufacturer, since these persons, due to their training, experience, and instruction as well as their knowledge of relevant standards, regulations, accident prevention rules and operating conditions, are in a position to carry out the required activities and to recognize and avoid possible dangers.
- Installation and commissioning should be carried out by the manufacturer's qualified personnel in order to maintain the warranty.
- The instructions in these operating instructions must be observed without restriction. In the event of non-compliance, the manufacturer accepts no liability whatsoever for any resulting damage to people or machinery.
- As these systems described here are generally installed in belt conveyor systems, the manufacturers of these systems or the operator who installs the scrapers must comply with the provisions of the applicable machine guidelines.
- Scraper control systems from Schulte Strathaus may only be used in accordance with the intended use for the detection and control of STARCLEAN® scraper systems from Schulte Strathaus GmbH & Co. KG at the points provided for this purpose.
- Only spare parts from the manufacturer may be used in order to ensure the guaranteed functions.
- All work must comply with the relevant regulations of the local authorities and legislation.
- These safety instructions do not claim to be complete. If you have any questions or problems, please contact the manufacturer.
- The STARCLEAN® - scraper control type 94-C04-.... corresponds to the state of the art at the time of delivery.
- It may only be installed and operated in perfect condition, whereby the installation must always be designed to be safe for operation by the operator of the system in accordance with the relevant accident prevention regulations.
- Retrofitting/Upgrading, modifications or conversions are generally prohibited, as they may impair occupational safety.

1.5 Instructions for use in potentially explosive atmospheres

IMPORTANT



- The STARCLEAN® - scraper control 94-C04 is not intended for use in potentially explosive atmospheres.

1.6 Special safety instructions

! DANGER



- Before starting any work on STARCLEAN® conveyor system components, the power supply from the belt conveyor must be switched off and secured against unauthorized switching on.
- Before starting any work on the STARCLEAN® - electrical components, such as the scraper control 94-C04 and the linear drives, switch off the linear drives and disconnect the power supply to the components. Free the linear drives from any load that could come loose during the work.

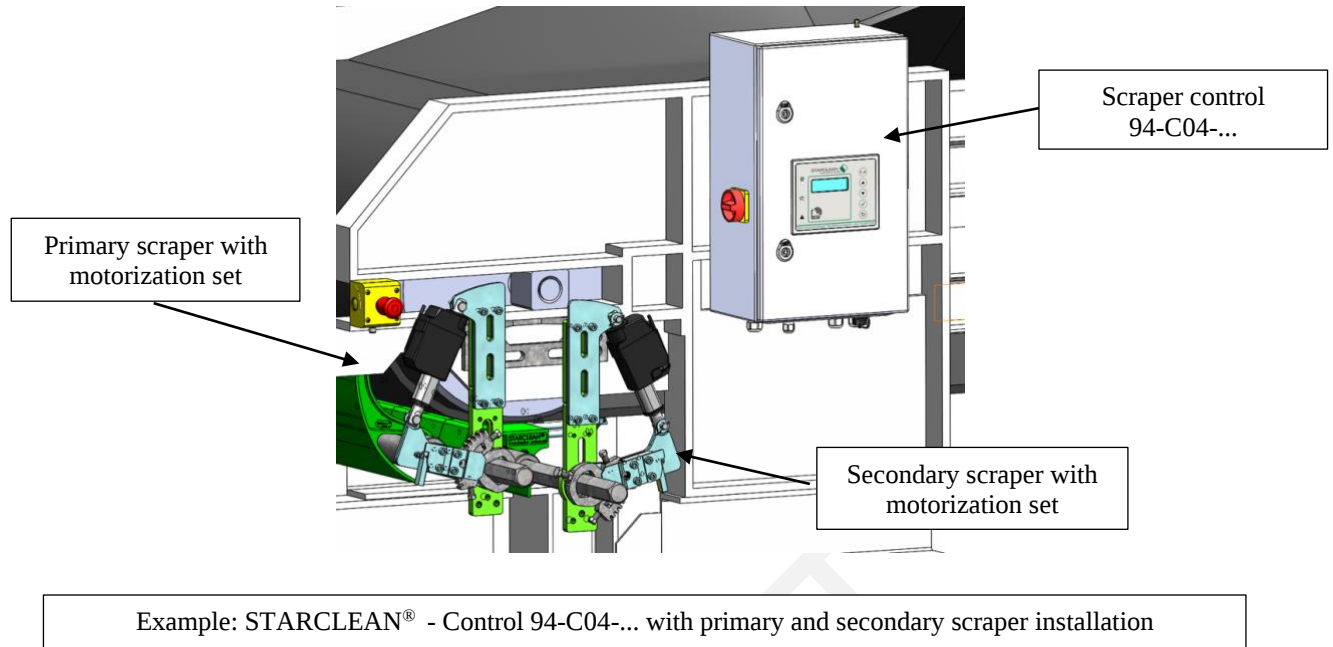


- Before starting welding and cutting work, a permit for this work must be obtained from the operator of the conveyor system!
- When installing the STARCLEAN® conveyor belt system components, it must be checked before using a welding torch and / or other tools of a welding device whether the official regulations (explosion protection, firedamp protection, etc.) are complied with.



- During welding and cutting work, heat-sensitive components, e.g. the conveyor belt, must be covered. A fire watch may be necessary.

2 Description of STARCLEAN® Control 94-C04 -...



2.1 Intended use and tasks (Intended use)

The STARCLEAN® control 94-C04-... is part of the STARCLEAN® scraper control system.

The control 94-C04-... is an electrical control system for controlling

- STARCLEAN® - Scraper systems of the 830, 832, 834 series on existing conveyor belt systems

in Connection with

- STARCLEAN® - Motorization sets 94-83E-090-018 / 94-83ED-090-018 (90 mm stroke) and 94-83E-210-025 / 94-83ED-210-025 (210 mm stroke)

and the

- STARCLEAN® - Measuring roller set 94-MD-MR...

as well as the monitoring of the belt condition (optional) with the

- STARCLEAN® - Belt damage detection (BDD) sensor modules 94-MD-SM....

The STARCLEAN® scraper systems to be controlled, the STARCLEAN® motorization sets, the STARCLEAN® measuring roller set and the STARCLEAN® BDD sensor modules are not part of the delivery.

The control is used exclusively for the functions:

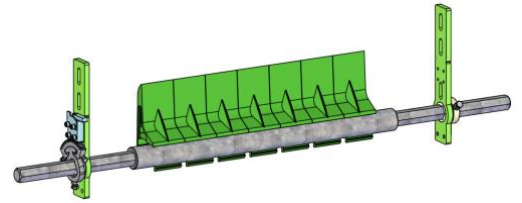
- Automatic engaging and pretensioning of the connected STARCLEAN® - Scraper during belt run
- Automatic engaging and disengaging of the scrapers in case of belt direction change or belt standstill
- Automatic pretensioning and readjustment of STARCLEAN® - Primary scraper segments made of polyurethane
- Automatic engaging and disengaging of STARCLEAN® - secondary scraper segments in interval mode
- Automatic engaging and disengaging, as well as pretensioning and readjusting of STARCLEAN® - primary scraper segments made of polyurethane in interval operation.
- Indication of the wear condition of the STARCLEAN® - Primary scraper segments made of polyurethane
- Manual engaging and disengaging of STARCLEAN® scraper systems via the operating unit of the control system for (predictive) maintenance purposes
- Display of belt running direction and belt speed in connection with the STARCLEAN® measuring roller system
- Monitoring of the belt condition (optional) in connection with the STARCLEAN® BDD sensor modules for the STARCLEAN® - secondary scraper

A maximum of four STARCLEAN® scraper systems with one-sided clamping device or a maximum of two STARCLEAN® scraper systems with two-sided electric clamping device can be connected to the electrical control.

When using the scrapers in potentially explosive atmospheres, it is essential to observe the information given in point 1.5!

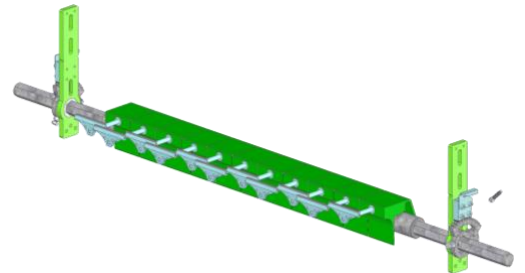
2.2 Components of the STARCLEAN® - Scraper control system

Primary scraper Series 830, 832, 834



and / or

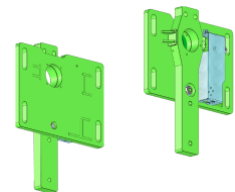
Secondary Scraper Series 830, 832, 834



and optionally

BDD sensor modules

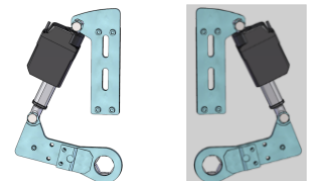
94-MD-SM-500-001-R	BDD Sensor Module, Right
94-MD-SM-500-001-L	BDD Sensor Module, Left



and

Motorization set(s)

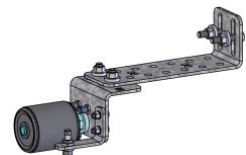
94-83E-090-018	E-motorization set, 90 mm stroke
94-83ED-090-018	Double-E motorization set, 90 mm stroke
94-83E-210-025	Electric motorization set, 210 mm stroke
94-83ED-210-025	Double E motorization set, 210 mm stroke



and

Measuring roller set

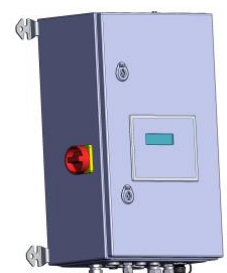
94-MD-MR-002	Measuring roller with speed sensor and direction of rotation sensor
94-MD-MR-003	Measuring roller with speed sensor, direction of rotation sensor and position detection and initiator set



and

Control 94- C04-...

94-C04-001	Control C04
94-C04-002	Control C04 with ESH module
94-C04-003	Control C04 with Edge Controller Light
94-C04-004	Control C04 with Edge Controller Light and ESH module
94-C04-005	Control C04 with Edge Controller Light and BDD module
94-C04-006	Control C04 with Edge Controller Light, BDD module and ESH module
94-C04-007	Control C04 with BDD module
94-C04-008	Control C04 with BDD module and ESH module



2.3 Functional description

2.3.1 Engaging/Disengaging STARCLEAN® - Scraper segments with carbide insert / Intermittent operation

In certain cases, such as changing belt direction or keeping cleaning intervals, the function "Engaging/Disengaging the scraper systems" is required.

For example, in the case of reversing belts and the use of STARCLEAN® secondary scrapers with carbide segments, the conveyor belt must not run until the scraper, which should not be active, has been disengaged.

The Engaging function is also required for belts where the belt is to be cleaned at intervals.

The STARCLEAN® control 94-C04 can be used engage and disengage STARCLEAN® scraper systems.

The scraper system must also be equipped with a STARCLEAN® - motorization set 94-83E-090-018 / 84-83ED-090-018 (90 mm stroke). The STARCLEAN® - motorization sets represent an extension variant for the clamping device of the 830 series.

The linear drive allows all primary and secondary scrapers with carbide inserts to be used on the reversing belt by disengage when the belt is at a standstill and engage them back up again according to the running direction of the belt. This reduces the belt and segment wear considerably, as only the scrapers required in each case are engaged during the belt run. The control system detects the belt run and the belt run direction via signals from the conveyor belt system or via the STARCLEAN® - measuring roller 94-MD-MR-... and moves the scraper systems automatically into the corresponding positions.

In interval operation, the scrapers can be engaged and disengage at adjustable intervals, e.g. to protect sensitive PVC belts or to save energy in the case of conveyor belts that only require a small amount of cleaning.

Furthermore, the scrapers can be disengage manually via the control system in case of maintenance.

The control of the scraper systems is always done by the complete extension and retraction of the linear drives up to the limit switches. The pretensioning of the scraper segments is done manually by using the detent clamping device of type 830, 832 and 834.

2.3.2 Automatic adjustment of STARCLEAN® - Primary scraper segments made of polyurethane

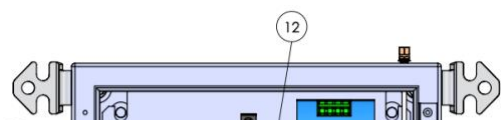
In addition to the 2.3.1 the **automatic adjustment of** primary scraper segments made of polyurethane can be set with the STARCLEAN® control **unit** 94-C04.

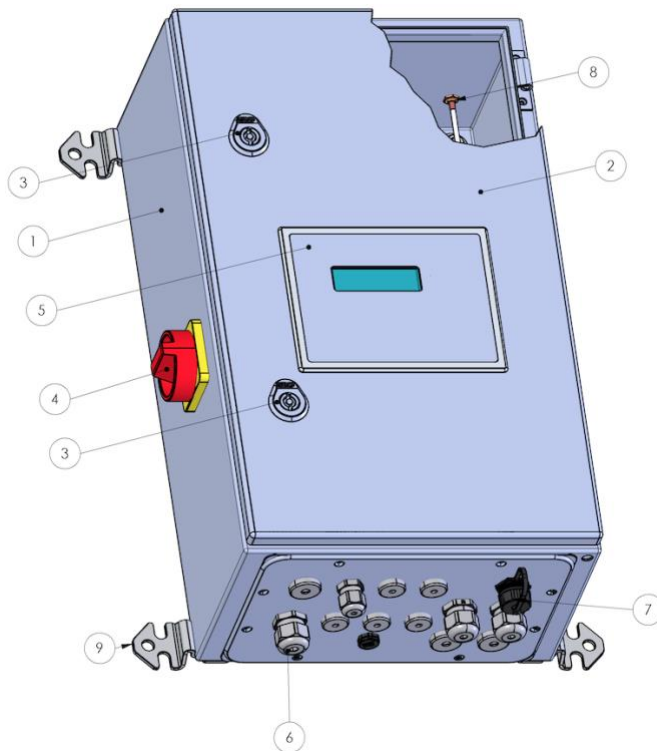
For this function, the scraper system must additionally be equipped with a STARCLEAN® - motorization sets 94-83E-210-025 / 94-83ED-210-025 (210 mm stroke). The STARCLEAN® - motorization sets represent an extension variant for the clamping device of the 830 series.

The pretension of the PU scraper segments is set and automatically readjusted by the linear drive. The pretension is checked and adjusted during operation at adjustable, regular intervals. This considerably reduces belt and segment wear, as the optimum pretension is always applied.

At the same time, **the wear of** the PU scraper segments is monitored by the control system and reported at an early stage in order to plan the segment change (predictive maintenance).

2.4 Description of the control





Picture: Exterior view switch cabinet

- 1 Control cabinet housing
- 2 Control cabinet door
- 3 Switch cabinet lock
- 4 Main switch -S1
- 5 Operating unit with display -A2
- 6 Cable glands
- 7 RJ45 connector socket
- 8 External antenna connection
- 9 Mounting bracket

Picture: Interior view of control cabinet

- 11 Input terminal strip -X1
- 12 Distribution terminal strip -X2
- 13 Power supply -NTZ1
- 14 Control board -A1
- 15 Space for ESH module (control cabinet heating option)
- 16 Space for Edge Controller -A3 (Option 4G / LTE)
- 17 Space for GSD module -A4 (belt monitoring option)
- 18 Place for one expansion module

3 Technical data

3.1 Control cabinet

Material:	Sheet steel
Coating:	hardened polyester lacquer coating, RAL 7035
Weight:	10 kg
Dimensions:	300 mm x 500 mm x 215 mm (W x H x D), without wall bracket.
Version:	IP66
Temperature range:	-20°C to 50°C (-4°F to 50°F) -40°C to 50°C (-40°F to 50°F) when used with control cabinet heater (ESH-Module)

3.2 Electrical data

Supply voltage:	1~/N/PE 100V-240V, 50/60Hz
Power consumption control cabinet (without drives):	35 W
Power consumption control cabinet with 4 drives:	300 W
Power consumption control cabinet with 4 drives and control cabinet heating:	400 W

3.3 Radio

	frequencies:	maximum transmitted power:
RFID:	13.56 Mhz	0,5W
WIFI:	2402.0 - 2480.0 MHz	0,5W
LTE:	Cellular	0,5W

3.4 Electrical connection switch cabinet

Only by qualified electricians!

The customary national electrical regulations and the regulations of the local power supply companies and the technical data and information on the type plate must be observed.

A mains voltage of 100V - 240V 50/60Hz is required for the power supply of the control cabinet, which is provided by the conveyor belt system. To protect the control cabinet, a fuse element for line protection with a tripping current adapted to the rated device current must be installed on site. The control cabinet must be permanently connected to permanently laid cables. The control cabinet must be connected to the protective earth conductor.



The power supply must be integrated into the emergency stop chain of the conveyor belt system.

4 Installation / Assembly

4.1 Environmental conditions

The control unit is suitable for outdoor installation, whereby the control cabinet should be mounted in a protected location. The control cabinet should not be exposed to direct sunlight or rain, otherwise suitable protection must be provided. Vibrations must be kept away from the control cabinet. The technical data, in particular the min. and max. permissible ambient temperature, must be observed.

4.2 Assembly instructions

The control cabinet is designed for wall mounting.
For mounting, 4 mounting brackets are attached to the control cabinet.
After installation, the necessary electrical connections must be made.

IMPORTANT

During any work, it must be ensured that no humidity or dust gets into the control unit. As long as the control cabinet door is opened during installation or electrical connection, any humidity must be prevented from entering, e.g. by covering with a protective tarpaulin, even if there is only slight precipitation.
In order to maintain the corresponding degree of protection, the control cabinet door must always be firmly closed!
Unused cable entries must be sealed with dummy plugs!

5 Electrical connection of the components

The electrical connection of the components to the control depends on the equipment and the desired functionality. The connection diagrams shown refer to standard connections.

