

Operating Instructions

Control RS 300 V



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2. Information in this document

Original operating instructions

- Copyright.
- No part of these instructions may be reproduced without our prior approval.
- Subject to alterations in the interest of technical progress.
- All dimensions given in mm.
- The diagrams in this manual are not to scale.

Key to symbols

DANGER!

Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

WARNING!

Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

CAUTION!

Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

ATTENTION!

Indicates an imminent danger of damage or destruction.

CHECK

Indicates a check to be performed.

REFERENCE

Reference to separate documents which must be complied with.

 Action request


– List, itemisation

→ Reference to other sections of this document

3. General safety instructions

DANGER!

Failure to comply with the documentation could result in life-threatening danger!

-  Be sure to follow all the safety instructions in this document.

Warranty

The function and safety of the equipment is only guaranteed if the warning and safety instructions included in these operating instructions are adhered to.

MFZ Antriebe GmbH + Co. KG is not liable for personal injury or damage to property if these occur as a result of the warnings and safety advice being disregarded.

MFZ does not accept any liability or warranty for damage due to the use of non-approved spare parts and accessories.

Use for the intended purpose

The controller RS 300 V is intended exclusively for controlling loading bridges with an extendable lip. It is possible to actuate loading bridges with 2 or 3 valves.

Target group

Only qualified and trained electricians may connect, programme and service the control.

Qualified and trained electricians must meet the following requirements:

- knowledge of the general and specific safety and accident prevention regulations.
- knowledge of the relevant electrical regulations,
- training in the use and care of appropriate safety equipment.
- capable of recognising the dangers associated with electricity.

Instructions regarding installation and connection

- The system must be disconnected from the electricity supply before carrying out any electrical work. It must be ensured that the electricity supply remains disconnected for the duration of the work.
- Local protective regulations must be complied with.
- Observe the valid standards and regulations!

Information concerning operation

- Unauthorised persons (particularly children) should not be allowed to play with permanently installed adjusting or control devices.

4. Product overview

4.1 Product description

The controller RS 300 V is suitable for use on a loading bridge with extendable lip, hydraulic power unit and up to 3 solenoid valves. The controller is installed in an MFZ standard housing and is generally fitted with an integrated main switch.

4.2 Versions

Variant of the circuit board and housing

- Variant with load contactor for actuating a door seal 400V/3~. Installation in the MFZ combination housing.

Command device variants

- Controller RS 300 V with 3 direction buttons (standard)
 - RAISE button
 - LIP BACK button
 - LIP FORWARDS button
 - AUTO-RETURN button
- Controller RS 300 V with 2 direction buttons
 - RAISE / LIP BACK. button
 - LIP FORWARDS button
 - AUTO-RETURN button
- Controller RS 300 V with 4 direction buttons
 - RAISE button
 - LIP BACK button
 - LIP FORWARDS button
 - LOWER button
 - AUTO-RETURN button

Options

- LCD monitor with plain text display
- Housing with green/red indicator lamps
- Housing with emergency stop
- Housing with selector switch for door sealing

The operating instructions describe the connection options and variants of the RS 300 V controller with the standard software from software version 1.79.

4.3 Software variants

It is possible to select different menu languages via different software versions.

- German, English, Dutch (standard)
- French, Spanish, English (option 1)
- Italian, German, English (option 2)

Optional with customer-specific special software.

4.4 Function tables

Each loading bridge can be assigned to a function table.

With the RS 300 V, this overview for the valve actuation distinguishes between 2 or 3 valves and shows in detail which valves can be switched when and how. In this way it is possible to decide whether the RS 300 V can be used directly or if a special solution is required. Customer-specific solutions can also be retrospectively added if necessary.

Overview of existing and pre-programmed function tables:

→ "9.3 Function tables for valve actuation"

4.5 Housing overview

Version with 2 direction buttons

4.5 / 1



Legend:

- A RAISE / LIP FORWARDS button
- C LIP FORWARDS button
- E AUTO-RETURN button

Version with 3 direction buttons (Standard)

4.5 / 2



Version with 4 direction buttons

4.5 / 3



Legende:

- A RAISE button
- B LIP BACK button
- C LIP FORWARDS button
- D LOWER button
- E AUTO-RETURN button

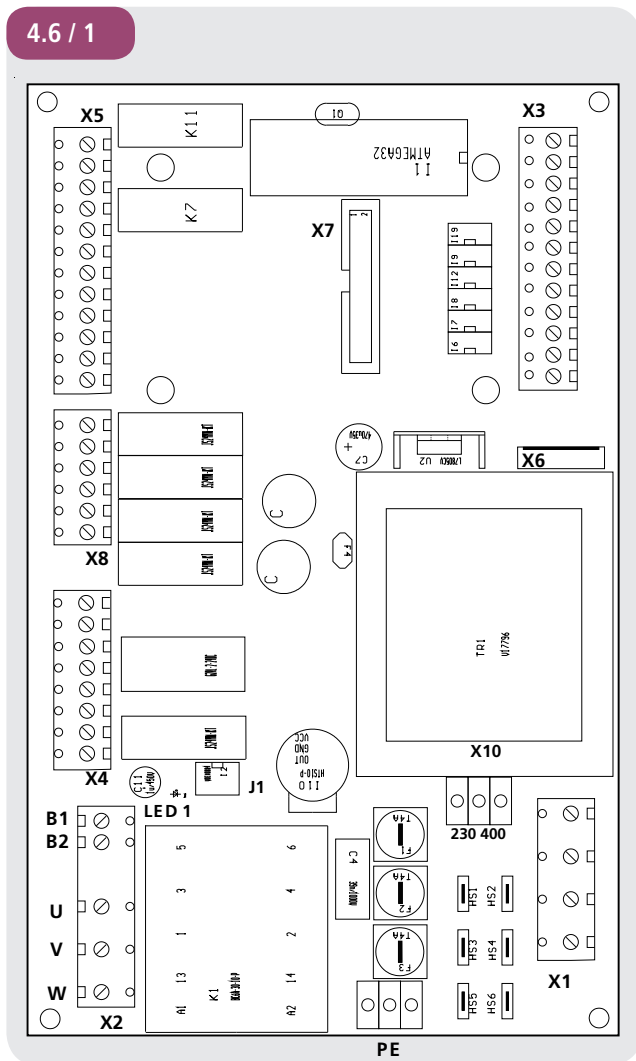
Product overview

4.6 Circuit board overview

Legend:

- X1: Mains connection
- PE: PE connection
- HS1 to HS6: Main switch
- X2: Connection of hydraulic power unit / emergency stop
- X3: Connection of command devices / sensors
- X4: Connection of tubular motor / external signal devices
- X5: Connection of valves and gate
- X6: Connection of pushbuttons
- X7: Connection of LCD monitor
- X8: Connection of traffic lights
- X10: Mains voltage selection

- F1 to F3: Hydraulic power unit fuse protection
- J1: Jumper rotating field / phase failure test



5. Start-up

5.1 General

The following points must be correct to guarantee fault-free functioning:

- The loading bridge is fitted and functional.
- The command and safety devices are fitted and functional.
- The control housing with the RS 300 controller is fitted.

i REFERENCE

The instructions from the respective manufacturer must be observed for the installation of the loading bridge, the hydraulic unit and the command and safety devices.