5.1 Connection options on the control board

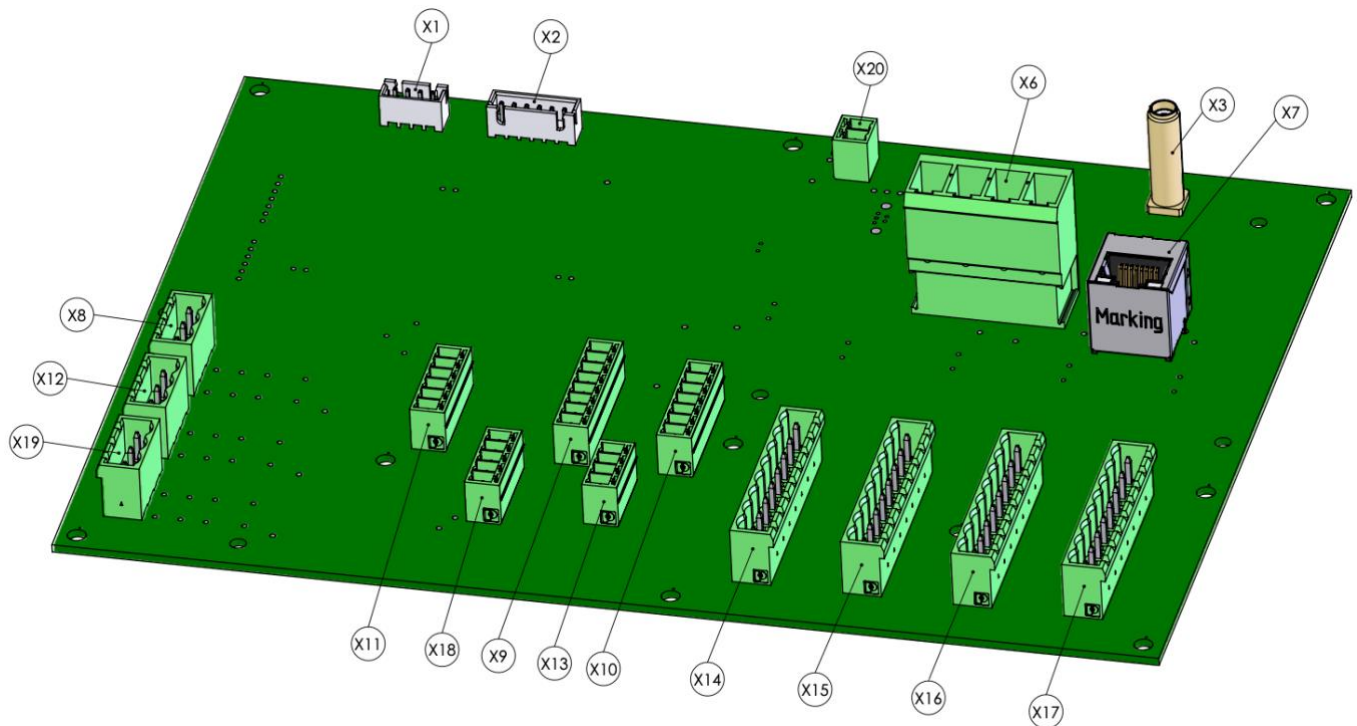


Figure: Control board, connectors, plug connectors

X1	4-pin JST socket, serial connection Edge Controller
X2	6-pin JST socket, control unit connection
X3	Connection WLAN antenna
X6	24 VDC supply for drives
X7	LAN RJ45 (no function)
X8	3-pin connector Output relay 1 (no function)
X9	8-pin plug connector of input signals from the conveyor belt system (see point 5.3.1)
X10	Reserve inputs (no function)
X11	CAN bus, Edge Controller connection, belt monitoring connection
X12	3-pin connector Output relay 2 (no function)
X13	4-pin plug connector for external 24VDC signal lamp (see point 5.1.4 ff.)
X14	8-pin plug connector Linear drive 1 (see point 5.1.1 ff.)
X15	8-pin plug connector Linear drive 2 (see point 5.1.1 ff.)
X16	8-pin plug connector Linear drive 3 (see point 5.1.1 ff.)
X17	8-pin plug connector Linear drive 4 (see point 5.1.1 ff.)
X18	5-pin plug connector Measuring roller input (see section 5.1.2 ff.)
X19	3-pin connector Output relay 3 (no function)
X20	24 VDC supply for CPU

5.1.1 Connection of the linear drives of the motorization sets to the control unit

The motorization sets 94-83E-090-018 / 94-83ED-090-018 and 94-83E-210-025 / 94-83ED-210-025 are extension components for the STARCLEAN® - scraper systems of type 90-83..., which are operated with different STARCLEAN® - conveyor belt scraper types.

Depending on the version, they consist of a corresponding number of linear actuators of type 94-LA1800-90 or 95-LA2500-210-F3-025, mounting components and connecting cables.

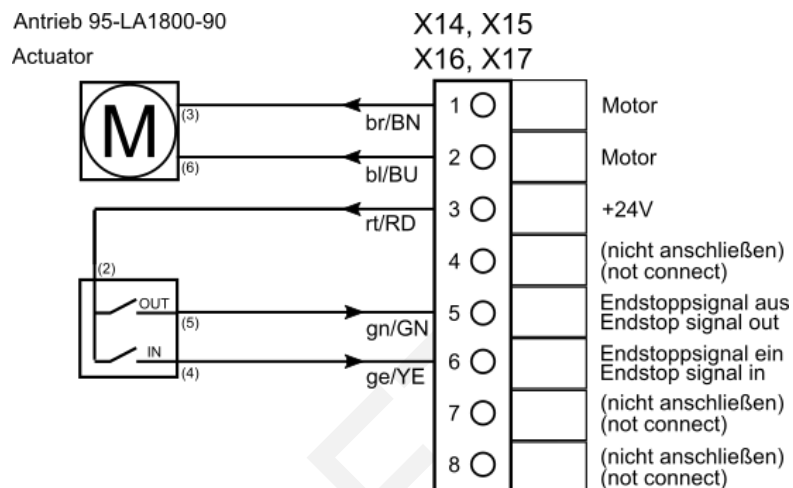
5.1.1.1 Connection linear actuators 95-LA1800-90

The motorization sets 94-83E-090-018, 94-83ED-090-018 include linear drives 95-LA1800-90 with corresponding connecting cables 94-LAK-01-25 (2.5 m) or 94-LAK-01-50 (5.0 m) and 8-pin connectors 941-Klt-1004 for connection to the control board.

The connection cables must be connected to the linear drives and then connected to the 8-pole plug connectors 941-Klt-1004 in the control cabinet.

The plug connectors or the linear drives are connected to the plug connectors X14, X15, X16 or X17 on the control board (see section 5.1 ff.) according to their assignment in the system menu of the Scraper control unit (see section 7.1.3.1.4 ff.).

X14 - Linear drive 1
X15 - Linear drive 2
X16 - Linear drive 3
X17 - Linear drive 4



Wiring diagram: Actuator 95-LA1800-90 - Plug connector 941-Klt-1004

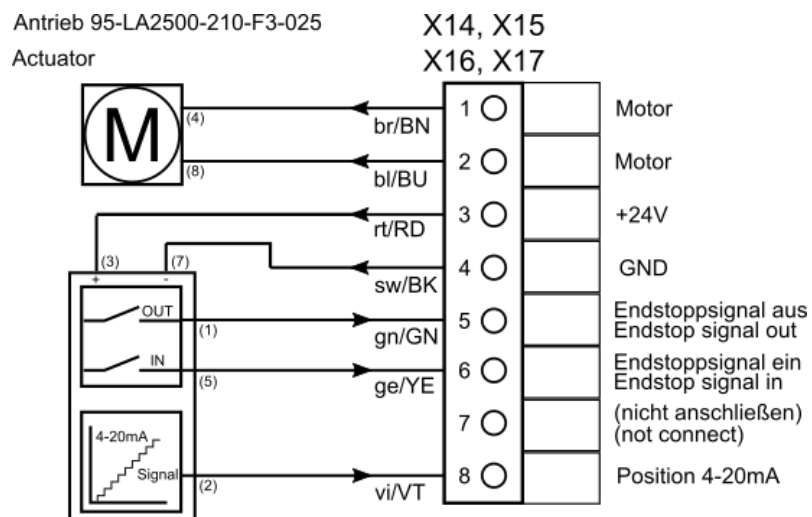
5.1.1.2 Connection linear actuators 95-LA2500-210-F3-025

The motorization sets 94-83E-210-025, 94-83ED-210-025 include linear drives 95-LA2500-210-F3-025 with corresponding connecting cables 94-LAK-03-50 (5.0 m) or 94-LAK-03-100 (10.0 m) and 8-pole plug connectors 941-Klt-1004 for connecting the control board.

The connection cables must be connected to the linear drives and then connected to the 8-pole plug connectors 941-Klt-1004 in the control cabinet.

The plug connectors or the linear drives are connected to the plug connectors X14, X15, X16 or X17 on the control board (see section 5.1 ff.) according to their assignment in the setting menu of the Scraper control unit. (see section 7.1.3.1.4 ff.).

X14 - Linear drive 1
X15 - Linear drive 2
X16 - Linear drive 3
X17 - Linear drive 4



Wiring diagram: Actuator 95-LA2500-210-025 - Plug connector 941-Klt-1004

5.1.2 Connection of measuring roller set 94-MD-MR-... to the control

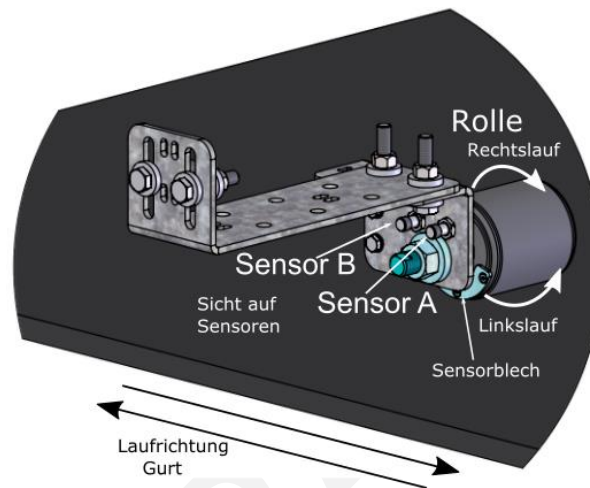
The control system detects the signals for the belt run via the measuring roller set 94-MD-MR-002 and recognizes the direction of rotation of the belt conveyor. Depending on the situation, the conveyor belt scrapers are brought into their positions.

With the 94-MD-MR-003 version, the controller also determines a belt position for belt monitoring.

The measuring roller set 94-MD-MR-002 consists of a roller with holder, two inductive sensors (A) & (B) with connection cables and a 2 x 5-pin connector 941-Klt-1018 for connection to the control board.

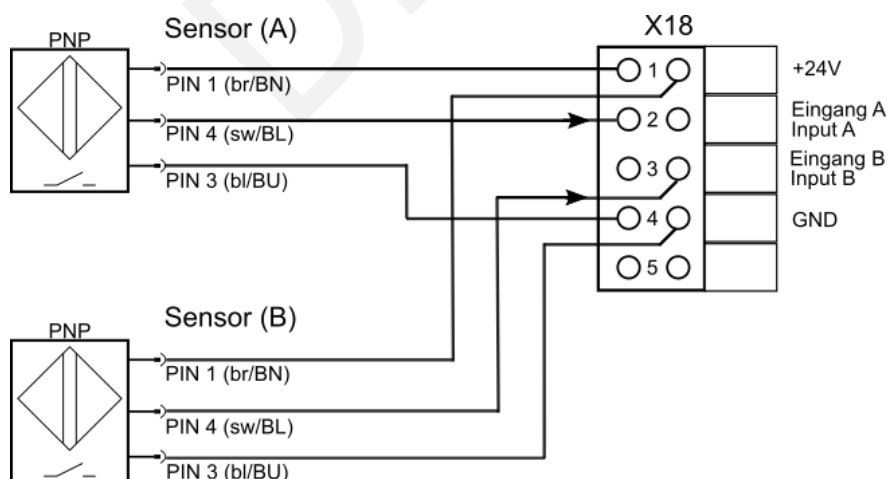
The measuring roller set 94-MD-MR-003 consists of a roller with holder, two inductive sensors (A) & (B) with connection cables and a 2 x 5-pin connector 941-Klt-1018 for connection to the control board and a third sensor (C) with connection cable and a 3-pin connector 941-Klt-1017 for connection to the BDD module 941-GSD-001.

5.1.2.1 Connection of the proximity sensors (A) & (B) of the measuring roller set



Picture: Measuring roller 94-MD-MR-002 with sensor (A) & (B)

The connection cables of the sensors (A) & (B) are to be connected to the sensors and then connected to the 2 x 5-pin connector 941-Klt-1018 in the control cabinet.



Connection diagram: Measuring roller 94-MD-MR-002, sensor (A) & (B) - connector X18 (941-Klt-1018)

The plug connector X18 is connected to the plug connector X18 on the control board (see point 5.1 ff.).

The measuring roller can be set in the system menu under the menu item Belt conveyor (see point 7.1.2.1.1 ff.).

5.1.2.1 Connection of the proximity sensor (C) of the measuring roller set

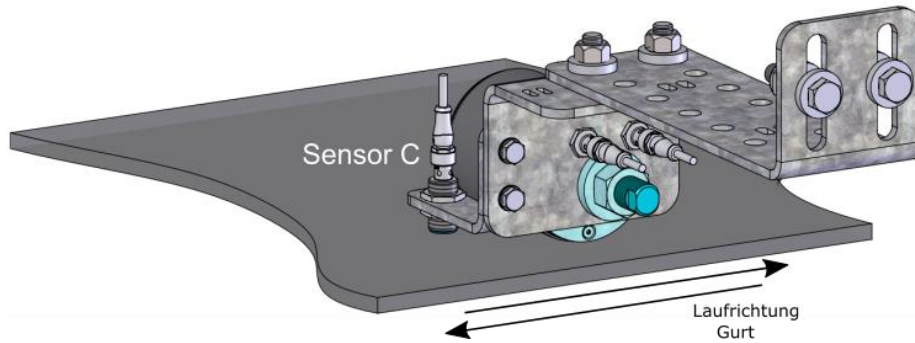
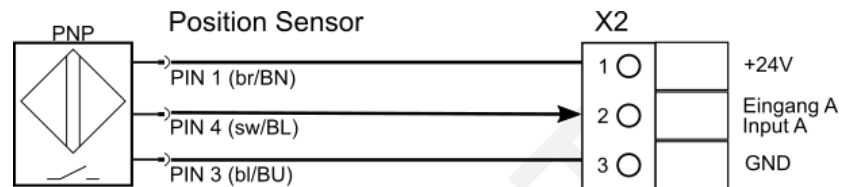


Figure: Measuring roller 94-MD-MR-003 with sensor (C)

The sensor connection cable (C) must be connected to the sensor and then connected to the 3-pole plug connector 941-Klt-1017 in the control cabinet.



Connection diagram: Measuring roller 941-MR-003, sensor (C) - connector X2 (941-Klt-1017)

The plug connector X2 is connected to the plug connector X2 on the BDD module 941-GSD-001 (see section 5.3.3 ff.).

The function of the sensor can be set in the system menu under the menu item belt monitoring, position detection. (see point 7.1.4.1.11 ff.)

5.1.3 Input signals from the conveyor belt system (option)

If there is no measuring roller, the 94-C04 control can also detect the belt run and the direction of rotation via signals from the conveyor system control and move the scrapers into their positions. The function can be set in the system menu under the menu item "Belt conveyor, belt run detection V(521)".

The following four signals can be switched from the conveyor control system to the 94-C04 control system via potential-free contacts.

IMPORTANT

The system operator is responsible for the professional and correct installation!

Signal "Scraper enable" - Input 1

ON: The scrapers are released by the control system of the conveyor belt system and can be moved by the control system 94-C04 in the "Automatic" operating mode.

OFF: The scrapers are not enabled by the conveyor control system and cannot be moved automatically by the 94-C04 control system.

Signal "Belt run right" - Input 2

ON: The conveyor belt runs in the direction to the right

OFF: The conveyor belt is stationary, the scrapers on the right-hand side move into the disengaged position.

Signal "Belt run left" - Input 3

ON: The conveyor belt runs in the direction to the left

OFF: The conveyor belt is stationary, the scrapers on the left side move into the disengaged position.

If input 2 - ON and input 3 - ON at the same time, this is interpreted as an error and the scrapers move to the disengaged position.

Signal "engage scraper" - Input 4

When input 4 - ON and

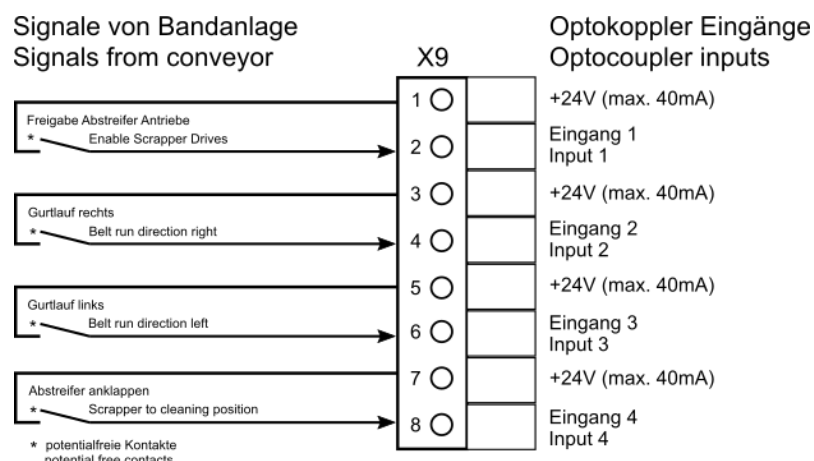
Input 2 ON (belt run right) the scrapers on the right side move into cleaning position

When input 4 - ON and

Input 3 ON (belt run left) the scrapers on the left side move into cleaning position

Input 4 - OFF: The scrapers move to the disengaged position

The signal line from the conveyor control system must be connected to the 8-pole plug connector 941-Klt-1006 in the control cabinet of the 94-C04 control system.



Connection diagram: Input signals from the conveyor belt system - connector X9 (941-Klt-1006)

The plug connector X9 is connected to the plug connector X9 on the control board (see point 5.1 ff.).

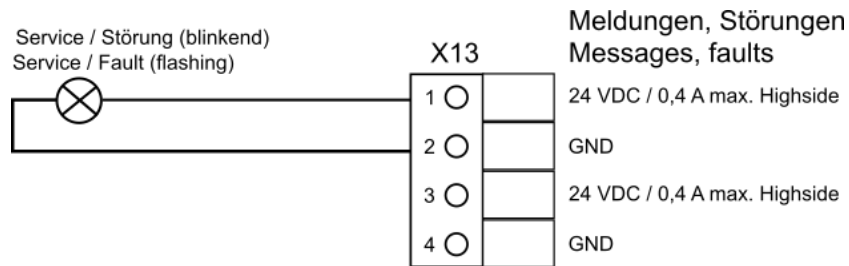
5.1.4 Connection "external 24VDC signal lamp "

Messages or faults are indicated on the display and by an LED  on the control unit.

In order to pass on these messages or faults to other devices, the controller provides a 24VDC output. A relay or an external signal lamp, for example, can be connected to this output. The output current must not exceed 0.4A.

5.1.4.1 Connection signal lamp

The signal lamp or the relay must be connected to the 4-pole plug connector 941-Klt-1009 in the control cabinet.



Wiring diagram: external signal lamp - connector X13 (941-Klt-1009)

The plug connector X13 is connected to the plug connector X13 on the control board (see point 5.1 ff.).

5.2 Electrical control cabinet heater 94-ESH-001 (optional)

For locations where an ambient temperature below -20°C is to be expected, it is necessary to purchase and install the optionally available control cabinet heater 94-ESH-001.

5.2.1 Safety instructions

- Installation may only be carried out by qualified electricians in compliance with the national power supply guidelines (IEC 60364).
- Never work on the device when it is live. Before doing so, disconnect the power supply to the control cabinet and check that no voltage is present.
- The protective measures customary in the country must be ensured.
- The technical data on the Rating Label must be strictly observed.
- No other components may be mounted above the air outlet grille.
- The device must not be operated in aggressive ambient air.
- The unit is installed vertically (air discharge direction upwards).
- No modifications or conversions may be made to the device.
- In case of visible damage or malfunction of the heater, the device must not be repaired or put into operation. (Dispose of heater)
- Do not dismantle the heater until it has cooled down.

IMPORTANT

- The heater must not come into contact with easily flammable materials (wood, plastic, etc.).



WARNING

- Hot surface after commissioning! Risk of injury!
- Failure to observe the connection values or incorrect polarity may result in personal injury and damage to the device!

5.2.2 Application

The device is used in the control cabinet to heat the components and to prevent condensation. The control cabinet heater has an integrated thermostat for temperature control. The heater switches on independently at +5°C (+41°F) and off at +15°C (+59°F) when the main switch is switched on.

5.2.3 Technical data

Heat output:	100W
Heating element:	PTC thermistor - temperature limiting
Switch-off temperature:	15 °C (+59°F)
Operating temperature:	-40 ... + 70 °C (-40°F ... +158°F)
Power supply:	120 - 240 VDC
Inrush current, typ:	4,5 A
Protection class:	IP 20 / II (insulated)
Dimensions:	110 x 60 x 90 mm
When operating under AC 140 V, the heating capacity is reduced by approx. 10 %.	

5.2.4 Mounting

1. Disconnect the control cabinet from the power supply, switch off the main switch and open the control cabinet door and check that no voltage is present.
2. Screw the supplied mounting rail onto the mounting plate using the two M4 x 12mm screws.
3. Clip the control cabinet heater onto the mounting rail.

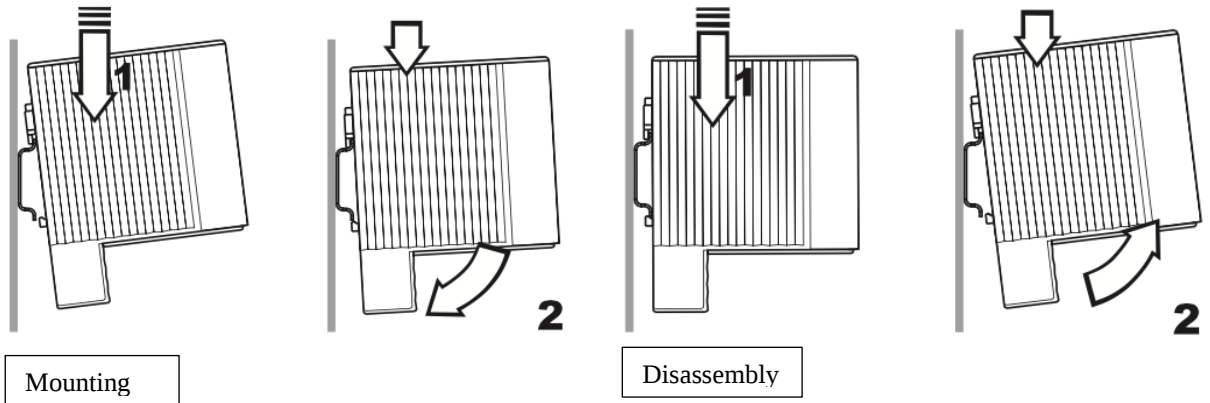


Figure: Assembly, disassembly control cabinet heater

4. Connect the two lines of the control cabinet heating to the terminal strip X2
Heater terminal 1 (L', black wire) to terminal strip X2 / L' to fuse (black terminal)
Heater terminal 2 (N, blue wire) to terminal strip X2 / N (blue terminal)

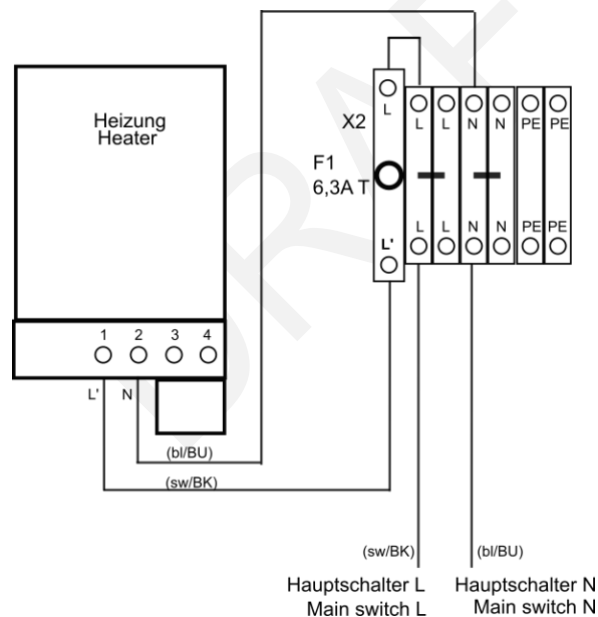


Figure: Connection of the control cabinet heating to terminal strip X2

5. Close the control cabinet door after assembly.
6. Switch on the supply voltage and the main switch on the control cabinet.

5.3 Edge Controller 94-ECL-001 (Optional)

The Edge Controller 94-ECL-001 is required for the radio connection of the control to the StarCleanCloud. If the Edge Controller is not installed when the controller is delivered, it can be upgraded.

5.3.1 Safety instructions

- Installation may only be carried out by specialist personnel trained by the manufacturer.
- When installing and handling the device, ensure adequate ESD protection.
- The device may only be used for the intended application.
- In the event of visible damage or malfunctions, the device must not be repaired or put into operation.
- No modifications or conversions may be made to the device.
- Never work on the device when it is live. Before doing, disconnect the power supply to the control cabinet and check that no voltage is present.

5.3.2 Application

The Edge Controller, consisting of a motherboard, processor board and a 4G modem, establishes the data exchange between the control unit and the StarCleanCloud. A SIM card is pre-installed in the 4G modem for this purpose.

5.3.3 Technical data

Power supply:	24VDC, reverse polarity protection integrated, no internal fuse protection
Current consumption:	200mA
Temperature range:	-20 ... +60°C (-4°F to 140°F)
Protection class:	None
Dimensions:	Board 115 x 65 x 50 mm with mounting plate

5.3.4 Connection Edge Controller 94-ECL-001

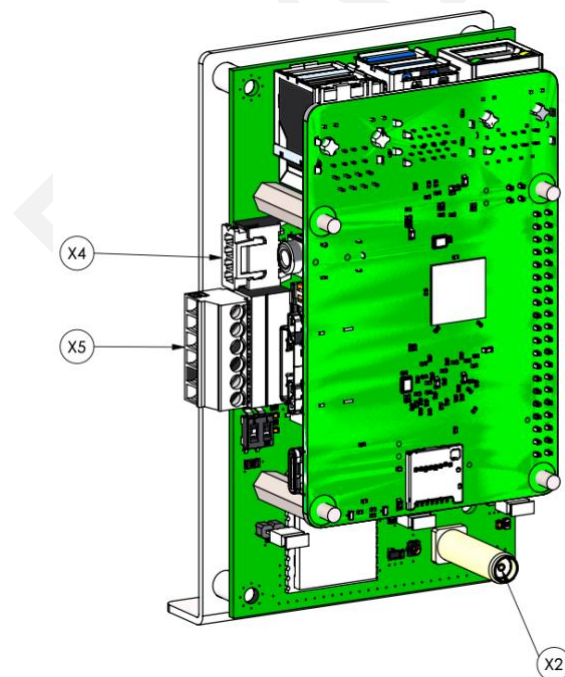


Figure: Edge Controller 94-ECL-001, Connectors

X2	SMA socket / connection antenna cable
X4	JST socket / Serial data line
X5	Connector strip / CAN bus line, supply 24VDC

5.3.5 Mounting/ Assambly

1. Disconnect the control cabinet from the power supply, switch off the main switch and open the control cabinet door and check that no voltage is present.
2. Screw the supplied LTE antenna, on the top of the control cabinet, onto the SMA socket on the outside, hand-tight.
3. Screw the SMA connector of the antenna cable located in the control cabinet to the SMA socket X2 on the Edge Controller / LTE hand-tight.
4. Then screw the Edge Controller onto the mounting plate at position -A3 using the two M4 x 12 mm screws.
5. Connect the serial data line of the Edge Controller, outgoing from the JST socket X4, to the 4-pin JST socket X1 on the control board.
6. Connect the CAN bus line from connector X5 of the Edge Controller to the 6-pin connector X11 on the control board.

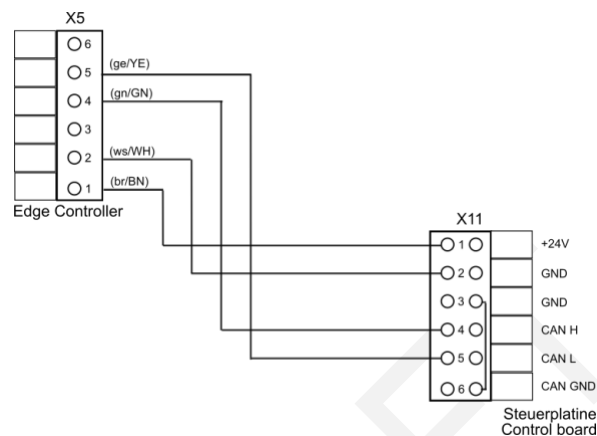


Figure: Edge Controller, CAN bus line - connector X11 control board

If connector X11 on the control board is already occupied by a 2 x 6-pin connector of another module, the individual wires of the Edge Controller CAN bus line must be disconnected at connector X11 and connected in parallel one-to-one to the existing 2 x 6-pin connector X11.

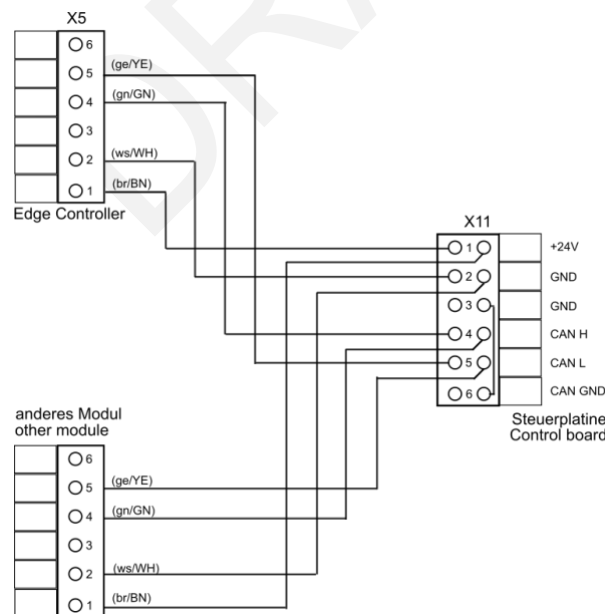


Figure: Parallel connection of two modules to the 2x 6-pin connector X11

7. Close the control cabinet door and switch on the supply voltage and the main switch on the control cabinet. The Edge Controller starts automatically, and the radio connection is established after a few minutes.
8. After approx. 4 minutes the reception level can be checked on the HMI in the display (see point 6.2.3 ff.).

5.4 Belt monitoring with BDD (Belt Damage Detection) module 94-GSD-001 (optional)

The belt monitoring is a function extension for the scraper control 94-C04-..... The BDD module 94-GSD-001 and the measuring roller with position detection 94-MD-MR-003 and the BDD sensor modules 94-MD-SM-001-R (right version), 94-MD-SM-001-L (left version), installed on a secondary scraper, are required for the belt monitoring. If the BDD module 94-GSD-001 is not installed when the controller is delivered, it can be upgraded.

5.4.1 Safety instructions

- Installation may only be carried out by qualified personnel trained by the manufacturer.
- When installing and handling the device, ensure adequate ESD protection.
- The device may only be used for the intended application.
- In the event of visible damage or malfunctions, the device must not be repaired or put into operation.
- No modifications or conversions may be made to the device.
- Never work on the device when it is live. Before doing so, disconnect the power supply to the control cabinet and check that no voltage is present.

5.4.2 Technical data

Power supply:	24VDC, reverse polarity protection integrated, no internal fuse protection
Current consumption:	30 mA
Temperature range:	-20 ... +60°C (-4°F to 140°F)
Protection class:	None
Dimensions:	Board 115 x 65 x 20 mm with mounting plate

5.4.3 Application

The BDD module 941-GSD-001 determines the belt status of a conveyor belt system with the aid of a secondary scraper with sensor modules and passes this on to the control board via a CAN bus.

The belt condition can be monitored by three adjustable levels.

A signal can be generated via a relay output when a level is exceeded.

- The maximum belt length to be monitored is 65km
- The maximum time for a belt rotation is 10h

5.4.4 Connection options BDD module 941-GSD-001

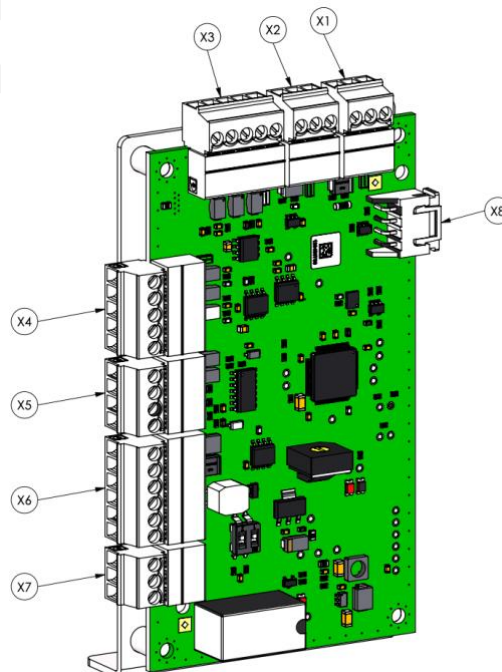


Figure: BDD module 941-GSD-001, connections

X1 Connector strip (no function)

X2	Connector strip / connection of position initiator of measuring roller 94-MD-MR-003
X3	Connector strip / connection BDD sensor modules 94-MD-SM-001-L, 94MD-SM-001-R
X4	Connector strip / (no function)
X5	Connector strip /(no function)
X6	Connector strip / connection CAN bus line, supply 24VDC
X7	Connector strip / connection relay contact
X8	JST socket / RS232 connector, TTL level (for service purposes only)

5.4.5 Mounting

1. Disconnect the control cabinet from the power supply, switch off the main switch and open the control cabinet door and check that no voltage is present.
2. Screw the BDD module 941-GSD-001 onto the mounting plate at position -A4 using the two M4 x 12 mm screws.
3. Connect the CAN bus line, outgoing from connector X6 of the BDD module, to the 6-pin connector X11 on the control board.

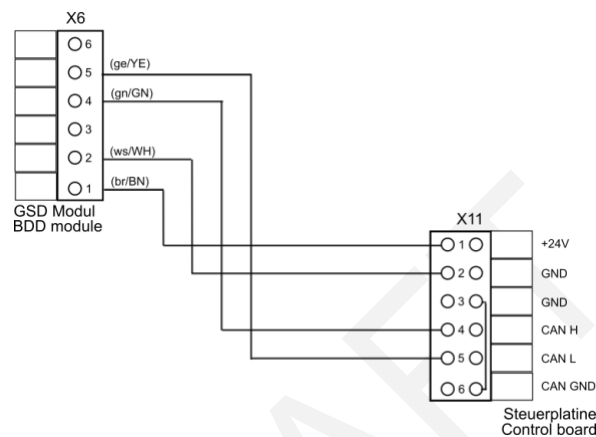


Figure: BDD module, CAN bus line - plug connector X11 control board

If connector X11 on the control board is already occupied by a 2 x 6-pin connector of another module, the individual wires of the BDD module CAN bus line must be disconnected at connector X11 and connected in parallel one-to-one to the existing 2 x 6-pin connector X11.