5.2 Mains connection

Prerequisites

The following points must be correct to guarantee the function of the controller:

- The mains voltage must correspond with the information on the type plate.
- The mains voltage must correspond with the voltage of the hydraulic power unit.
- In the case of three-phase power, this must have a clockwise rotating field.
- With three-phase power connection, only triple block circuit breakers (10 A) shall be used.

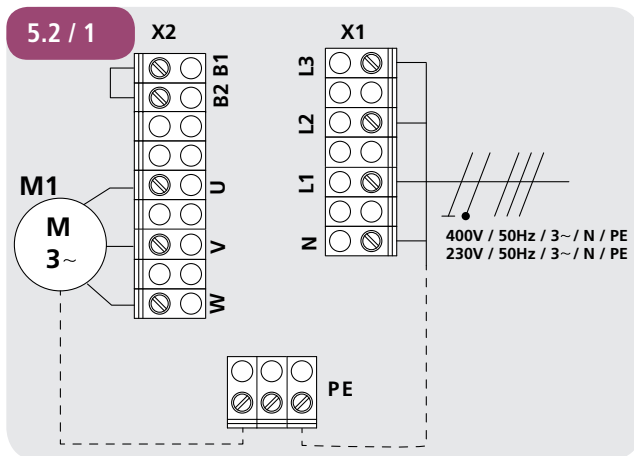
! ATTENTION!

Malfunctions due to improper installation of the controller!

Before switching on the controller for the first time but after all of the wiring has been completed, it is necessary to check that all motor connections on the motor and controller sides are tight. All control voltage inputs are galvanically separated from the supply.

The control and load lines of the connected hydraulic unit must be double-insulated along their entire length.

Mains connection and hydraulic power unit



Legend:

- M1: Motor (hydraulic power unit)
- X1: Mains connection terminal strip
- X2: Hydraulic power unit terminal strip
- F1-3: Hydraulic power unit fuse protection (max. 8 A)

⚠ ATTENTION!

Malfunctions due to unprofessional protection of the hydraulic unit!

Fuses with a maximum load capacity of 3.15 A are used ex works for the internal protection of the hydraulic power unit. These must be adjusted to the unit on site if necessary. The top limit here lies at 8 A and must not be exceeded.

NOTE:

The RS300V is equipped with an integrated rotating field test and phase failure detection. These monitoring functions can be activated or deactivated via jumper J1.

With activation (only with supply with 400V/3~ and jumper J1 plugged in), a clockwise rotating field must be present. Otherwise LED 1 is off and the system cannot be put into operation.

With supply with 230V/3~ the rotating field test and phase failure detection cannot be used and jumper J1 must be unplugged. If jumper J1 remains plugged in, the system cannot be put into operation.

→ "6.4 Rotating field test / Phase failure detection"

Mains voltage selection

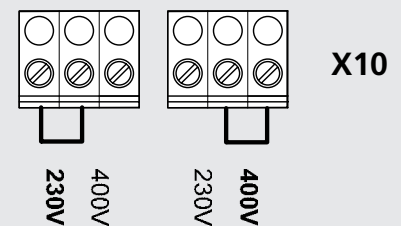
⚠ ATTENTION!

Risk of destruction due to improper adjustment of the mains supply!

Incorrect adjustment of the mains supply can lead to a controller fault.

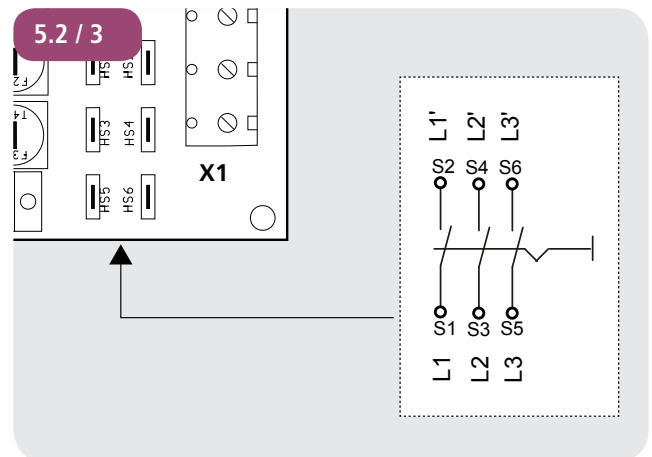
- 🔧 Adjust the position of the bridge connector to the supply voltage and motor voltage.

5.2 / 2



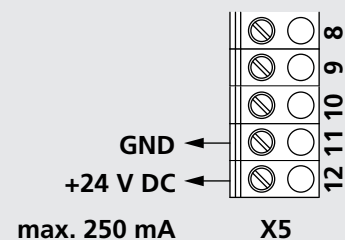
Main switch connection

5.2 / 3



5.3 24 V DC for external devices

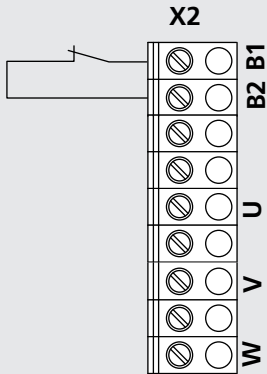
5.3 / 1



Start-up

5.4 Connection of emergency stop device

5.4 / 1



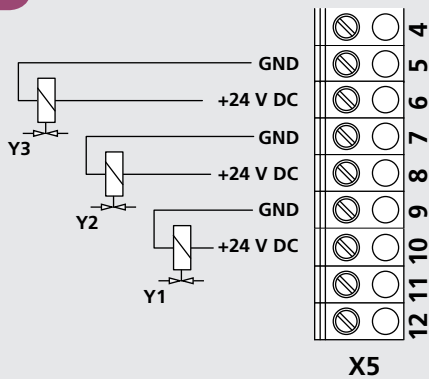
NOTE:

If no emergency stop is connected, the input must be bypassed.

5.5 Connection of valves

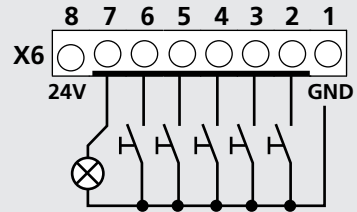
It is possible to connect up to 3 valves (24 VDC) and actuate these directly (max. 600 mA per valve).
The supply is realised via the connection terminals.
The function is specified via the "VALVE VERSION" parameter.

5.5 / 1



5.6 Connection of pushbuttons

5.6 / 1



Legend:

- 2: LIP FORWARDS button
- 3: LIP BACK button
- 4: RAISE button
- 5: AUTO-RETURN (AR) button
- 6: LOWER button
- 7: LED

NOTE:

The LED is optional and is an indicator for the supply voltage of the control in the standard variant.
However, with special customer-specific software the LED can also indicate other operational states.

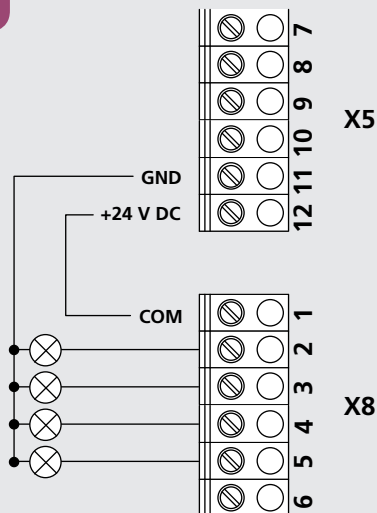
5.7 Connection of signal traffic lights

It is possible to connect up to 4 signal traffic lights. The supply is realised via the connection terminals and it is possible to select between 24 V DC and 230 V AC. The functions are derived from the settings of the parameters:

- TRAFFIC LIGHT MOD
- WHEEL BLOCK
- TRUCK SENSOR
- SHELTER
- SHELTER TIME
- BRIDGE FREE
- FREE INPUT

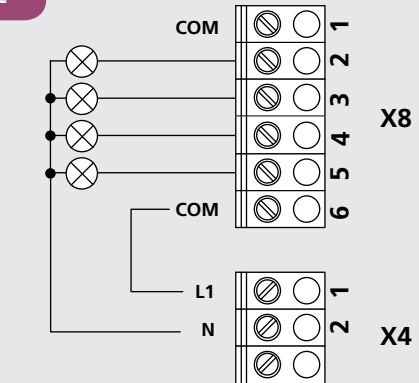
24 V DC version

5.7 / 1



230 V AC version

5.7 / 2



GREEN internal traffic light:	Terminal 2
RED internal traffic light:	Terminal 3
GREEN external traffic light:	Terminal 4
RED external traffic light:	Terminal 5

5.8 Connection of loading bridge limit switch

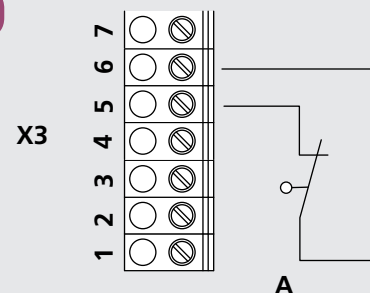
The connection can be optionally used.

- Implementation as NC contact.
- Active if the extendable lip is fully retracted.
- Release for lowering into the standby position (Home).
- The unit is switched off.
- The external green traffic light switches on (if available).
- The truck can depart.

Standard:

Wire bridge ex works. Procedure only via time settings.

5.8 / 1



A: NC contact

NOTE:

The standard is a wire bridge ex works. In this case the process takes place via time settings only.

Start-up

5.9 Connection of approach sensor

Optical and acoustic collision protection through an approach sensor.

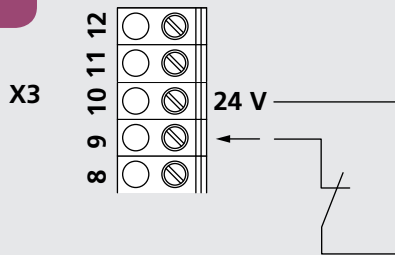
- A vehicle drives in front of the door.
- The approach sensor is activated.
- A warning signal sounds.
- The red external traffic light switches on.
- The red internal traffic light flashes.
- Actuation of the loading bridge is enabled.
- Gate interlocking can be optionally activated.

The function must be activated in the input via the TRUCK SENSOR parameter.

The sensor can be realised as an NC contact or as a PNP Open Collector

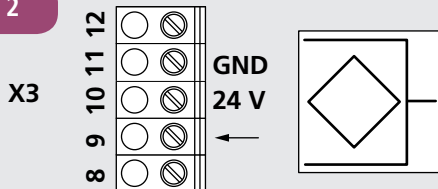
NC contact

5.9 / 1



PNP Open Collector

5.9 / 2



5.10 Wheel block connection

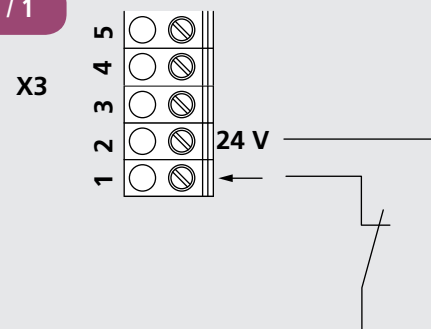
The wheel block serves to secure the vehicle during the loading process.

The function must be activated in the input via the WHEEL BLOCK parameter.

The wheel block can be realised as an NC contact or as a PNP Open Collector.