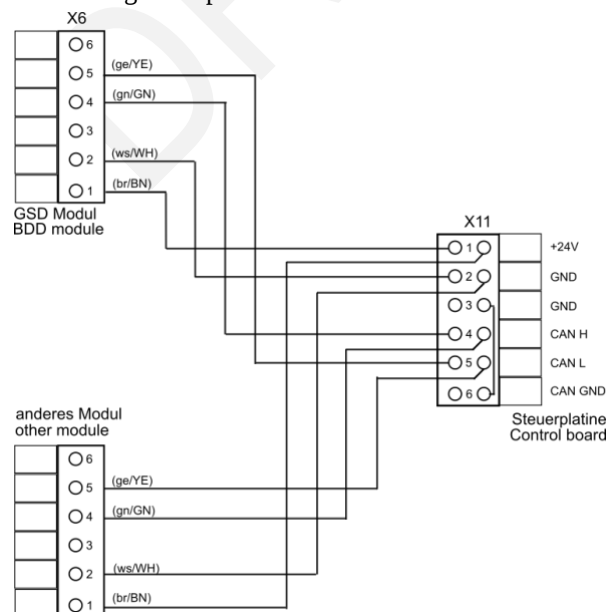
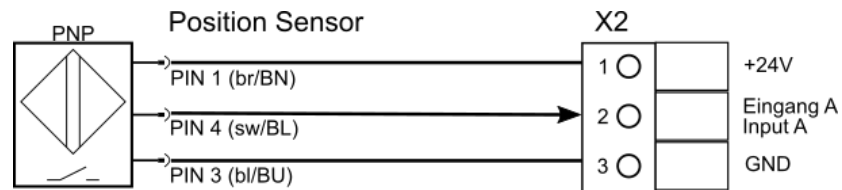


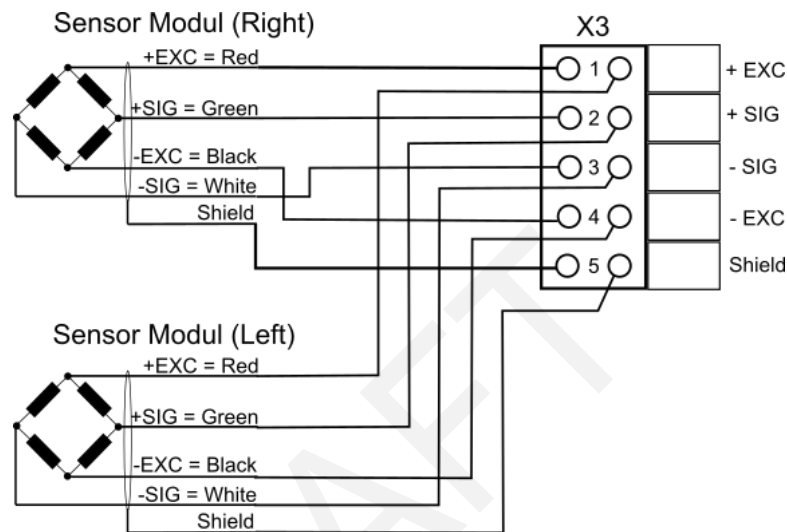
Figure: Parallel connection of two modules to the 2x 6-pin connector X11

4. Insert the cable of the position initiator from the measuring roller 94-MD-MR-003 into the control cabinet and connect it to the 3-pin plug connector X2 (941-Klt-1017). Plug the connector X2 into the connector strip X2 on the BDD measuring module 941-GSD-001.



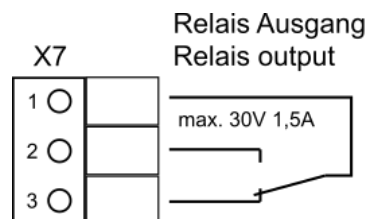
Wiring diagram: Position initiator - plug connector X2 941-Klt-1009

5. Insert the two cables of the BDD sensor modules 94-MD-SM-001-R (right version) and 94-MD-SM-001-L (left version) into the control cabinet and connect them in parallel to the 2x 5-pin plug connector X3 941-Klt-1018. The two cables of the BDD sensor modules must not be shortened. Plug the connector X3 into the connector strip X3 on the BDD measuring module 941-GSD-001.



Wiring diagram: GSD sensor modules - plug connector X3 941-Klt-1009

6. Close the control cabinet door and switch on the supply voltage and the main switch on the control cabinet.
7. Activate the belt monitoring via the HMI (see point 7.1.4.1.1 ff.) and perform a calibration. (see point 6.2.8.1 ff.)
8. The BDD measuring module 941-GSD-001 offers the possibility to output a potential-free signal via a relay contact when a certain level is exceeded. (see point 7.1.4.1.7 ff.) The signal can be picked up at connector X7.



Wiring diagram: Connector X7 - relay contact (potential-free)

6 Operation

6.1 Main switch -S1

The main switch can be used to disconnect the control unit from the power supply. When switched off, the main switch can be padlocked to prevent it from being switched on again.

The main switch has an emergency stop function and switches the linear actuators.



Even when the main switch is switched off, the input terminals -X1 and the main switch -S1 can carry voltage!

6.2 Control unit with display -A2

6.2.1 Overview

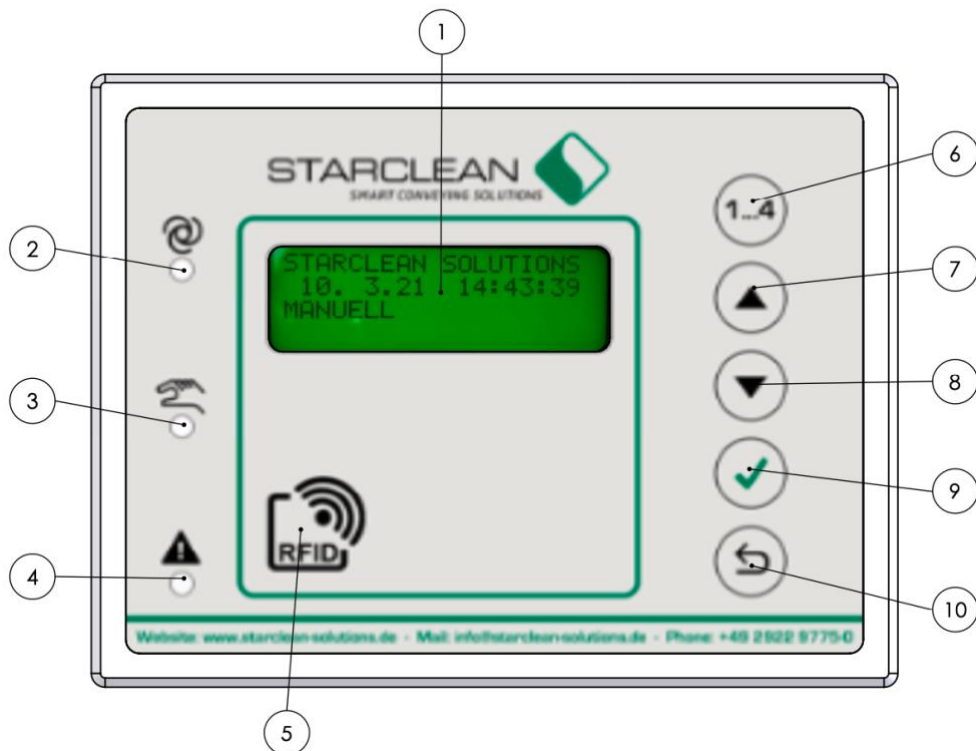


Figure: Control unit with display

- 1 Display four-line display
The displays are in plain text via a four-line LCD display with 20 characters each in the set language DE or EN.
- 2  Display LED - Automatic
 - LED lights up green = The control system is in automatic mode, the scrapers are in operation.
- 3  Display LED - Manual
 - LED lights up yellow = The control is in manual mode, the scrapers move to the set disengage position, manual operation is possible.
- 4  Display LED red - messages, collective faults
 - LED lights up red = service message (segment wear, additional information in the display)
 - LED flashes red = collective fault (faults, additional information in the display)

- 5



RFID Reader

The RFID reader reads the RFID keys and allows access to the menus and settings.
- 6



Scraper 1...4 button, (optional belt monitoring menu)

Scrapers are selected in the order 1,2,3,4,1,2,... selected

Scraper and belt monitoring are selected in the sequence 1,2,3,4, belt monitoring, 1,2,... selected
- 7



Arrow up - key

 - changes the display values in the main view
 - Switches between the menu items (upwards)
 - increases the setting value (+)
 - moves the selected scraper manually in the direction of the disengaged position
- 8



Arrow down - button

 - changes the display values in the main view
 - Switches between the menu items (downwards)
 - decreases the setting value (-)
 - moves the selected scraper manually towards the cleaning position
- 9



ENTER key

 - Jumps to the selected submenu
 - jumps to the set value
 - Enter the setting value with acceptance of the changes
 - Confirmation of questions, instructions, info
- 10



ESC key

 - Return from a menu or operation
 - Exits the setting value without accepting the changes
 - Enables selection of the system menu in the "Manual" operating mode.

6.2.2 Switch on Supply voltage

After switching on the supply voltage, all three indicator LEDs light up for 3 seconds and the display shows the currently installed software version.

If the  button is pressed during this time, the language can be selected and set.

STARCLEAN SOLUTIONS

V01.03.50 (10.02.21)

Deutsch

ENTER = Set Language

Fig. : installed software V01.03.050

Set Language <ENTER>

Deutsch / DE →

Set Language <ENTER>

English / EN →

Fig. : Language selection

The control supports the languages German (DE) and English (EN) in the display.

The language can also be set via the system menu (see point 10.1.1.1).

6.2.3 Main view of the four-line display

In the main view, the date and time are displayed in the 2nd line and the operating mode "Manual or Automatic" in the 3rd line.

1st line	STARCLEAN SOLUTIONS	
2nd line	10 . 3 . 21 14 : 43 : 39	Date, time
3rd line	MANUELL	Operating mode
4th line		

Fig.: 3rd line: MANUAL operating mode

1st line	STARCLEAN SOLUTIONS	
2nd line	10 . 3 . 21 14 : 43 : 39	Date, time
3rd line	AUTOMATIK 2 . 6 m / s R	Operating mode
4th line		

Fig.: 3rd line: AUTOMATIC operating mode

With the   keys it is possible to change between date, time and the values of the wipers in the 2nd line. If an Edge Controller is available, the reception level of the radio module (LTE) is also displayed in the 2nd line.

1st line	STARCLEAN SOLUTIONS	
2nd line	A1 66 mm 0 . 003 A	Scrapper no., drive position (mm), drive current (A)
3rd line	MANUELL	
4th line		

Fig.: 2nd line: A1 = scrapper1, drive position 66 mm, drive current 0.003A

1st line	STARCLEAN SOLUTIONS	
2nd line	A1 20 % 33 Nm	Scrapper no., segment volume (%), torque (Nm)
3rd line	MANUELL	
4th line		

Fig.: 2nd line: A1 = scrapper1, segment volume 20 %, torque 33 Nm

1st line	STARCLEAN SOLUTIONS	
2nd line	ZM LTE - Empfang : 3 / 4	Receive level of the radio module (LTE)
3rd line	MANUELL	0 = none, 1-2 = low, 3-4 = good
4th line		

Fig.: 2nd line: Receive level of the radio module

In the 4th line, information on messages or faults is displayed and, if a GSD module is installed, belt damage is indicated. Pressing the ENTER button displays further information.

1st line	STARCLEAN SOLUTIONS	
2nd line	A1 20 % 33 Nm	
3rd line	MANUELL	
4th line	Service mld. <ENTER>	References to Service or fault

Fig.: 4th line: Service message

1st line	STARCLEAN SOLUTIONS	
2nd line	A1 20 % 33 Nm	
3rd line	MANUELL	
4th line	Stoermeldung <ENTER>	

Fig.: 4th line: Fault message

1st line	STARCLEAN SOLUTIONS	
2nd line	A1 20 % 33 Nm	
3rd line	AUTOMATIK	
4th line	Gurtschaden <ENTER>	Reference to Belt damage

Fig.: 4th line: Seat belt damage report

6.2.4 Operating mode "Automatic "

The control system switches to the "**Automatic**" operating mode after the belt run is detected.

Automatic is shown in the 3rd line of the display. If a measuring roller is installed, the belt speed is also displayed, and if a measuring roller with direction of rotation recognition is installed, the running direction R (right) / L (left) is also displayed.

1st line	STARCLEAN SOLUTIONS	
2nd line	1 0 . 3 . 2 1 1 4 : 4 3 : 3 9	
3rd line	AUTOMATIK 2 . 6 m / s R	Operating mode / belt speed / belt running direction
4th line		

Fig.: Main view display

The scrapers on the discharge side move into the cleaning position.

In the "**Automatic**" operating mode, scrapers that automatically readjust themselves can be selected with the ^(1..4) button. If belt monitoring is installed and activated, the ^(1..4) button can also be used to select the Belt monitoring menu item.

The menu items appear:

- **Readjust the pretension** (only visible with wipers that readjust automatically)

The preload of the segments can be changed manually by means of the arrow keys. (see point 6.2.7.1 f.f)

- **Belt monitoring** (only visible if the BDD module is installed and activated)

By means of arrow keys it is possible to switch between the submenu items damage level (see point 6.2.7.1 f.f), belt damage (see point 6.2.7.1 f.f) and data (see point 6.2.7.1 f.f) can be changed.

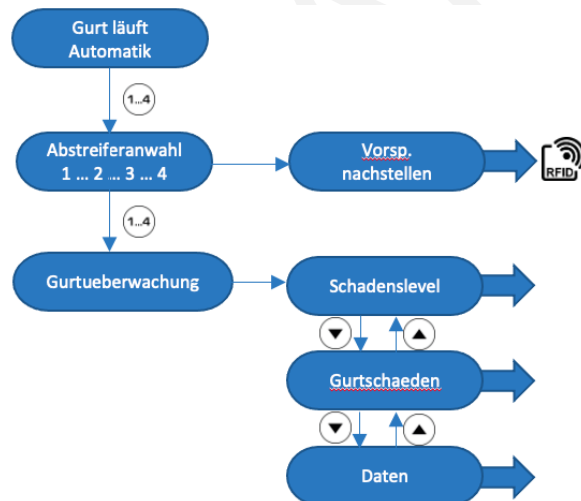


Fig.: Scraper and belt monitoring menu items in AUTOMATIC operating mode

6.2.5 Operating mode "Manual "

The control system is in the "Manual" operating mode when the belt is at a standstill. Manual appears in the 3rd line of the display.

```
STARCLEAN SOLUTIONS
10 . 3 . 21    14 : 43 : 39
MANUELL
```

Fig.: Main view of the "Manual" operating mode display

In the "Manual" operating mode, the installed scrapers can be selected with the ^(1..4) key.

▲▼ The keys can be used to switch between the following menu items for the selected scraper.

- **Manual operation**
- **Readjust the pretension** (only visible with scraper that readjust automatically)
- **Segment change**
- **Commissioning**
- **Settings**

If the BDD module is installed and belt monitoring is activated, the belt monitoring menu item can also be selected with the ^(1..4) button.

▲▼ The buttons can be used to switch between the following submenu items during belt monitoring.

- **Calibration**
- **Damage level**
- **Belt damage**
- **Data**
- **Variables**

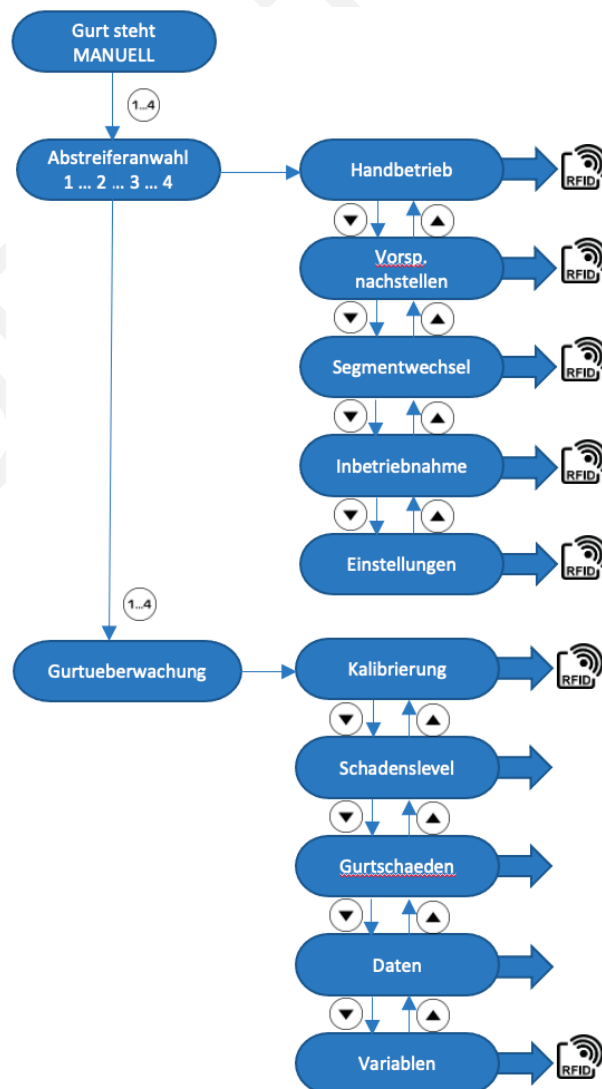


Fig.: Scraper and belt monitoring menu items in MANUAL operating mode

6.2.6 RFID-Reader / Data protection

In order to ensure the safety of the conveyor belt system and the associated equipment, the STARCLEAN® - control 94-C04 is equipped with a safety device by means of RFID keys.

The RFID keys are provided with unique identifiers that are read by the controller when the keys are used and are stored in a log file so that authorized users can track when a particular RFID key was used.

To allow access to certain functions and settings of the control unit, RFID keys with different authorization levels are required, which must be held on the RFID symbol  of the control unit before using the control unit.

There are three RFID keys with different authorizations.

It is the responsibility of the plant operator to distribute the RFID keys in his plant.

The supplier of the STARCLEAN® control unit 94-C04 is equipped with a "master key" and can provide replacements if necessary and operate the control unit like a "super user" for maintenance purposes. The latter is regulated by a corresponding contract between the supplier and the plant operator.

RFID key 1 - User key (green)



The user key is required to operate and check the scraper.

The user key gives access to the menu items.

Scraper

- **Manual operation**
- **Readjust the preload**

Belt monitoring

- **Confirm belt damage**

RFID Key 2 - Service User Key (black)



The service user key is required for commissioning the scrapers, when changing segments and when commissioning the belt monitoring system for calibrating and setting the variables.

The service user key gives access to the following menu items **and** access to the system menu. In the Settings menu and in the System menu, some settings cannot be changed, only read.

Scraper

- **Manual operation**
- **Readjust the preload**
- **Segment change**
- **Commissioning**
- **Settings**

Belt monitoring

- **Calibration**
- **Variables**
- **Confirm belt damage**

Notes:

Under the menu item Scraper Settings some variables are hidden and only visible with the Super User key. In the system menu, some settings cannot be changed, only read.

RFID Key 3 - Super User Key (red)



The super-user key is required for the installation and configuration of the control system, the scraper and the belt monitoring system.

The super-user key gives access to all menu items and access to the system menu.

Scraper

- **Manual operation**
- **Readjust the preload**
- **Segment change**
- **Commissioning**
- **Settings**

Belt monitoring

- **Calibration**
- **Variables**
- **Confirm belt damage**

6.2.7 Scraper Menu items

In the "Manual" or "Automatic" operating mode, the installed scrapers can be selected with the  key. Each additional  keystroke switches to the next installed scraper.

Various menu items appear in the display under the respective scraper.

  The keys can be used to switch between the menu items.