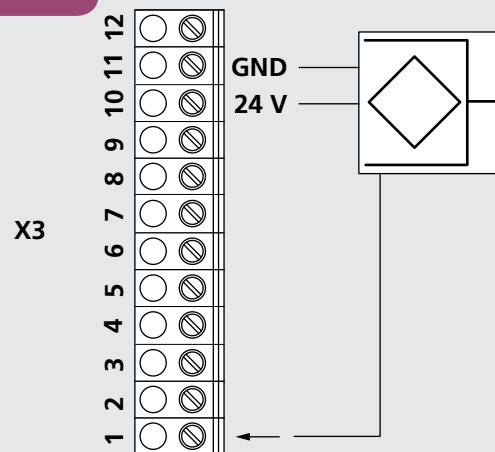
NC contact

5.10 / 1



PNP Open Collector

5.10 / 2



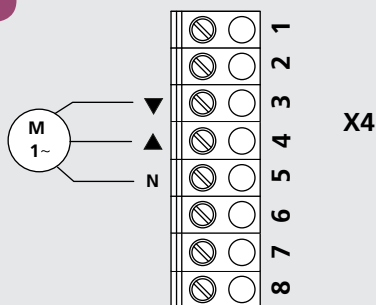
5.11 Connection of the tubular motor / fan (shelter function)

The area between the truck loading bay and the building interior can be sealed. This can consist of an inflatable seal (fan) or a winding seal (tubular motor).

The outlet for the tubular motor is generally functioning if the shelter function has been activated (SHELTER parameter)

Tubular motor

5.11 / 1

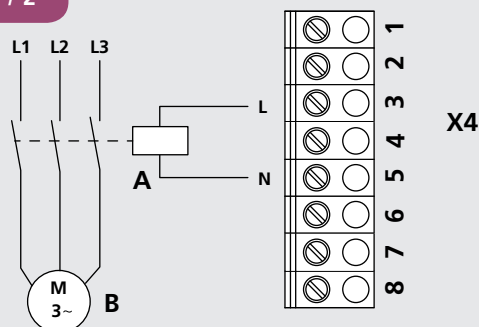


Fan with auxiliary contactor (optional)

This is only used if the output at X4 /6-7 is used for a signal horn or a loading light and the gate seal must additionally take place via a fan. Otherwise the fan is connected to X4/6-7.

→ "5.12 Connection of signal horn / loading light / Fan (shelter function)"

5.11 / 2



- A: Additional contactor for actuating the fan. Not included in the standard scope of supply.
- B: The motor (fan) can be single-phase or three-phase by design.

5.12 Connection of signal horn / loading light / Fan (shelter function)

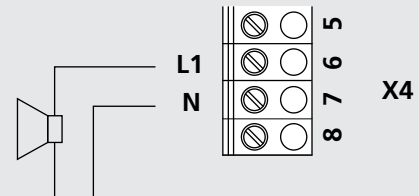
To safeguard the loading process, it is possible to either select a signal horn or a loading light.

In order to seal the area between the HGV loading bay and the building interior, it is possible to connect an inflatable seal (fan).

The function must be activated in the input via the parameter HU/LI/SH.

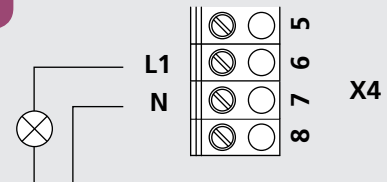
Signal horn

5.12 / 1



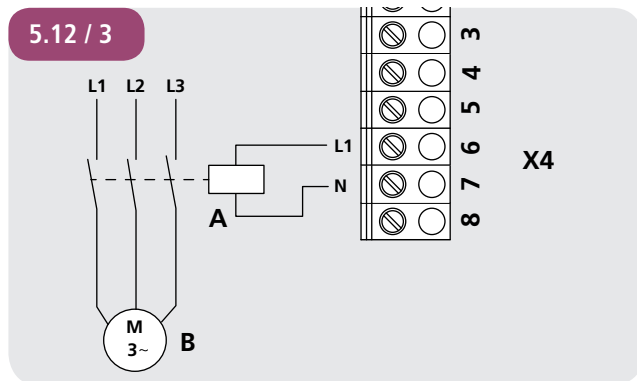
Loading light

5.12 / 2



Start-up

Fan



If this output is used for a signal horn or loading light, actuation of the fan takes place via X4/3+5.

→ "5.11 Connection of the tubular motor / fan (shelter function)"

- A: Auxiliary contactor for actuation of the fan. Not included in the standard scope of supply.
- B: The motor (fan) can be single-phase or three-phase by design.

5.13 Connection to the gate controller

The RS 300 V can be linked with a gate controller to control or interlock the loading bridge and gate controller in relation to each other.

Bridge release

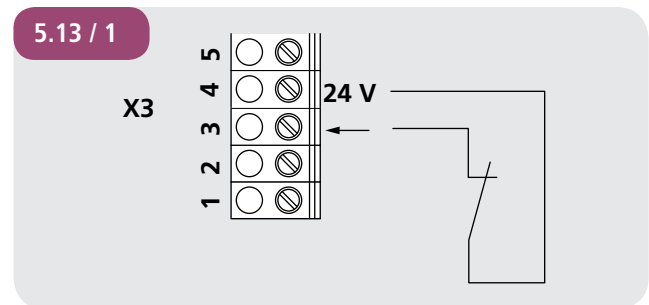
The loading bridge controller can be interlocked via a potential-free contact of the gate system or via a sensor.

The polarity of the signal can be adjusted.

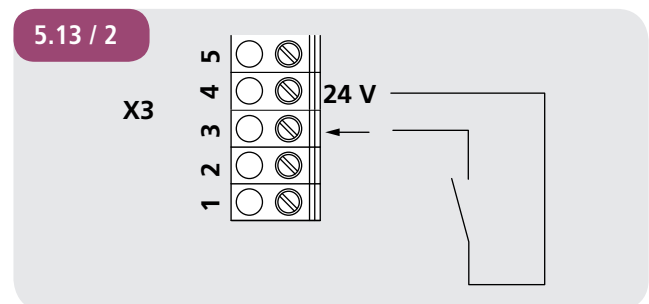
Actuation can take place via an NO or NC contact and can be set with the ENABLE +/- parameter.

The loading bridge can only be operated if a gate system release is present. If release is withdrawn during operation of the loading bridge, both traffic lights switch to red and an acoustic warning signal sounds (only if the signal horn is connected).

NC contact



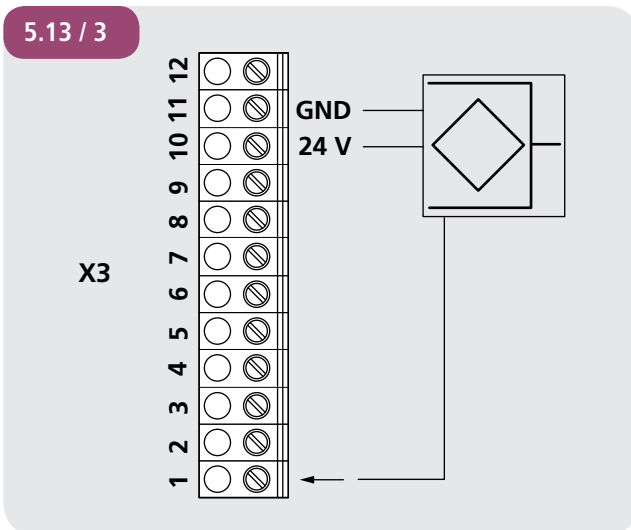
NO contact



NOTE:

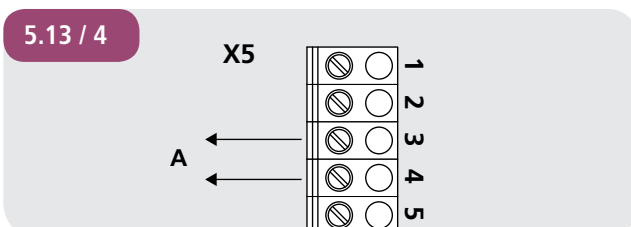
If no connection to a gate control is established, either terminals 3+4 must be bypassed or the ENABLE +/- parameter must be set to MOD2.

PNP Open Collector



Gate release

Potential-free contact for interlocking the gate system. The contact is opened as soon as the loading bridge is no longer in the standby position. The gate system is then blocked.



A Gate system safety circuit

Close gate command

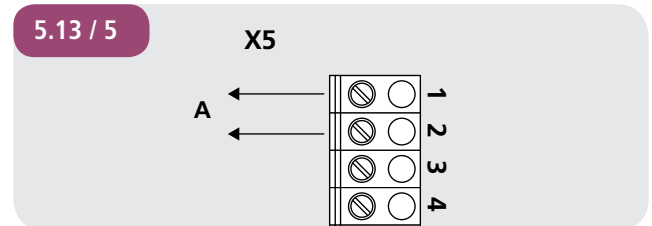
The gate system can be closed automatically after the loading procedure via a potential-free contact (NO). The function is determined according to the setting of the SHELTER parameter.

SHELTER parameter = MOD 4

The contact is only closed in the resting position (HOME) of the loading bridge and is passed on to the gate control (X3/9-10) as a pulse (1 sec.) in order to trigger direct closing.

SHELTER parameter = MOD 5

The contact is permanently closed after the shelter time has passed, and ensures that the gate remains open via input 1 of the gate control (X4/9-10 - MOD4). After loading, the contact is opened again and the gate closes after the set open time has passed.

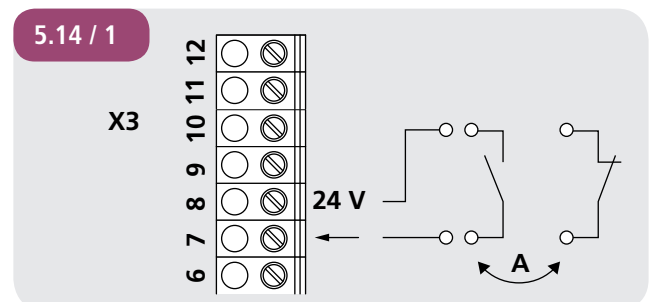


A Gate system CLOSED command

→ "9.2 Input operating mode"

5.14 Connection of free input

The free input can be individually configured. The function and type of circuitry can be selected in the input via the parameter FREE 1.



A: optionally

6. Functional description

6.1 Operation of the loading bridge

The loading bridge can be raised with the raise pushbutton in 'dead-man' mode. The loading bridge must be lifted for the **1st raise** time as a minimum.

After reaching the optimum position, the button can be released. The loading bridge remains in the **adjustment** position for 5 seconds. The lip should be positioned during this period. If no buttons are actuated, the loading bridge drops back to the standby position.

The lip can be positioned using the lip IN/OUT buttons in dead-man mode. With this, the lip must be extended for the time **MIN TIME EXTEND LIP** as a minimum. Once the time **MAX TIME EXTEND LIP** is reached, the lip stops automatically. After releasing the button, the loading bridge lowers to the loading position (floating position).

If the position of the lip requires correction during the loading process, this can be performed directly with the buttons **Lip IN/OUT**. With this, the loading bridge is automatically raised for 1 second before the lip drives in or out.

After every setting of the **LOWER** parameter, the bridge drops back to the floating position automatically or after the **LOWER** button has been pressed.

6.2 Automatic Return (AR)

After the loading process is complete, the loading bridge returns to the standby position by means of the AR button. The procedure is carried out automatically.

AR – Version 1: (AUTO-RETURN MOD 2 parameter)

- The loading bridge is lifted for the time **AR-RAISE 1**.
- The lip is retracted up to the value **MIN TIME EXTEND LIP**.
- The loading bridge is further lifted for the time **AR-RAISE 2**.
- The lip is fully retracted.
- The loading bridge lowers into the standby position.

AR – Version 2: (AUTO-RETURN MOD 4 parameter)

- The loading bridge is raised for the time **AR-RAISE 1** or **AR-RAISE 2** (the greater time value is applied here).
- The lip is fully retracted.
- The loading bridge lowers into the standby position.

6.3 Start-up interlocking

The RS 300 V controller has integrated start-up interlocking. This safety function ensures that the stop valve is switched off and therefore that the loading bridge is locked.

If, during actuation of the loading bridge,

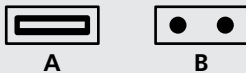
- an emergency stop signal is issued, the display shows the message **EMERGENCY STOP**. The error message can be acknowledged with the **RAISE** or **AR** buttons. After this, **ADJUSTMENT** appears in the display.
- the power supply is interrupted, once the power is switched back on again **ADJUSTMENT** appears in the display.

It is now possible to move the loading bridge again using the direction buttons, and place it back in the floating position if necessary.

6.4 Rotating field test / Phase failure detection

The RS 300 V controller has integrated rotating field monitoring. When the controller is switched on, a check takes place to determine whether a clockwise rotating field is present. If this is not the case, the contactor does not activate. The circuit is also safeguarded against a phase drop-out. This is also checked when the controller is switched on. Both errors are signalled through LED 1. The LCD monitor shows **ERROR ROTATING FIELD**. Both functions can be deactivated via jumper 1.