After confirming the menu item with the  button, the display prompts you to enter the RFID key.

```
E i n g a b e   R F I D

B e n d e n           < E S C >
```

Fig.: Request for RFID input

An RFID key with the corresponding authorization must be applied to the symbol  on the control unit in order to gain access to the menu item.

6.2.7.1 Menu item "Manual mode "



CAUTION

Beware!

Manual operation is only permitted with a stationary conveyor belt.

Before a scraper is run in manual mode, the loaded conveyor belt must be run empty!

After entering the RFID key, the selected scraper can be moved in touch mode via the   keys.

```
ABSTREIFER 1      < E S C >
  1 2 6 mm        0 , 0 0 3 A
B e e n d e n      < E N T E R >
```

```
ABSTREIFER 2      < E S C >
                        0 , 0 0 2 A
B e e n d e n      < E N T E R >
```

Fig.: Manual operation with actuator LA2500-210-F3-025 Fig.: Manual operation with actuator LA1800-90

With the  button the scraper moves in the direction of the conveyor belt into the cleaning position (engaged).

With the  button, the scraper moves in the direction of the maintenance position (disengaged).



CAUTION

Beware!

The scraper can be moved in manual operation over the complete travel path of the linear drive.

Exit the menu by pressing the  key or the ESC  key.



WARNING

Warning.

As soon as the menu is exited, the scraper automatically moves in the direction of folding down to the end position of the linear drive! Danger of crushing!

```
ABSTREIFER 1      < E S C >

A b s t r e i f e r
k l a p p t a b !
```

Fig.: Scraper disengages



CAUTION

Beware!

After the conveyor belt has been restarted, the scraper must be given sufficient time to move into its cleaning position before belt loading starts.

6.2.7.2 Menu item "Preload adjustment "

With STARCLEAN® - primary scraper segments made of polyurethane, the pretension of the segments can be adjusted automatically.

If the cleaning result of the scraper is not optimal in automatic mode, it can also be optimized by manually adjusting the pretension of the segments. The pretensioning of the segments can be readjusted in the operating mode "**Manual**" as well as in the operating mode "**Automatic**".

Ideally, the preload is readjusted in the "**Automatic**" operating mode, as the cleaning result can be checked immediately here.

In the "**Manual**" operating mode, the selected scraper is automatically moved to the last cleaning position after the RFID key is entered and the <ENTER> button is pressed.

```
ABSTREIFER 1    <ESC>
Achtung Abstreifer
wird angefahren!
Weiter          <ENTER>
```

Fig.: <ENTER> key, scraper moves to cleaning position

In the "**Automatic**" operating mode, the scraper is already in the cleaning position.

When the scraper is in the cleaning position, the pretension can be changed manually using the ▲▼ buttons.

With the ▼ key, the position value is reduced in jog mode and the preload is increased.

The ▲ key increases the position value and decreases the preload.

Caution:

Reduce the position value only until the cleaning result is optimal again!

Increase the position value only so far that the segments are still in contact with the belt!



```
ABSTREIFER 1    <ESC>
Vorspannung <AUF/AB>
125 mm          0.003 A
Weiter          <ENTER>
```

Fig.: Adjusting the preload

Pressing the <ENTER> key takes you to another display showing the old position and the new position again.

```
ABSTREIFER 1
alt : 125mm neu : 120mm
bestaetigen?
Ja <ENTER>   Nein <ESC>
```

Fig.: old and new position

If the new position is confirmed with the <ENTER> key, a measurement run is performed.

```
ABSTREIFER 1
Messfahrt
122 mm          1.187 A
```

Fig.: Measuring run

```
ABSTREIFER 1    <ESC>
Messfahrt Ende
120 mm          1.234 A
Weiter          <ENTER>
```

Fig.: Measuring run end

If the measuring run is finished, it is queried once again whether the preload is OK.

```
ABSTREIFER 1
Vorspannung OK?
Ja <ENTER>   Nein <ESC>
```

Fig.: Preload OK

When confirmed with Yes (<ENTER>✓ key), the new preload is accepted and the menu is exited.

If you confirm with No (<ESC>↵ key), the new preload is not accepted and you return to setting the preload.

6.2.7.3 Menu item "Segment Change"

In the menu item "Segment Change", the scrapers are moved to the maintenance position by means of the control system in order to be able to change worn or defective scraper segments.

When selecting this menu item, the control automatically recognizes that after inserting new segments, the start position of these new segments must be approached, and not the last approached position of the replaced segments.

6.2.7.3.1 Segment change for scraper with "engaged" mode of operation

After entering the RFID key, the display shows "Segment change, disengage scraper". After pressing the <ENTER>✓ key, the scraper disengages and the display changes to the prompt to release the locking bolt(s) of the clamping devices and to change the segments.

```
ABSTREIFER 2 <ESC>
Segmentwechsel
Abstreifer
abklappen <ENTER>
```

```
ABSTREIFER 2 <ESC>
Segmentwechsel
Abstreifer
klappt ab!
```

```
ABSTREIFER 2 <ESC>
Segmentwechsel
Rastbolzen entrieg.
Segmente wechseln
```

After the new segments have been inserted, this is confirmed with the <ENTER>✓ button.

```
ABSTREIFER 2 <ESC>
Segmentwechsel
Segmente eingsetzt?
<ENTER>
```

Next, engage the detent pin in detent 1 and then confirm this also with the <ENTER>✓ button.

```
ABSTREIFER 2 <ESC>
Segmentwechsel
Rastbolzen in Raste 1
einrasten
```

```
ABSTREIFER 2 <ESC>
Segmentwechsel
Rastbolzen in Raste 1
eingerastet? <ENTER>
```

The scraper is then moved in the direction of the cleaning position until it reaches the end position of the drive.

```
ABSTREIFER 2 <ESC>
Segmentwechsel
Abstreifer
klappt an!
```

Now the scraper segments are **manually** pretensioned by turning the segment core with the wrench SW 36. Fine adjustment of the preload by adjusting the fine adjustment screws is possible.

```
ABSTREIFER 2 <ESC>
Vorspannung mit
Rastvorrichtung
einstellen
```

```
ABSTREIFER 2 <ESC>
Segmentwechsel
Segmente
gespannt? <ENTER>
```

After pretensioning the scraper segments, a test run is performed after pressing the <ENTER>✓ key. In doing so, the scraper first disengages and then engages again.

ABSTREIFER 2 <ESC> Segmentwechsel Testfahrt starten! <ENTER>	ABSTREIFER 2 <ESC> Segmentwechsel Abstreifer klappt ab 0 mm I-GO 0.655 A	ABSTREIFER 2 <ESC> Segmentwechsel Abstreifer klappt an 0 mm I-GO 0.385 A
---	---	---

Commissioning is completed by pressing the <ENTER>✓ button. The scraper disengages.

ABSTREIFER 2 <ESC> Segmentwechsel abgeschlossen! <ENTER>	ABSTREIFER 2 <ESC> Abstreifer klappt ab!
---	--

Commissioning can be aborted at any time by pressing the <ESC>⌫ key and then pressing the <ENTER>✓ key.

ABSTREIFER 2 <ESC> Segmentwechsel wirklich abbrechen? <ENTER>
--

If you cancel, no new values are saved or accepted.

6.2.7.3.2 Segment change for scrapers with "automatic readjustment" mode of operation

After entering the RFID key, the display shows "Segment change, Scraper disengages". After pressing the <ENTER>✓ button, the scraper disengages over the entire travel path of the drive.

ABSTREIFER 1 <ESC> Segmentwechsel Abstreifer abklappen <ENTER>	ABSTREIFER 1 <ESC> Segmentwechsel Abstreifer klappt ab!
---	--

The segment change prompt appears. After the new segments have been inserted, the change must be confirmed with the <ENTER>✓ key.

ABSTREIFER 1 <ESC> Segmentwechsel Segmente wechseln	ABSTREIFER 1 <ESC> Segmentwechsel Segmente eingesetzt? <ENTER>
---	---

In the next step, the segments are clamped after pressing the <ENTER>✓ key. The values for the preload and position from the commissioning are adopted. Manual adjustment of the preload of the new segments is not required.

ABSTREIFER 1 <ESC> Segmentwechsel Segmente spannen <ENTER>	ABSTREIFER 1 <ESC> 134 mm 1.036 A Segmente werden gespannt!
---	--

Monitoring function

If the position from commissioning differs from the new current position, an error message is displayed and the user is asked whether the segment change should be repeated.
(An error message may occur if, for example, a different segment type is used or something is between the segments and the ejector drum).

ABSTREIFER 1 <ESC> 79 mm 0.637 A Positionsabweichung Bitte pruefen!	ABSTREIFER 1 79 mm 0.637 A wiederholen? Ja<ENTER> Nein<ESC>
--	--

If Yes (<ENTER>  key) is pressed, the scraper is disengaged and the segment change operation can be repeated.

If No is selected (<ESC>  key), the segment change is cancelled and the message that a new start-up must be carried out is displayed.

ABSTREIFER 1 <ESC> Neue Inbetriebnahme durchfuehren! <ENTER>

The scraper disengages and leaves the segment change menu. Commissioning must be carried out.

If no error message is displayed and the segments are tensioned, the next step is to start a test run with the <ENTER>  button. The scraper first disengages and then engages again.

ABSTREIFER 1 <ESC> 120 mm 1.234 A Testfahrt starten! <ENTER>	ABSTREIFER 1 <ESC> Segmentwechsel Abstreifer klappt ab 170 mm I-GO 0.655 A	ABSTREIFER 1 <ESC> Segmentwechsel Abstreifer klappt an 170 mm I-GO 0.785 A
---	---	---

Afterwards, the segment change must be terminated by pressing the <ENTER>  key. The scraper disengage.

ABSTREIFER 1 <ESC> Segmentwechsel abgeschlossen! <ENTER>	ABSTREIFER 1 <ESC> Abstreifer klappt ab!
---	--

The segment change can be cancelled at any time by pressing the <ESC>  key and then the <ENTER>  key.

ABSTREIFER 1 <ESC> Segmentwechsel wirklich abbrechen? <ENTER>
--

NOTE

If you cancel, no new values are saved or accepted.

6.2.7.4 Menu item "Commissioning "

After the scraper has been configured in the system menu, the selected scraper can be put into operation after entering the RFID key. When commissioning the scraper, a distinction is made between the functions "Engaging with motorization sets 94-83E-090-018, 94-83ED-090-018" and "automatic adjustment" with motorization sets 94-83E-210-025, 94-83ED-210-025.



Beware!

Commissioning is only permitted with a stationary conveyor belt and can only be selected in the "Manual" operating mode.

Before a scraper is put into operation, the loaded conveyor belt must be emptied!

6.2.7.4.1 Commissioning scraper with "engage/disengage" mode of operation

After entering the RFID key, the selected scraper can be put into operation.

The first thing the display will tell you to do is to unlock the latch bolt(s) on the motorization kits. (See assembly instructions for the wiper systems).

```
ABSTREIFER 2    <ESC>
Inbetriebnahme
Rastbolzen entrieg. !
Antrieb pruef<ENTER>
```

After the indexing pin(s) have been unlocked and the <ENTER>  key has been pressed, the linear actuator(s) is/are tested for function.

```
ABSTREIFER 2    <ESC>
Inbetriebnahme
Abstreifer
klappt ab!
```

```
ABSTREIFER 2    <ESC>
Inbetriebnahme
Fahrrichtung anklap.
0 mm l - LL 0,002 A
```

```
ABSTREIFER 2    <ESC>
Inbetriebnahme
Abstreifer
klappt ab!
```

The actuator first moves to its disengaging position, then towards the cleaning position and then back to the disengaging position. If the drive does not move or moves in the wrong direction, check the electrical connection and the settings in the system menu of the respective scraper.

In the next step, the scraper segments are inserted into the segment core, and the segment core is brought into position by twisting so that the indexing pin can be engaged in detent 1 of the clamping device.

```
ABSTREIFER 2    <ESC>
Rastbolzen in Raste1
einrasten, Segmente
einsetzen!    <ENTER>
```

After pressing the <ENTER>  key, you will be asked whether the segments are inserted.

If this is confirmed, the scraper moves in the direction of the cleaning position until the end position of the drive is reached.

```
ABSTREIFER 2    <ESC>
Inbetriebnahme
Segmente eingesetzt?
<ENTER>
```

```
ABSTREIFER 2    <ESC>
Inbetriebnahme
Abstreifer
klappt an!
```

Now the scraper segments are manually pretensioned by turning the segment core with the wrench SW 36. Fine adjustment of the preload by adjusting the fine adjustment screws is possible.

```
ABSTREIFER 2    <ESC>
Vorspannung mit
Rastvorrichtung
einstellen
```

```
ABSTREIFER 2    <ESC>
Inbetriebnahme
Segmente
gespannt?    <ENTER>
```

After pretensioning the scraper segments, a test run is performed after pressing the <ENTER>  key. In doing the scraper first disengages and then engages again.

```
ABSTREIFER 2    <ESC>
Inbetriebnahme
Abstreifer klappt ab
0 mm l - LL 0,002 A
```

```
ABSTREIFER 2    <ESC>
Inbetriebnahme
Abstreifer klappt an
0 mm l - LL 0,002 A
```

```
ABSTREIFER 2    <ESC>
Inbetriebnahme
Testfahrt
starten!        <ENTER>
```

Commissioning is completed by pressing the <ENTER>  button. The scraper disengages.

ABSTREIFER 2 <ESC> Inbetriebnahme abgeschlossen! <ENTER>	ABSTREIFER 2 <ESC> Abstreifer klappt ab!
--	---

Commissioning can be aborted at any time by pressing the <ESC>  key and then pressing the <ENTER>  key.

```
ABSTREIFER 2    <ESC>
Inbetriebnahme
wirklich abbrechen?
                <ENTER>
```

6.2.7.4.2 Commissioning of scraper with "automatic readjustment" function

After entering the RFID key, the selected scraper can be put into operation.

The first thing the display will tell you to do is to unlock the latch bolt(s) on the motorization kits. (See assembly instructions for the scraper systems).

```
ABSTREIFER 1    <ESC>
Inbetriebnahme
Rastbolzen entrieg. !
Antrieb pruef<ENTER>
```

After the indexing pin(s) have been unlocked and the <ENTER>  key has been pressed, the linear actuator(s) is/are tested for function.

ABSTREIFER 1 <ESC> Inbetriebnahme Abklappposition anfahren	ABSTREIFER 1 <ESC> Inbetriebnahme Fahrrichtung anklap. 200 mm I - LL 0,209 A	ABSTREIFER 1 <ESC> Inbetriebnahme Abklappposition anfahren
--	--	--

The actuator first moves to its disengaging position, then towards the cleaning position and then back to the disengaged position. If the drive does not move or moves in the wrong direction, check the electrical connection and the settings in the system menu of the respective scraper.

```
ABSTREIFER 1    <ESC>
Rastbolzen in Raste1
einrasten, Segmente
einsetzen!      <ENTER>
```

In the next step, the scraper segments are inserted into the blade base, and the blade base is brought into position by twisting so that the indexing pin can be engaged in detent 1 of the clamping device.

```
ABSTREIFER 1    <ESC>
Inbetriebnahme
Segmente eingesetzt?
                <ENTER>
```

After pressing the <ENTER>✓ key, the scraper is moved in the direction of the conveyor belt until the drive reaches the "position mm".

Now the scraper segments are applied to the drum manually by turning the blade base loosely with the wrench SW 36, without pretension.

Fine adjustment of the preload by adjusting the fine adjustment screws is possible.

ABSTREIFER 1 <ESC> Inbetriebnahme Abstreifer klappt an!	ABSTREIFER 1 <ESC> Segmente mit Rastvorrichtung lose an Trommel anlegen	ABSTREIFER 1 <ESC> Inbetriebnahme Segmente in Position? <ENTER>
--	--	--

After the scraper segments have been brought into position on the drum and this has been confirmed with the <ENTER>✓ button, the pretension can be set manually using the ▲▼ buttons.

With the ▼ key, the position value is reduced in jog mode and the preload is increased.

The ▲ key increases the position value and decreases the preload.



CAUTION

Caution:

Reduce the position value only until the cleaning result is optimal again!

Increase the position value only so far that the segments are still in contact with the belt!

ABSTREIFER 1 <ESC> Vorspannung <AUF/AB> 125 mm 0.003 A Weiter <ENTER>
--

If the preload is confirmed with the <ENTER>✓ key (Yes), a measurement run is performed; if <ESC>Ⓟ (No) is pressed, the preload can be set again.

ABSTREIFER 1 Vorspannung OK, Messfahrt starten? Ja <ENTER> Nein <ESC>	ABSTREIFER 1 Messfahrt 122 mm 1.187 A
--	---

If the measurement run is finished, it is queried once again whether the preload is OK.

ABSTREIFER 1 Vorspannung OK, Messfahrt beenden? Ja <ENTER> Nein <ESC>
--

After the measurement run has been terminated with the <ENTER>✓ key, a test run is performed.

In this case, the scraper first disengages and then engages again. With <ESC>Ⓟ (No) the preload can be adjusted again.

ABSTREIFER 1 <ESC> Inbetriebnahme Testfahrt starten! <ENTER>	ABSTREIFER 1 <ESC> Inbetriebnahme Abstreifer klappt ab 170 mm I-GO 0.655 A	ABSTREIFER 1 <ESC> Inbetriebnahme Abstreifer klappt an 170 mm I-GO 0.785 A
---	---	---

Commissioning is completed by pressing the <ENTER>✓ key. The scraper disengages.

ABSTREIFER 1 <ESC> Inbetriebnahme abgeschlossen! <ENTER>	ABSTREIFER 1 <ESC> Abstreifer klappt ab!
---	--

Commissioning can be cancelled at any time by pressing the < ESC> key and then the < ENTER> key.

```
ABSTREIFER 1    <ESC>
Inbetriebnahme
wirklich abbrechen?
                  <ENTER>
```

6.2.7.5 Menu item Settings

In the "**Manual**" operating mode, the variables for the configuration, settings of the selected scraper can be changed or adjusted under Settings after entering the RFID key and pressing the  button. The same stripper variables are available as in the system menu.