6.4 / 1



- A: Rotating field / phase failure monitoring active (Jumper plugged in)
- B: Rotating field / phase failure monitoring not active (Jumper not plugged in)

NOTE:

The rotating field test and phase failure detection only operate if supplied with 400V/3~. If the supply is 230V/3~ jumper J1 must be unplugged, otherwise the system cannot be put into operation.

6.5 Current monitoring

The control RS300 V has integrated current monitoring for the motor of the hydraulic unit. Depending on the height and characteristics of the HGV loading bay and/or setting of the div. action times, the loading bridge can reach its mechanical stop in various movement directions, even if the pre-set runtime of the respective movement has not fully elapsed. However, the cause of excessive mechanical resistance can also be a pallet, which is still located on the bridge or directly driving the lip against the HGV. In order that the hydraulic unit does not run on unnecessarily, if this does occur then the current monitoring ensures the unit switch-off and lowering into the floating position.

Monitoring is only active

- when the lip is driven out prior to the loading process
- when lifting during automatic resetting in the resting position (Auto-Return)

In order that the current monitoring works faultlessly, it is initially necessary to adjust the **CURRENT SWITCH-OFF** to the respective hydraulic unit.

The maximum permissible deviation of the motor current in % is set here.

This limit value can only be determined if the parameter **MAX LIP OUT** is set to a time value that is higher than the time required to fully drive the lip out.

In this way the lip runs against the mechanical stop when extending and the motor current of the hydraulic unit increases.

The parameter **CURRENT SWITCH-OFF** (in %) must now be set back sufficiently that the current monitoring triggers upon driving the lip against the mechanical stop, the hydraulic unit switches off and the bridge lowers directly into the floating position.

Afterwards, the parameter **MAX LIP OUT** must be set to a sufficiently low value that the lip cannot drive against the mechanical stop.

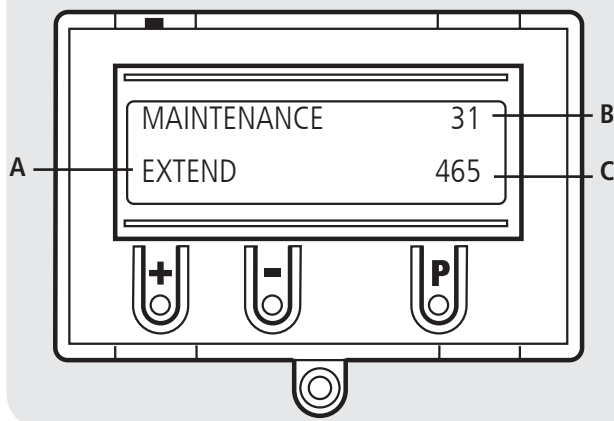
Functional description

6.6 Time and current measurement

In the MAINTENANCE and AUTOMATIC operating modes, different times and current values are displayed, which pertain to the internal measurements of the control. These values primarily serve as information for the service technician during commissioning or can help to support the diagnostic process in case of a fault.

MAINTENANCE mode

6.6 / 1



- A: Display of the function that is currently active.
EXTEND (example)
RETRACT
RAISE
- B: Display of the time only for the duration of the respective function (example 31 = 3.1 seconds)
- C: Display of the current only for the duration of the respective function.

The display describes an abstract value that is in relation to the current consumption of the hydraulic unit. This value does not constitute the actual motor current in A, but it does enable conclusions to be drawn regarding the characteristic curve for the current.

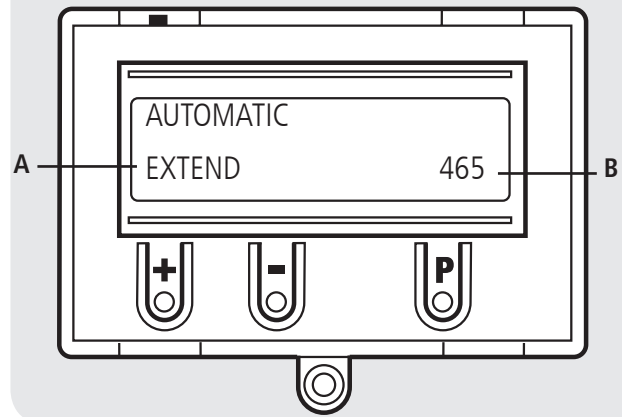
If the motor current doubles for example, the displayed value also doubles.

With this the service technician is able to determine whether

- motor current is flowing,
- the characteristic curve for the current makes greater jumps during a movement (this would indicate a mechanical problem),
- the values are approximately identical in a comparison with multiple loading bridges of the same type.

Automatic mode

6.6 / 2



- A: Display of the function that is currently active.
EXTEND (example)
AUTO-RETURN
- B: Display of the current only for the duration of the respective function. With AUTO-RETURN, the current measurement is only performed during the RAISE function.

The display describes an abstract value that is in relation to the current consumption of the hydraulic unit. This value does not constitute the actual motor current in A, but it does enable conclusions to be drawn regarding the characteristic curve for the current.

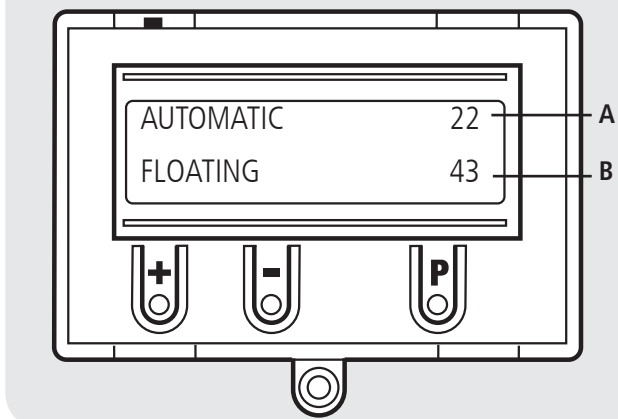
If the motor current doubles for example, the displayed value also doubles.

With this the service technician is able to determine whether

- motor current is flowing,
- the characteristic curve for the current makes greater jumps during a movement (this would indicate a mechanical problem),
- the values are approximately identical in a comparison with multiple loading bridges of the same type.

If the loading bridge is in the floating position, the time values are displayed, which were measured during RAISE and EXTEND.