See 8.1.3.1 "Scraper variables" menu item



**Any adjustments are only allowed when the conveyor is out of operation.
Adjustments during operation are not allowed.
The menu must be exited before the conveyor starts operating again.**

DRAFT

6.2.8 Belt monitoring menu

If the belt monitoring components (see section 5.5 ff.) are installed and the variable BDD activation V(549) is set to "1" in the system menu, the belt monitoring menu appears after pressing the button on the control panel several times ⁽¹⁻⁴⁾. In the "Manual" operating mode, it is possible to switch between the various submenu items Calibration, Damage level, Belt damage, Data and Variables in the Belt monitoring menu using the   buttons.

```
Start mit <ENTER>
Kalibrierung      →
Gurtueberwachung
```

Fig.: Belt monitoring menu / Calibration submenu item

After confirming with the , you can access the selected submenu items Damage level, Belt damage and Data. To access the Calibration and Variables submenu items, you will be prompted to enter the RFID key in the display after pressing the  button.

```
Eingabe
RFID Schluesel 2
Beenden          <ESC>
```

Fig.: Request for RFID input

An RFID key with the corresponding authorization must be applied to the symbol  on the control unit to gain access to the Calibration and Variables submenu items.

In the "Automatic" operating mode, the   buttons in the Belt monitoring menu can only be used to switch between the submenu items Damage level, Belt damage and Data. The submenu items Calibration and Variables are not displayed.

6.2.8.1 Submenu item "Calibration"

To put the belt monitoring system into operation, a calibration must always be carried out first.

During calibration, the zero level of the BDD measuring system is set and the values for belt monitoring are determined in a reference run.

During zeroing, the belt must be stationary and the scraper with the BDD measuring system must be disengaged.



CAUTION

Beware!

The start of the calibration is only permitted with a stationary conveyor belt and can only be selected in the "Manual" operating mode.

Before the calibration is carried out, the loaded conveyor belt must be run empty!

The measuring system is zeroed by pressing the  key.

Kalibrierung <ESC>	Kalibrierung <ESC>	Kalibrierung <ESC>
Nullniveau setzen	Nullniveau jetzt	...wird gesetzt...
<ENTER>	setzen?	<ENTER>

Fig.: Zeroing of the GSD measuring system

Subsequently, the secondary scraper with the BDD measuring system is engaged to the previously defined pre-tension and the conveyor belt system is started. The belt run is confirmed by pressing the  button.

```
Kalibrierung <ESC>
Nullniveau gesetzt
Gurt läuft?
<ENTER>
```

Fig.: Confirmation of the belt run

Then press the <ENTER>  key to initiate homing.

Kalibrierung <ESC> Nullniveau gesetzt Referenzfahrt starten? <ENTER>	Kalibrierung <ESC> ... Referenzfahrt laeuft...	Kalibrierung <ESC> Referenzfahrt beendet <ENTER>
---	--	---

Fig.: Carry out reference run

During the reference run, measured values are recorded, from which the BDD Measuring Module calculates a maximum value (reference height V(1010)) and further values for the belt run.

The measurement starts only after the delay time "T_Start Refer.drive" V(1004) has elapsed and after the position initiator of the measuring roller is actuated for the first time.

The reference run is automatically terminated when the position initiator is switched X times (see point 7.1.4.1.3 ff.). The calibration is now complete.

6.2.8.2 Submenu item "Damage level"

After the reference height has been determined, the damage levels are determined. The damage levels 1, 2 and 3 are either calculated by multiplying the reference height V(1010) with adjustable damage factors 1 V(1014), 2 V(1015) and 3 V(1015) on the BDD Measuring Module or a fixed value for each damage level is entered directly via the control unit in the menu item "Variables".

Under the menu item "Damage level" the values for the damage levels 1 V(1011), 2 V(1012) and 3 V(1013) are displayed.

Start mit <ENTER> Schadenslevel → Gurtueberwachung	Schadenslevel <ESC> Level 1: 1097 Level 2: 1497 Level 3: 1996
--	--

Fig.: Damage levels 1, 2 and 3

6.2.8.3 Submenu item "conveyor belt damage"

During operation of the conveyor belt system, the BDD measuring module records measured values and checks whether or not the measured values exceed the defined damage levels 1, 2 or 3. If a damage level is exceeded, this is shown in the display of the operating unit and the damage value is stored in a table with the corresponding belt position. There is a separate table for each damage level. If higher damage values occur at the same belt position and in the same damage level, the damage value entered is overwritten with the higher value. If a higher damage value occurs at the same belt position in a higher level, it is also stored in the table of the higher damage level.

You can switch between the 3 damage levels, tables with the   buttons.

Pressing <ENTER>  switches to the corresponding table.

Start mit <ENTER> Gurtschaeden → Gurtueberwachung	Gurtschaeden <ESC> Level 1 →	Gurtschaeden <ESC> Level 2 →
---	---------------------------------	---------------------------------

Fig.: Conveyor belt damage menu, level 1, level 2, ...

10 overruns can be entered per table. The last overrun is always entered in line 1), the older overruns move down one line. After 10 entries, the oldest entries are deleted.

The   keys can be used to switch between lines 1) - 10) in the table.

Gurtschaeden Level 2 1) 11.08m 1666 2) 8.44m 1666 3)	Gurtschaeden Level 2 8) 9) 10)
---	---

Fig.: Level 2, table with position information and damage value

If the <ENTER> key is pressed for longer than 4s in the table view, all values from all tables can be deleted. The deletion must be confirmed by pressing the <ENTER> key.

Gurtschaeden	
Liste loeschen	
Bestaetigen	<ENTER>
Abruch	<ESC>

Fig.: Deleting the tables

After deleting the tables, the damage values and belt positions are recorded again during the next belt run.

DRAFT

6.2.8.4 Submenu item "Data"

Various values for the belt monitoring are displayed in the "Data" submenu item.

```
Start mit <ENTER>
Daten                                     →
Gurtueberwachung
```

Fig.: Belt monitoring, "Data" submenu item

6.2.8.4.1 Submenu item „Reference speed"

The variable "Reference speed" V(1001) displays the average speed determined during the last reference run.

```
Daten                                     <ESC>
Referenzgeschw.
      2.6 m/s V(1001)
UP/DOWN
```

Fig.: Reference speed

6.2.8.4.2 Submenu item "circulation time"

The variable "round trip time" V(1003) shows the measured time of the round trip of the last reference run.

```
Daten                                     <ESC>
Umlaufzeit
      7.998 s V(1003)
UP/DOWN
```

Fig.: Orbital period

6.2.8.4.3 Submenu item "Belt length"

The variable "Belt length" V(1008) is the calculated belt length from the last reference run.

```
Daten                                     <ESC>
Gurtlaenge
      21 m V(1008)
UP/DOWN
```

Fig.: Belt length

6.2.8.4.4 Submenu item „Reference run max."

The variable "Reference run Max. " V(1006) is the highest measured value during the last reference run.

```
Daten                                     <ESC>
Referenzfahrt Max.
      907 V(1006)
UP/DOWN
```

Fig.: Reference run Max.

6.2.8.4.5 Submenu item „Reference height"

The variable "reference height" V(1010) is the calculated value for the minimum adjustable damage height for belt monitoring.

```
Daten                                     <ESC>
Referenzhoehe
      997 V(1010)
UP/DOWN
```

Fig.: Reference height

6.2.8.5 Submenu item "Variables"

The variables for the configuration and settings of the belt monitoring are located under the submenu item "Variables" or also in the system menu.

An RFID key with the appropriate authorization must be applied to the symbol  on the control unit to gain access.

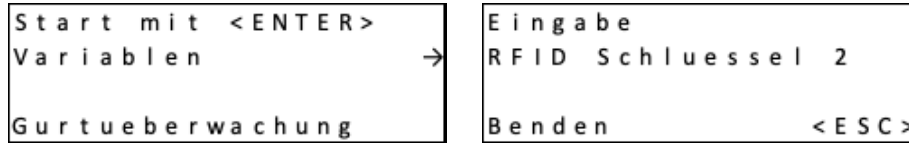


Fig.: Submenu item Variables

The individual variables for configuring and setting are described in chapter 7.1.4.

7 System menu / Control settings

In the system menu, the connection components can be configured and functions of the control system can be set.

The configurations and settings normally only have to be made once, before or during assembly or when installing the controller.

The system menu also records and displays the running performance of the conveyor belt and the scrapers.


DANGER

Any settings in the system menu are only allowed when the conveyor is out of operation.
Adjustments during operation are not allowed.
The system menu must be exited before the conveyor starts operating again.

The system menu can only be accessed in the Manual operating mode.
By pressing the ⏻ button and then confirming with the ✓ button, the display prompts you to enter the RFID key.

E i n g a b e R F I D

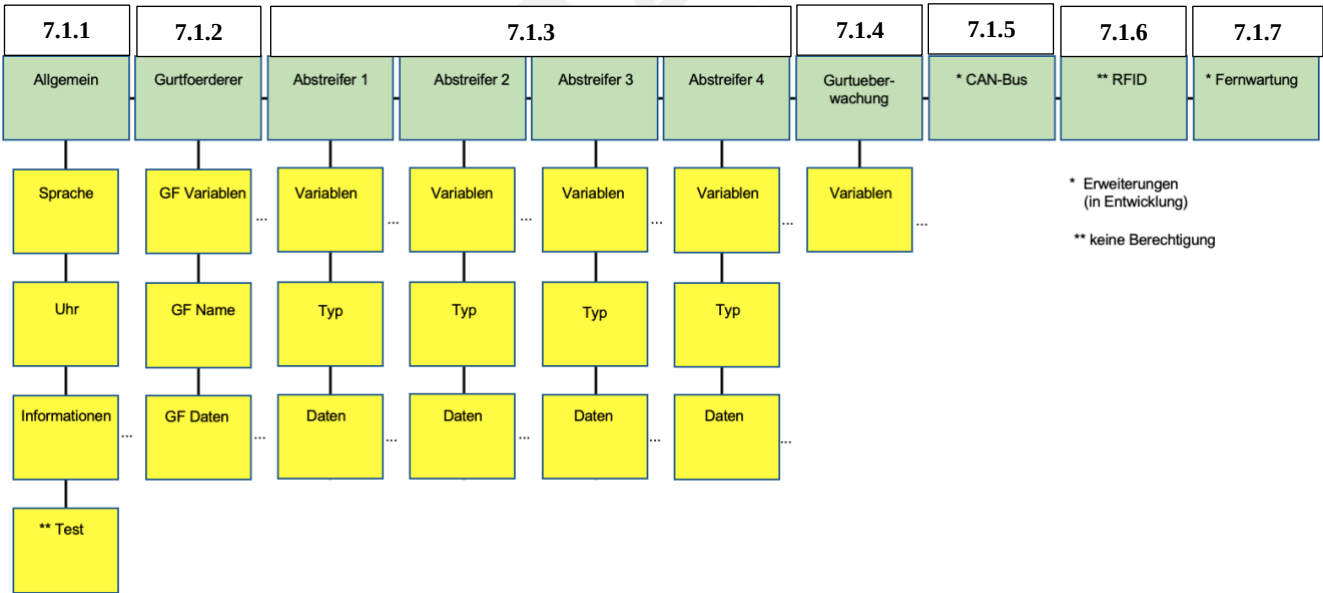
B e n d e n

< E S C >

Fig.: Request for RFID input

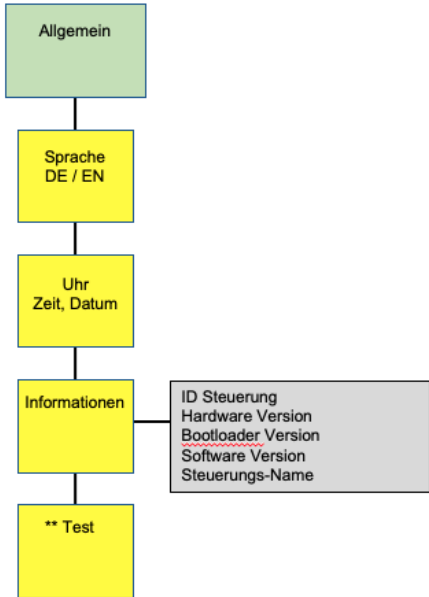
The Super User key gives access to the system menu.
With the service user key, access to the system menu is restricted.
Some menu items are not displayed or can only be read.

7.1 Overview main menu



7.1.1 Menu "General "

After selecting and confirming the General menu, the ▲▼ keys can be used to select between Language, Clock, Information and Test.



7.1.1.1 Menu item "Language / Language

In this menu item the language can be selected.
The control supports the languages German (DE) and English (EN) in the display.

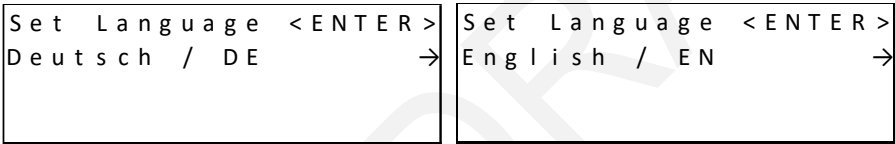


Fig. : Language selection

7.1.1.2 Menu item "Clock "

In this menu item the date and time can be set.

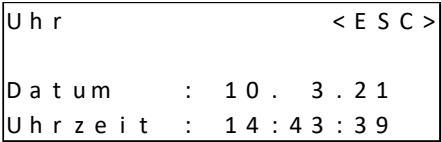


Fig. : Setting date, time

7.1.1.3 Menu item "Information“

This menu item displays the control ID, the control name, the software version and the hardware version of the control unit. The control name can only be assigned to the control from the Starcleancloud.

Information <ESC>	Information <ESC>
ID Steuerung :	Steuerungs - Name
30 - AE - A4 - 9B - 22 - DC	94 - C04
UP / DOWN	UP / DOWN

Fig. : Control ID and control name

Information <ESC>	Information <ESC>	Information <ESC>
Software Version	Bootloade Version	Hardware Version
1.01. 50	1.00	V1.0
UP / DOWN	UP / DOWN	UP / DOWN

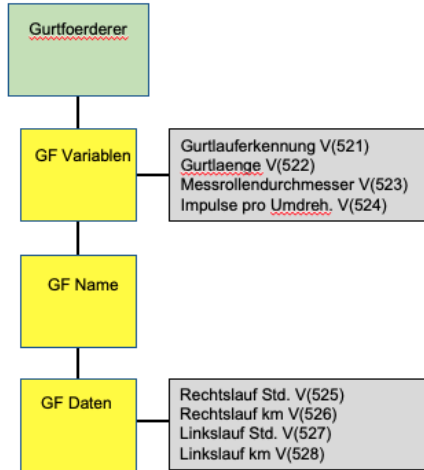
Fig. : Software version, bootloader version and hardware version

7.1.1.4 " Menu item "Test "

The Test menu is locked and cannot be accessed.

7.1.2 Belt conveyor" menu "

After selecting and confirming the Belt Conveyor (BC) menu, the ▲▼ keys can be used to select between the BC Variables, BC Name and BC Data submenus.



7.1.2.1 Belt conveyor variables

The BC Variables menu item contains the variables for configuring and setting the belt run detection. If the Super User key is used when calling up the system menu, all BC variables can be set. If the Service User key is used, the BC variables can only be read.

7.1.2.1.1 Submenu "Belt run detection"

The GF variable "Belt run detection" V(521) is used to set the method for detecting the belt run.

```

GF Variablen    <ESC>
Gurtlauferkennung
      3          V ( 5 2 1 )
UP / DOWN / ENTER
  
```

Fig.: Belt tracking detection setting

- 1 = Measuring roller with one sensor A / X18
- 2 = A / B encoder (option) / X18
- 3 = Measuring roller with two sensors A & B / X18 = Standard
- 4 = Signals 1-4 from conveyor belt system / X9
- 5 = Signals 1-4 from conveyor system / X9 + measuring roller with one sensor A / X18
- 6 = Signals 1-4 from conveyor system / X9 + A / B Encoder (option) / X18
- 7 = Signals 1-4 from conveyor system / X9 + Measuring roller with two sensors A & B / X18

Notes:

Depending on the supplied version, the following data is determined, provided the corresponding sensors are installed and connected.

With setting 1 the belt run, the speed but no belt run direction are determined.
 With setting 4 the belt run, the belt run direction but no speed are determined.
 For all other settings, the belt run, the belt run direction and the speed are determined.

7.1.2.1.2 Submenu "Belt length"

With the variable "Belt length" V(522) the length of the conveyor belt in m is set.

```
G F  V a r i a b l e n      < E S C >
G u r t l a e n g e
      1 0 0                V ( 5 2 2 )
U P / D O W N / E N T E R
```

Fig.: Belt length adjustment

5m - 65000m

7.1.2.1.3 Submenu „Measuring roller diameter“

The variable "Measuring roller diameter" V(523) is used to set the diameter of the measuring roller in mm. The standard setting is 89 mm. If the roller is worn, the diameter can be corrected.

```
G F  V a r i a b l e n      < E S C >
M e s s r o l l e n d u r c h m .
      8 9                V ( 5 2 3 )
U P / D O W N / E N T E R
```

Fig.: Setting the measuring roller diameter

50mm - 2500mm

94-MD-MR-... = 89 mm

7.1.2.1.4 Submenu „Impulses per revolution“

The variable "Impulses per revolution" V(524) is used to set the number of impulses /Turning of the measuring roller.

```
G F  V a r i a b l e n      < E S C >
I m p u l s e   p r o   U m d r e h .
      1                V ( 5 2 4 )
U P / D O W N / E N T E R
```

Fig.: Imp./Turning setting

1 - 2000

94-MD-MR-... = 1

7.1.2.1.5 Submenu "Belt conveyor name "

Under the menu item "BC Name" the name of the conveyor system is displayed. The designation can be assigned to the controller from the Starcleancloud.

```
                                < E S C >
G u r t f o e r d e r e r   N a m e :
F o e r d e r b a n d   1 0 0 0
U P / D O W N
```

Fig.: Name of the conveyor belt system

7.1.2.1.6 Submenu "Belt conveyor data "

Various values and counters for the conveyor belt are displayed under the menu item "BC Data".

7.1.2.1.7 Submenu "Clockwise hours"

The variable "Clockwise running hours" V(525) shows the operating time of the conveyor belt in h for clockwise running since commissioning. The counter cannot be reset.

G F	D a t e n	< E S C >
	R e c h t s l a u f	S t d .
	5 0	V (5 2 5)
	U P / D O W N	

Fig.: Operating time of the conveyor belt when running clockwise

7.1.2.1.8 Submenu "Clockwise Kilometer"

The variable "Clockwise kilometers" V(526) shows the distance performance of the conveyor belt in clockwise rotation since commissioning. The counter cannot be reset.

G F	D a t e n	< E S C >
	R e c h t s l a u f	k m
	5 4 0	V (5 2 6)
	U P / D O W N	

Fig.: Distance of the conveyor belt when running clockwise

7.1.2.1.9 Submenu "Counterclockwise hours"

The variable "counterclockwise running hours" V(527) shows the operating time of the conveyor belt in h for counterclockwise running since commissioning. The counter cannot be reset.

G F	D a t e n	< E S C >
	L i n k s l a u f	S t d .
	1 0 2	V (5 2 7)
	U P / D O W N	

Fig.: Operating time of the conveyor belt with counterclockwise rotation

7.1.2.1.10 Submenu "Counterclockwise Kilometer"

The variable "Counterclockwise kilometers" V(528) shows the mileage of the conveyor belt in counterclockwise rotation since commissioning. The counter cannot be reset.

G F	D a t e n	< E S C >
	L i n k s l a u f	k m
	1 0 8 0	V (5 2 8)
	U P / D O W N	

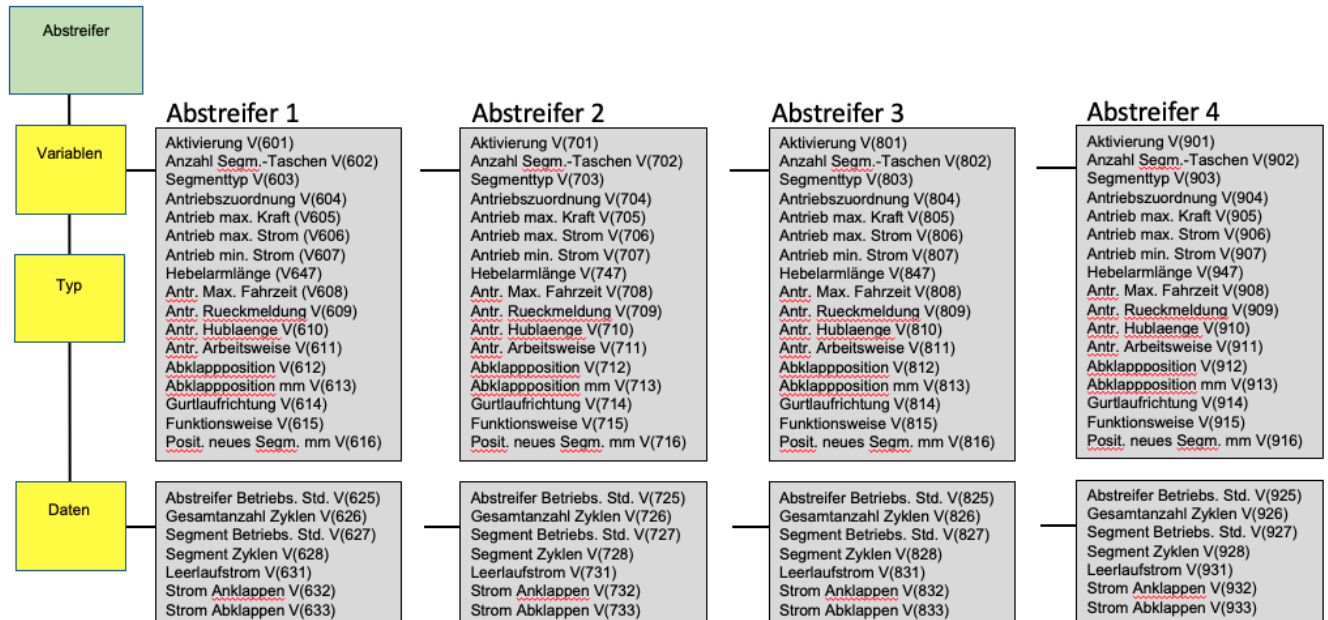
Fig.: Mileage of the conveyor belt when running counterclockwise

7.1.3 Menu "Scraper 1, 2, 3 or 4 "

The controller can control up to four scrapers.

There is a separate menu for each scraper. The menus of the Scraper are all identically structured.

After selecting and confirming the scraper 1, 2, 3 or 4 menu, the ▲▼ keys can be used to select between the submenus Scraper variables, Type and Data of the respective scraper.



7.1.3.1 Menu item "Scraper variables "

Under the menu item "Scraper Variables" the variables for the configuration and settings of the scraper are in the submenu.

If the Super User key is used when calling up the system menu, all variables can be set.

If the service user key is used, some settings are hidden and not available.

NOTE

For the variables mentioned below, the following applies:

Scraper 1 of the number range V(6..)

Scraper 2 of the number range V(7..)

Scraper 3 the number range V(8..)

Scraper 4 of the number range V(9..)

7.1.3.1.1 Submenu item „Activation"

With the variable "Activation" V(601,701,801,901) the scraper is activated.

```

ABSTREIFER 1 <ESC>
Aktivierung
    1          V ( 6 0 1 )
UP / DOWN / ENTER
    
```

Fig.: Scraper activation

0 = Scraper not activated
1 = Scraper activated

NOTE

Activated scrapers are available in the "Manual" or "Automatic" operating modes and can be selected via the menu. If a scraper is not activated, it is not available in the "Manual" and "Automatic" operating modes and is not shown in the display!

7.1.3.1.2 Submenu item "Number of base blade pockets"

The variable "Number of base blade pockets" V(602,702,802,902) is used to set the number of occupied base blade pockets.

```
ABSTREIFER 1      <ESC>
Anzahl Segm. - Taschen
      7           V ( 6 0 2 )
UP / DOWN / ENTER
```

Fig.: Number of base blade pockets

1 - 50

7.1.3.1.3 Submenu item „Segment type“

The variable "Segment type" V(603,703,803,903) is used to set the type of scraper segment.

```
ABSTREIFER 1      <ESC>
Segmenttyp
      3           V ( 6 0 3 )
UP / DOWN / ENTER
```

Fig.: Segment type

0 - 150

0 = The setting "0" is only for test purposes, not permissible in normal operation.

1 = Type HM - Standard

2 = Type 18 / 218 / 318

3 = Type 81 / 82

4 = Type 281 / 282 / 283

5 to 9 = free

10 = Type 481

11 = Type 481HD

12 = Type 581

13 = Type 681

14 = Type 781

15 to 50 = free

51 = type 50

52 = type 53

53 = Type 54

54 = type 55

55 = type 56

56 = type 256

57 = type 66

58 = type 266

59 = type 85

60 = type 86

57 = Type 286

57 = Type 08

57 = Type 09

57 = Type 385

58 to 150 = free

NOTE

The settings 0 and 5- 9 and 15 - 50 and 58 - 150 are not allowed.

7.1.3.1.4 Submenu item „Drive assignment“

With the variable "Drive assignment" V(604,704,804,904) the drive (in parallel operation the drives) is assigned to **the scraper**.

```
ABSTREIFER 1      <ESC>
Antriebszuordnung
      1            V(604)
UP/DOWN/ENTER
```

Fig.: Drive assignment

Scraper 1 V(604)

0 = no linear drive
1 = Linear drive 1 / X14
5 = Linear drive 1 / X14 and linear drive 2 / X15

Scraper 2 V(704)

0 = no linear drive
2 = Linear drive 2 / X15
6 = Linear drive 3 / X16 and linear drive 4 / X17

Scraper 3 V(804)

0 = no linear drive
3 = Linear drive 3 / X16
6 = Linear drive 3 / X16 and linear drive 4 / X17

Scraper 4 V(904)

0 = no linear drive
4 = Linear drive 4 / X17
5 = Linear drive 1 / X14 and linear drive 2 / X15

NOTE

If a scraper is activated, a 94-83E / 94-83E-210 drive or, in the case of parallel operation, two 94-83ED / 94-83ED-210 drives must also be assigned to the scraper.

The setting 0 is only allowed if the scraper is not activated.

Settings 5, 6 are intended for parallel operation when using 94-83ED / 94-83ED-210 with two linear actuators.

7.1.3.1.5 Submenu item "Drive maximum force"

With the variable "Drive maximum force" V(605,705,805,905) the maximum nominal force of the linear drive in N is set.

```
ABSTREIFER 1      <ESC>
Antrieb max. Kraft
      2500          V(605)
UP/DOWN/ENTER
```

Fig.: Drive maximum force

Linear actuator 95-LA1800-90 = 1800 N
Linear actuator 95-LA2500-210-F3-025 = 2500 N

7.1.3.1.6 Submenu "Drive maximum current"

The variable "Actuator maximum current" V(606,706,806,906) is used to set the maximum current in mA of the linear drive.

```
ABSTREIFER 1      <ESC>
Antrieb max. Strom
      2500          V(606)
UP/DOWN/ENTER
```

Fig.: Drive maximum current

Linear actuator 95-LA1800-90 = 2100 mA
Linear actuator 95-LA2500-210-F3-025 = 2300 mA

7.1.3.1.7 Submenu "Drive minimum current"

The variable "Actuator minimum current" V(607,707,807,907) is used to set the minimum current in mA of the linear actuator.

```
ABSTREIFER 1    <ESC>
Antrieb min. Strom
    250          V(607)
UP/DOWN/ENTER
```

Fig.: Drive minimum current

Linear actuator 95-LA1800-90	= 250 mA
Linear actuator 95-LA2500-210-F3-025	= 350 mA

7.1.3.1.8 Submenu item „Lever arm length"

With the variable "lever arm length" V(647,747,847,947) the lever arm length of the clamping device is set in mm.

```
ABSTREIFER 1    <ESC>
Hebelarmlänge
    180          V(647)
UP/DOWN/ENTER
```

Fig.: Lever arm length

Motorization sets 94-83E, 94-83ED	= 180 mm
Motorization sets 94-83E-210-025, 94-83ED-210-025	= 180 mm

7.1.3.1.9 Submenu "Drive maximum run time"

The variable "Drive maximum run time" V(608,708,808,908) is used to set the maximum travel time in s of the linear drive.

```
ABSTREIFER 1    <ESC>
Antr. max. Fahrzeit
    65          V(608)
UP/DOWN/ENTER
```

Fig.: Drive maximum run time

Linear actuator 95-LA1800-90	= 23 s
Linear actuator 95-LA2500-210-F3-025	= 70 s

IMPORTANT

The maximum run time of the linear drive protects the drive against overload.

The maximum run time must be set so that the scraper reaches the preset preload!

7.1.3.1.10 Submenu " Drive feedback"

The variable "Drive feedback" V(609,709,809,909) is used to set the position feedback provided by the linear drive.

```
ABSTREIFER 1    <ESC>
Antr. Rueckmeldung
      8          V(609)
UP/DOWN/ENTER
```

Fig.: Actuator feedback

1 = no feedback
 2 = Limit switch
 3 = 10k potentiometer
 4 = 0-10V
 5 = 4-20mA
 6 = Limit switch and 10k potentiometer
 7 = Limit switch and 0-10V
 8 = Limit switch and 4-20mA

Linear actuator 95-LA1800-90 = 2
 Linear actuator 95-LA2500-210-F3-025 = 8

7.1.3.1.11 Submenu "Drive stroke length"

The variable "Drive stroke length" V(610,710,810,910) is used to set the maximum stroke length in mm of the linear drive.

```
ABSTREIFER 1    <ESC>
Antr. Hublaenge
    210          V(610)
UP/DOWN/ENTER
```

Fig.: Drive Stroke length

min. = 60 mm
 max. = 400 mm

Linear actuator 95-LA1800-90 = 90 mm
 Linear actuator 95-LA2500-210-F3-025 = 210 mm

7.1.3.1.12 Drive mode" submenu

With the variable "Drive mode of operation" V(611,711,811,911) the mode of operation pull or push of the linear drive is set.

```
ABSTREIFER 1    <ESC>
Antr. Arbeitsweise
      1          V(611)
UP/DOWN/ENTER
```

Fig.: Drive Mode of operation

1 = Train / Standard
 2 = pressure

IMPORTANT

The drive mode of operation depends on the installation of the motorization set. Ideally, the lever of the linear drive should retract when the segments are clamped and extend when they are released. (see also: Assembly instructions 95-MA-83E/83ED)
 In this standard case, the "Pull" mode of operation must be set.

7.1.3.1.13 Submenu "disengaging position"

The variable "Disengaging position" V(612,712,812,912) is used to set the position that the scraper moves to after changing from the "Automatic" to "Manual" operating mode.

```
ABSTREIFER 1 <ESC>
Abklapposition
3 V(612)
UP/DOWN/ENTER
```

Fig.: Scraper disengaging position

- 1 = End position drive
- 2 = Position mm
- 3 = relaxed
- 4 = tense

Linear actuator 95-LA1800-90 = 1

Linear actuator 95-LA2500-210-F3-025 = 1,2,3,4 / Standard = 3

IMPORTANT

The setting "1" is selected for the Disengage function.

With the setting "1", the linear actuator travels the maximum travel distance to the end position. If the pull mode is set, the lever of the linear drive extends completely. If the push mode is set, the spindle of the linear drive retracts completely.

Setting "3" is selected for the "automatic readjustment" mode of operation of primary scraper segments made of polyurethane. After changing the operating mode "Automatic" to "Manual", the linear drive moves a few mm from the tensioned position. The primary polyurethane scraper segments are still in contact with the belt.

7.1.3.1.14 Submenu "Disengage position mm"

With the "Scraper disengage position mm" variable V(613,713,813,913) is used to set the exact position in mm that the scraper moves to after changing from "Automatic" to "Manual" mode.

The variable disengage position mm V(613,713,813,913) is only used if the variable "disengage position" V(612,712,812,912) is set to 2 (position mm) of the previous submenu.

```
ABSTREIFER 1 <ESC>
Abklappos. mm
160 V(613)
UP/DOWN/ENTER
```

Fig.: Drive disengage position mm

- min. = 160 mm
- max. = 400 mm

Linear actuator 95-LA2500-210-F3-025 = 160 mm

7.1.3.1.15 Submenu "Belt running direction"

The variable "belt running direction" V(614,714,814,914) determines which of the scrapers moves to which position under which conditions.

```
ABSTREIFER 1      <ESC>
Gurtlaufrichtung
      1            V(614)
UP/DOWN/ENTER
```

Fig.: Belt running direction

1 = clockwise rotation
2 = counterclockwise rotation

NOTE

The direction of belt travel is determined by the direction of rotation of the measuring roller, which is mounted in the lower run.

The decisive factor is the view of the sensors (cables) from the outside.

If the roller rotates clockwise, the running direction of the belt in the lower run is evaluated as R (Right). (Belt running direction from right to left).

If the idler rotates counterclockwise, the running direction of the belt in the lower run is evaluated as L (left). (Belt running direction from left to right)

7.1.3.1.16 Submenu " Scraper mode of operation".

With the variable "Scraper function" V(615,715,815,915) the function of the scraper is set.

```
ABSTREIFER 1      <ESC>
Funktionsweise
      2            V(615)
UP/DOWN/ENTER
```

Fig.: Scraper Mode of operation

0 = Off
1 = On - fold down
2 = automatic readjustment
3 = On - fold down in interval operation
4 = automatic readjustment in interval operation

Linear actuator 95-LA1800-90 = 1, 3
Linear actuator 95-LA2500-210-F3-025 = 1,2,3,4

7.1.3.1.17 Submenu "Position new segment"

The variable "Position new segment" V(616,716,816,916) is used to set the position in mm that the scraper moves to during start-up in order to position new segments on the conveyor belt without pre-tensioning.

The variable "Position new segment" V(616,716,816,916) is only used if the variable "Scraper function" V(615,715,815,915) (item 10.1.3.1.17) is set to 2 or 4 "automatic readjustment".

```

ABSTREIFER 1      <ESC>
Posit. neues Seg. mm
    160            V(616)
UP / DOWN / ENTER
    
```

Fig.: Position of new segment

min. = 160 mm
max. = 400 mm

Default value = 160 mm

7.1.3.1.18 Submenu "Measurement run time h"

The variable "Measurement run time h" V(617,717,817,917) is used to set the interval time in h for the automatic reset of the preload of the segments.

The variable "Reset time h" V(617,717,817,917) is only used if the variable "Scraper function" V(615,715,815,915) (item 10.1.3.1.17) is set to 2 or 4 "Automatic reset".

```

ABSTREIFER 1      <ESC>
Nachstellzeit h
    2              V(617)
UP / DOWN / ENTER
    
```

Fig.: Measurement run time h

min. = 0 h
max. = 24 h

Default value = 2 h

Notes:

The sum of the set hours and minutes from the two variables reset time h and reset time min results in the total interval time for automatic resetting.

7.1.3.1.19 Submenu "Measurement run time min"

With the variable "Measurement run time min" V(618,718,818,918) the interval time in min for the automatic reset is set.

The variable "measurement run time min" V(618,718,818,918) is only used if the variable "Scraper function"

V(615,715,815,915) (item 10.1.3.1.17) is set to 2 or 4 "Automatic reset".

```

ABSTREIFER 1      <ESC>
Nachstellzeit min
    0              V(618)
UP / DOWN / ENTER
    
```

Fig.: measurement run time min

min. = 0 min
max. = 59 min

Notes:

The sum of the set hours and minutes from the two variables measurement run time h and measurement run time min results in the total interval time for automatic resetting.

7.1.3.1.20 Submenu „Minimum preload"

With the variable "minimum preload" V(643,743,843,943) the preload of the segments for automatic readjustment is limited to a minimum value in %.

The variable "minimum preload" V(643,743,843,943) is only used if the variable "scraper function" V(615,715,815,915) (item 10.1.3.1.17) is set to 2 or 4 "automatic adjustment".

```
ABSTREIFER 1 <ESC>
minim. Vorspannung %
      10      V(643)
UP/DOWN/ENTER
```

Fig.: minimum preload

min. = 10 %
max. = 100 %

IMPORTANT

The value for the minimum preload is set automatically by selecting the segment type, variable V(603,703,803,903), and **must not be changed.**

7.1.3.1.21 Submenu item „Interval time off h"

The variable "Interval time Off h" V(620,720,820,920) is used to set the pause time in h for interval operation.

The variable "Interval time On h" V(620,720,820,920) is only used if the variable Scraper function V(615,715,815,915) (item 10.1.3.1.17) is set to 3 or 4 "Interval operation".

```
ABSTREIFER <ESC>
Intervallzeit Aus h
              V(620)
UP/DOWN/ENTER
```

Fig.: Interval time Off h

min. = 0 h
max. = 24 h

Notes:

The sum of the set hours and minutes from the two variables "Interval time off h" and "Interval time off min" gives the total pause time during which the scraper is not in contact with the belt.

7.1.3.1.22 Submenu item "Interval time Off min"

The variable "Interval time Off min" V(621,721,821,921) is used to set the pause time in min for interval operation.

The variable "Interval time On h" V(621,721,821,921) is only used if the variable Scraper function V(615,715,815,915) (item 10.1.3.1.17) is set to 3 or 4 "Interval operation".

```
ABSTREIFER <ESC>
Interv. Zeit Aus min
              V(621)
UP/DOWN/ENTER
```

Fig.: Interval time Off min

min. = 0 min
max. = 59 min

Notes:

The sum of the set hours and minutes from the two variables "Interval time off h" and "Interval time off min" gives the total pause time during which the scraper is not in contact with the belt.

7.1.3.1.23 Submenu item "Interval time On h"

The variable "Interval time On h" V(622,722,822,922) is used to set the cleaning time in h for interval operation. The variable "Interval time On h" V(622,722,822,922) is only used if the variable "Scraper mode of operation" V(615,715,815,915) (item 10.1.3.1.17) is set to 3 or 4 "Interval mode".

ABSTREIFER	<ESC>
Intervallzeit	Ein h
	V (6 2 2)
UP / DOWN / ENTER	

Fig.: Interval time One h

min. = 0 h
max. = 24 h

Notes:

The sum of the set hours and minutes from the two variables "Interval time On h" and "Interval time On min" results in the total cleaning time in which the scraper rests against the belt and cleans the conveyor belt.

7.1.3.1.24 Submenu "Interval time On min"

The variable "Interval time On min" V(623,723,823,923) is used to set the cleaning time in min for interval operation. The variable "Interval time One min" V(623,723,823,923) is only used if the variable "Scraper function" V(615,715,815,915) (item 10.1.3.1.17) is set to 3 or 4 "Interval operation".

ABSTREIFER	<ESC>
Interv. Zeit	Ein min
	V (6 2 3)
UP / DOWN / ENTER	

Fig.: Interval time One min

min. = 0 min
max. = 59 min

Notes:

The sum of the set hours and minutes from the two variables Interval time On h and Interval time On min results in the total cleaning time in which the scraper is in contact with the belt and cleans the conveyor belt.

7.1.3.2 Menu item "Scraper 1,2,3 or 4 type "

Under the menu item Type the designation of the wiper is displayed.
The designation can only be assigned to the controller from the cloud.

```
<ESC>
ABSTREIFER 1 Typ
90-832.81n.09
UP/DOWN
```

Fig.: Scraper Designation

7.1.3.3 Menu item "Scraper 1,2,3 or 4 data "

The menu item "Scraper data" displays various values and counters for the selected scraper.

```
Start mit <ENTER>
ABSTREIFER 1
Daten →
```

Fig.: Scraper data

7.1.3.3.1 Submenu "Scraper operating hours "

The variable "Scraper operating hours" V(625,725,825,925) shows the operating time of the scraper in h since commissioning. The counter cannot be reset.

```
ABSTREIFER 1 <ESC>
Abstr. Betriebsstd.
98 V(625)
UP/DOWN
```

Fig.: Scraper Operating hours

7.1.3.3.2 Submenu "Total number of cycles "

The variable "Total number of cycles" V(626,726,826,926) shows the approach cycles of the scraper to the cleaning position since commissioning. The counter cannot be reset.

```
ABSTREIFER 1 <ESC>
Gesamtanzahl Zyklen
63 V(626)
UP/DOWN
```

Fig.: Scraper Total number of cycles

7.1.3.3.3 Submenu "Operating hours segments "

The variable "Segments operating hours" V(627,727,827,927) shows the operating time of the scraper in h since the segment was installed. The counter is reset when the segment is changed.

```
ABSTREIFER 1 <ESC>
Segment Betriebsstd.
98 V(627)
UP/DOWN
```

Fig.: Segments Operating hours

7.1.3.3.4 Submenu "Segments Cycles "

The variable "Segment cycles" V(628,727,728,729) shows the approach cycles of the scraper to the cleaning position since the segment installation. The counter is reset when the segment is changed.

```
ABSTREIFER 1      <ESC>
Segment Zyklen
    63              V(628)
UP / DOWN
```

Fig.: Segments Cycles

7.1.3.3.5 Submenu "Idle current "

The variable "Idle current" V(631,731,831,931) shows the no-load current I-idle in mA, which was determined when the Scraper was started up.

```
ABSTREIFER 1      <ESC>
Leerlaufstrom
    236             V(631)
UP / DOWN
```

Fig.: No-load current

7.1.3.3.6 Submenu "Power engaging "

The variable "Engage current" V(632,732,832,932) shows the basic current I-G0 in mA, which was determined during commissioning and during the segment change in the direction of engaging.

```
ABSTREIFER 1      <ESC>
Strom Anklappen
    285             V(632)
UP / DOWN
```

Fig.: Power Engaging

7.1.3.3.7 Submenu "Power Disengaging "

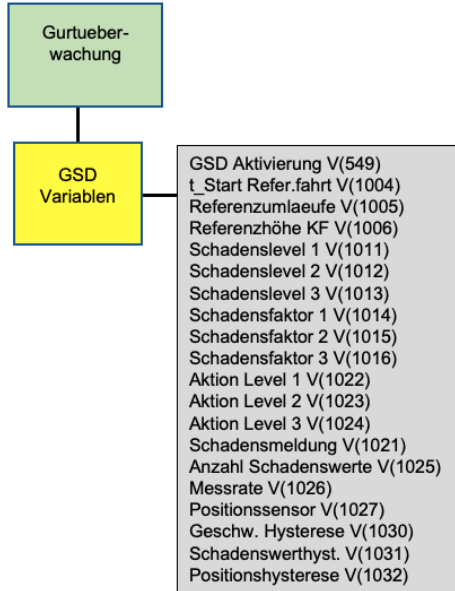
The variable "Disengaging current" V(633,733,833,933) shows the basic current I-G0 in mA, which was determined during commissioning and during the segment change in driving disengaging position.

```
ABSTREIFER 1      <ESC>
Strom Abklappen
    258             V(633)
UP / DOWN
```

Fig.: Disengaging Power

7.1.4 Menu „Belt monitoring“

After selecting and confirming the Belt monitoring menu, the variables for configuring and setting the belt monitoring can be called up using the   buttons.



7.1.4.1 BDD variables

The GSD Variables menu item contains all the variables for configuring and setting the belt monitoring.

NOTE

The variables can also be called up in "Manual Mode" under the menu item Belt Monitoring -Variables.

7.1.4.1.1 Submenu "BDD Activation"

The variable "BDD activation" V(549) informs the scraper control that a BDD measuring module 941-GSD-001 is present. The belt monitoring is available as a function.

```
GSD Variablen <ESC>
GSD Aktivierung
      1      V( 549 )
UP / DOWN / ENTER
```

Fig.: BDD activation

0 = Belt monitoring not activated
1 = Belt monitoring activated

NOTE

By activating the BDD measuring module, additional menus for belt monitoring are available in the "Manual" or "Automatic" operating modes.

7.1.4.1.2 Submenu "Delay time reference run"

The variable "Reference Delay time" V(1004) is used to define a delay time for starting the measurement during the reference run. The delay time is required to ensure that the measurement only starts after the scraper with the sensor modules is in the cleaning position.

```
GSD Variablen <ESC>
T_Start Refer.fahrt
      25      V(1004)
UP / DOWN / ENTER
```

Fig.: BDD variable Delaytime Reference run

0 - 60s
25s = Standard

NOTE

The time starts after the reference run is initiated at the control unit.

7.1.4.1.3 Submenu „Reference circulation"

The number of belt revolutions during the reference run is defined with the variable "Reference rounds" V(1005).

```
GSD Variablen <ESC>
Referenzumläufe
      1          V(1005)
UP/DOWN/ENTER
```

Fig.: BDD Reference Circulation

1 - 10
1 = Standard

7.1.4.1.4 Submenu „Reference height KF"

The variable "Reference height KF" V(1009) is required to calculate the "Reference height" V(1010). It is a correction factor (KF) to be able to compensate for the influence of environmental influences (dry/wet belt), Base blade lengths, span widths, etc.. The correction factor is multiplied by the maximum measured value "Reference run max. " V(1006) determined from the reference run.

```
GSD Variablen <ESC>
Referenzhoehe KF
  1.100          V(1009)
UP/DOWN/ENTER
```

Fig.: BDD variables reference height KF

0.000 - 10.000
1.100 = Standard

7.1.4.1.5 Submenu „Damage level 1, 2, 3"

The variables "Damage level 1" V(1011), "Damage level 2" V(1012), "Damage level 3" V(1013) define the limit values for the detection of belt damage. During the belt run, the BDD measuring module 941-GSD-001 continuously determines measured values. If these measured values exceed the defined limit values, this is evaluated as belt damage.

The damage levels 1, 2, 3 are automatically calculated and preset after calibration.

It is also possible to adjust and change the damage levels via the control panel.

GSD Variablen <ESC> Schadenslevel 1 1097 V(1011) UP/DOWN/ENTER	GSD Variablen <ESC> Schadenslevel 2 1497 V(1012) UP/DOWN/ENTER	GSD Variablen <ESC> Schadenslevel 3 1961 V(1013) UP/DOWN/ENTER
---	---	---

Fig.: BDD variables damage level 1, damage level 2, damage level 3

0 - 10000
1000 = Standard

0 - 10000
1500 = Standard

0 - 10000
2000 = Standard

NOTE

If the controller is connected to the Starcleancloud, the damage levels 1, 2, 3 can also be set from the cloud.

7.1.4.1.6 submenu „Damage factor 1, 2, 3"

Using the variables "damage factor 1" V(1014), "damage factor 2" V(1015), "damage factor 3" V(1016) the damage levels 1, 2, 3 are calculated after calibration. By multiplying the damage factor 1 with the reference height V(1010) the damage level 1 is determined, by multiplying the damage factor 2 with the reference height V(1010) the damage level 2 is determined and specified and by multiplying the damage factor 3 with the reference height V(1010) the damage level 3 is determined and specified.

GSD Variablen <ESC>	GSD Variablen <ESC>	GSD Variablen <ESC>
Schadensfaktor 1	Schadensfaktor 2	Schadensfaktor 3
1.100 V(1014)	1.500 V(1015)	2.000 V(1016)
UP/DOWN/ENTER	UP/DOWN/ENTER	UP/DOWN/ENTER

Fig.: BDD variables damage factor 1, damage factor 2, damage factor 3

1.000 - 10.000 1.100 = Standard	1.000 - 10.000 1.500 = Standard	1.000 - 10.000 2.000 = Standard
------------------------------------	------------------------------------	------------------------------------

NOTE

The damage factors 1, 2, 3 change automatically when the respective values for the damage levels 1, 2, 3 are manually adjusted or set.

7.1.4.1.7 Submenu „Action Level 1, 2, 3"

The variables "Action Level 1" V(1016), "Action Level 2" V(1017), "Action Level 3" V(1018) define which actions are triggered after detection of belt damage level 1, level 2 and level 3. Separate actions can be set for each damage level. There are the actions "no action", "Disengages all Scrapers", "switch BDD relay" and the combination of "Disengage Scrapers and switch BDD relay".

By default, "no action" is set.

With the action "Disengage Scrapers" all active scraper move to their defined "disengage position" V(612,712,812,912) after detection of a belt damage.

With the action "Switch BDD relay", the relay on the BDD measuring module 941-GSD-001 is switched on after detection of a damage. Via the potential-free contact of the relay (see point 5.5.ff.), the signal can, for example, be passed on to higher-level control systems or a fault lamp can be activated.

GSD Variablen <ESC>	GSD Variablen <ESC>	GSD Variablen <ESC>
Aktion Level 1	Aktion Level 2	Aktion Level 3
0 V(1016)	0 V(1017)	0 V(1018)
UP/DOWN/ENTER	UP/DOWN/ENTER	UP/DOWN/ENTER

Fig.: BDD variables Action Level 1, Action Level 2, Action Level 3

0 - No action = default 1 - All scraper disengages 2 - Switch BDD relay 3 - All scraper disengages and switch BDD relay	0 - No action = default 1 - All scraper disengages 2 - Switch BDD relay 3 - All scraper disengages and switch BDD relay	0 - No action = default 1 - All scraper disengages 2 - Switch BDD relay 3 - All scraper disengages and switch BDD relay
--	--	--

NOTE

If the Edge controller is connected to the Starcleancloud, the action levels 1, 2, 3 can also be set from the cloud.

7.1.4.1.8 Submenu "Damage report"

The variable "Damage report" V(1021) switches the damage messages of the BDD measuring module 941-GSD-001 on and off. In order for a belt damage to be reported on the display of the control unit, the variable must be set to 1.

GSD Variablen <ESC>
Schadensmeldung
1 V(1021)
UP/DOWN/ENTER

Fig.: BDD variable damage report

0 - 1 0 = Damage report off 1 = Damage report on = Standard

7.1.4.1.9 Submenu "Amount of damage values"

The variable "Amount of damage values" V(1025) defines the number of damage values needed to detect a belt damage.
The variable must not be changed.

```
GSD Variablen <ESC>
Anzahl Schadenswerte
      5          V(1025)
UP/DOWN/ENTER
```

Fig.: BDD Variable Amount of Damage

0 - 1000
5 = Standard

7.1.4.1.10 Submenu item „Measuring rate"

The variable "Measuring rate" V(1026) defines the number of measured values/sec for an output via a test interface.
The variable must not be changed.

```
GSD Variablen <ESC>
Messrate
      500        V(1026)
UP/DOWN/ENTER
```

Fig.: BDD Variable measuring rate

0 - 500
500 = Standard

7.1.4.1.11 Submenu „Position sensor"

If the position sensor is installed on the measuring roller, the sensor is activated by the variable "Position sensor" V(1027). The position sensor is required to determine the belt length, the belt characteristics, and the position of the belt damage. If no position sensor is installed, only the belt damage is reported when a damage level is exceeded; calculation of the belt length, belt characteristics and calculation of the damage position is not possible.

```
GSD Variablen <ESC>
Positionssensor
      1          V(1027)
UP/DOWN/ENTER
```

Fig.: BDD Variable Position Sensor

0 - 1
0 = without position sensor
1 = with position sensor = standard

7.1.4.1.12 Submenu "Speed hysteresis"

The "speed hysteresis" V(1030) tolerates the "reference speed" (V1001) by the set percentage value.

Belt monitoring is only active if the current belt speed is within this tolerance. This applies to belt start-up and further operation.

```
GSD Variablen <ESC>
Geschw. Hysteresis
      10 %       V(1030)
UP/DOWN/ENTER
```

Fig.: BDD Variable speed hysteresis

0% - 100%
0% = Off
10% = Standard

7.1.4.1.13 Submenu „Damage value hysteresis“

The "damage value hysteresis" V(1031) is not used and is switched off.

```
GSD Variablen <ESC>
Schadenswerthyst.
    0 %          V(1031)
UP / DOWN / ENTER
```

Fig.: BDD Variable damage value hysteresis

0% - 100%
0% = Off = Standard

7.1.4.1.14 Submenu "Position hysteresis"

The "Position hysteresis" V(1032) tolerates the measuring range before and after a belt damage by the set value in meters. All further belt damages in this tolerance range are combined and evaluated as one belt damage.

```
GSD Variablen <ESC>
Positionshysterese
    1.00 m        V(1032)
UP / DOWN / ENTER
```

Fig.: BDD Variable Position Hysteresis

0,01m - 10,00m
1,00m = standard

7.1.5 Menu "CAN-Bus"

The "CAN-BUS" menu is currently not used.

In the future, CAN bus modules for extending the functions of the controller can be managed and configured here.

7.1.6 Menu „RFID “

The RFID menu is locked and cannot be accessed.

7.1.7 Remote maintenance

The remote maintenance menu is currently not used.

8 Messages and errors

During operation, the control system monitors the wear of primary scraper segments made of polyurethane and issues messages on the display of the operating unit.

- Segments, wear limit reached, perform service
- Segments worn, replace segments immediately
- Segments, not in position

During operation, the control unit monitors other states. The following messages, errors can be shown in the display of the control unit.

- Change battery for date time
- Fault, 24VDC supply too low
- Fault, drive no current
- Fault, drive overcurrent
- Fault, drive limit switch fault
- Fault, drive travel time exceeded
- Fault, drive Error Position

If the **belt monitoring system** is **installed**, the following messages, errors **may** appear in the display of the control unit.

- Seatbelt damage
- Malfunction, BDD measuring system

9 Battery change

The control board contains a battery (CR2032 Li-Ion battery) to buffer the time and date.

If the battery level is too low (loss of date, time), a service message appears in the display after the control unit is switched on.

To replace the battery, de-energize the control cabinet and remove the battery from the holder on the control board and replace the battery.

Make sure that the positive pole of the battery is facing the metal bracket.

Switch the control cabinet back on and set the time and date.

Note: Only use batteries of the CR2032 battery type.

Be sure to dispose of the battery properly.

10 Applicable documentation

NOTE

For the operation of a conveyor belt system with connected STARCLEAN® - control 94-C04 always also

- the documentation of the conveyor belt system with all its components
- the documentation of the installed STARCLEAN® - scraper systems
- the documentation of the installed STARCLEAN® motorization sets
- the documentation of the STARCLEAN® measuring roller (if installed)
- the documentation of the STARCLEAN® - sensor modules (if installed)

to be used as well!

DRAFT

11 FCC Hint and IC:

FCC:

“Changes or modifications not expressly approved by the manufacturer could void the user’s authority to operate the equipment”.

“This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.”

IC:

“This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) This device may not interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.”

“Le présent appareil est conforme aux CNR d’Industrie Canada applicables aux appareils radio exempts de licence. L’exploitation est autorisée aux deux conditions suivantes : (1) l’appareil ne doit pas produire de brouillage, et (2) l’utilisateur de l’appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d’en compromettre le fonctionnement.”

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada’s licence-exempt RSS(s). Operation is subject to the following two conditions:

This device may not cause interference.

This device must accept any interference, including interference that may cause undesired operation of the device.

L’émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d’Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence.

L’exploitation est autorisée aux deux conditions suivantes :

L’appareil ne doit pas produire de brouillage;

L’appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d’en compromettre le fonctionnement.

12 Appendix

These documents must still be attached!

- 94-MA-83E-090-D_Motorisierungsset
- 94-MA-83E-210-025-D_Motorisierungsset
- 94-MA-MD-MR-D_belt run detection
- 94-MA-GSD_2022-09-12_Mechanik

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