6.6 / 3



- A: Display of the time only for the duration of raising
(Example 22 = 2.2 seconds)
- B: Display of the time only for the duration of extending
(Example 43 = 4.3 seconds)

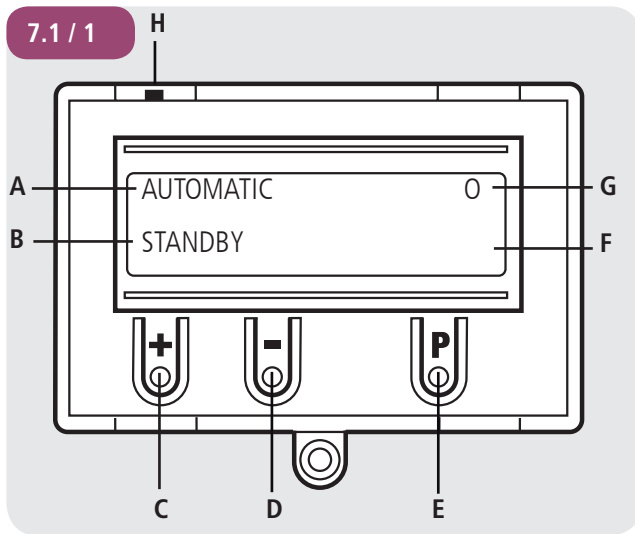
7. Programming

7.1 Overview of the LCD monitor

ATTENTION!

Property damage due to improper installation!

The display must be plugged in whilst de-energised. Only a display from MFZ (article number 91447) may be used.



Explanation:

- A: Operating mode / diagnostics info
- B: Parameters / diagnostics info
- C: (+) button
- D: (-) button
- E: (P) button
- F: Value/status
- G: Value/status
- H: Jumper

If the jumper H is removed, the (+), (-) and (P) buttons no longer function.

The display continues to function.

7.2 LCD monitor operating modes

With the LCD monitor, the controller has four operating modes:

1. AUTOMATIC
2. INPUT
3. DIAGNOSTICS
4. MAINTENANCE

Operating mode 1: AUTOMATIC

The loading bridge is driven in AUTOMATIC mode.

Display:

- Display of the function being carried out
- Display of possible faults
- Display of the current monitoring (factorised) whilst the lip extends
- Display of the time that was required for extending and raising

Operating mode 2: INPUT

The values of various parameters can be changed in INPUT mode.

Display:

- Displays the selected parameter
- Displays the status/value set

Operating mode 3: DIAGNOSTICS

System-specific checks can be interrogated in DIAGNOSTICS mode.

Display:

- Display of the check
- Display of the check status

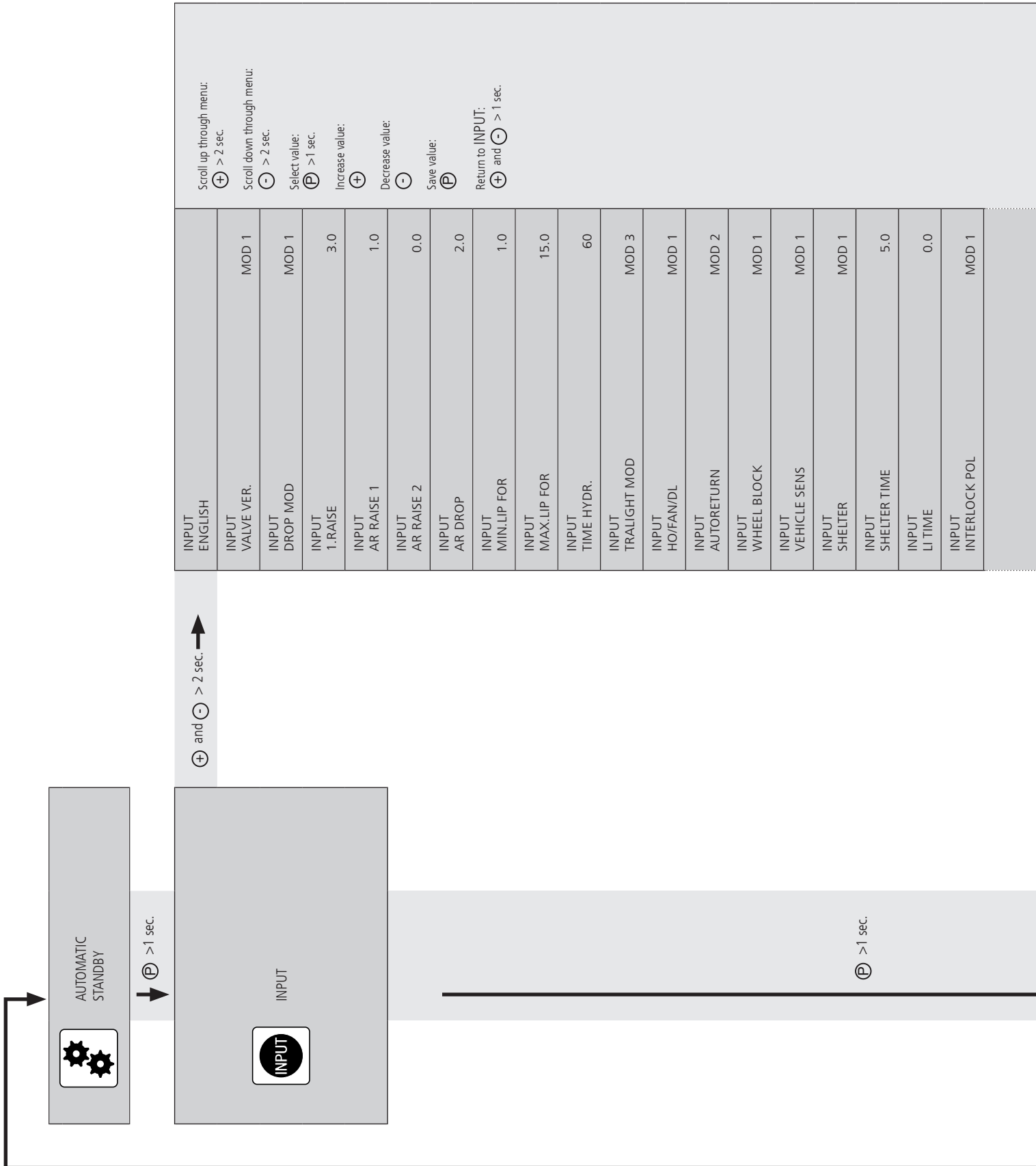
Operating mode 4: MAINTENANCE

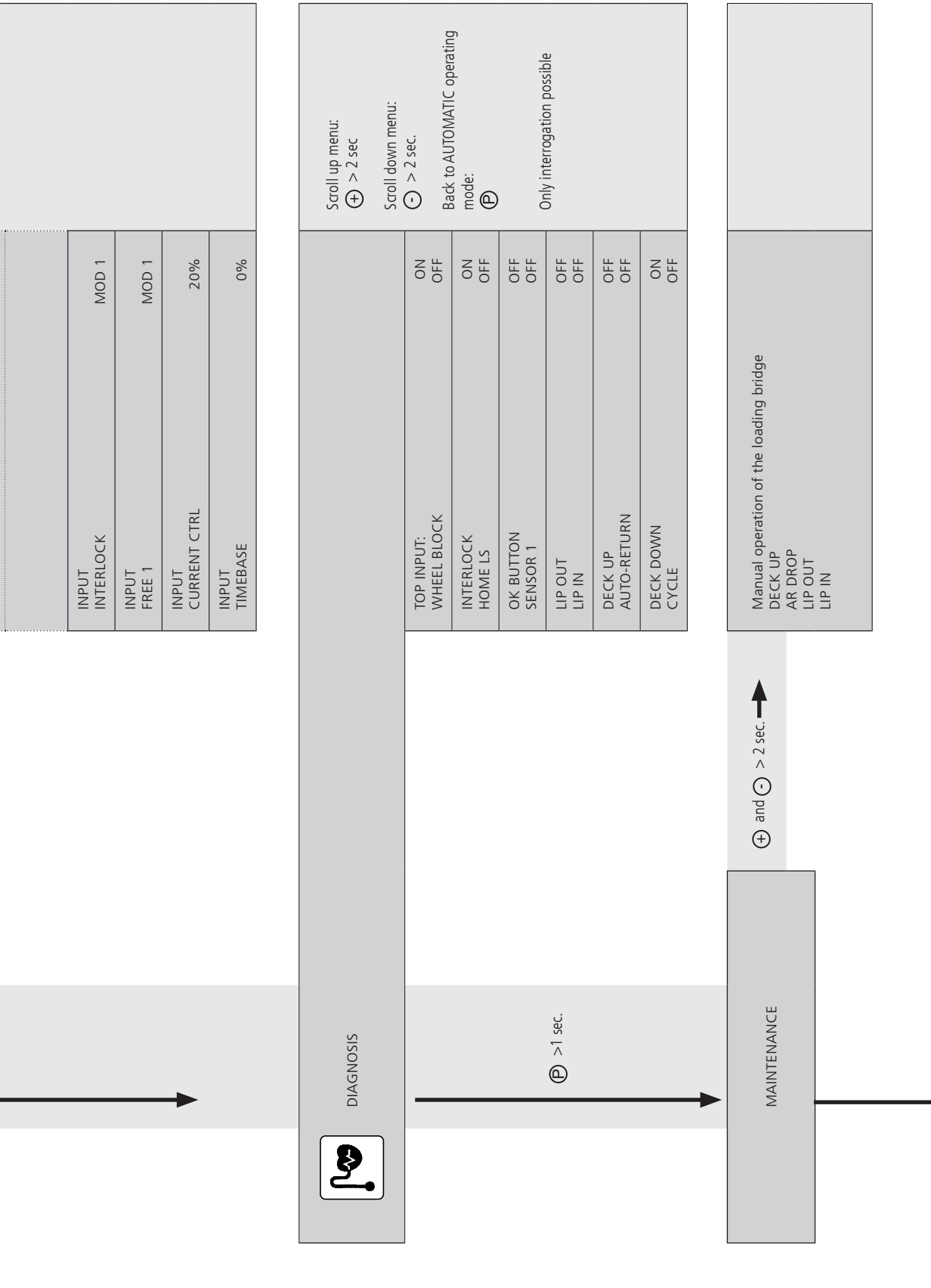
In MAINTENANCE mode, the loading bridge can be operated via the integrated housing buttons. MAINTENANCE mode is intended for start-up only. No floating position is realised here. All safety devices (apart from emergency stop) are ignored. Using the AR button it is possible to lower the loading bridge in the 'dead-man' function.

Display:

- Display of the functions being carried out
- Display of the current monitoring (factorised) during retracting, extending and raising
- Display of the time that was required for retracting, extending and raising

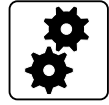
8. Navigator (only LCD monitor)





9. Functional overviews

9.1 Automatic mode



Display	Description
AUTOMATIC STANDBY	The loading bridge is in the standby position.
AUTOMATIC FLOATING	The loading bridge is in the loading position.
AUTOMATIC EMERGENCY STOP	The loading bridge is in the EMERGENCY STOP position. Resetting in the floating or resting position, the error message must first be acknowledged with the RAISE or AUTO-RETURN button. The display shows ADJUSTMENT and the loading bridge can be moved with the direction buttons again.
AUTOMATIC ADJUSTMENT	With loading bridges with an extendable lip, the lip can be extended or retracted in this mode.
AUTOMATIC 1. RAISE	The loading bridge is lifted out of the standby position (home position).
AUTOMATIC DECK UP	The loading bridge is raised. Appears after the time 1.RAISE has been exceeded.
AUTOMATIC LIP OUT	The extendable lip is extended.
AUTOMATIC LIP IN	The extendable lip is retracted.
AUTOMATIC AUTORETURN	Auto-return cycle runs. Automatic reset in the standby position (home position).
AUTOMATIC SHELTER <->	The shelter time runs (inflate or deflate).

9.2 Input operating mode



Function	Description	Adjustment options	Factory setting
ENGLISH	Selection of the menu language	Depending on the software version: GERMAN DUTCH ENGLISH FRENCH SPANISH ENGLISH ITALIAN GERMAN ENGLISH	GERMAN FRENCH ITALIAN
VALVE VER.	Selection of the predefined valve functions. MOD1: 3 valves Standard MOD2: 3 valves Special MOD3: 2 valves Standard MOD4: 2 valves Hafa MOD5: 3 valves Zuccaro MOD6: 3 valves Laweco MOD7: 3 valves Cobelux MOD8: 2 valves Special → "9.3 Function tables for valve actuation"	MOD1 – MOD8	MOD1
DROP MOD	Setting how the loading bridge should be lowered into the floating position. MOD 1: Automatic lowering MOD 2: Forced lowering via LOWER button (only with 4 direction buttons). Through the pulse command the loading bridge is automatically lowered into the floating position. MOD 3: Forced lowering via LIP BACK (only with 3 direction buttons). Through the pulse command the lip retracts briefly and is then lowered into the floating position automatically. MOD 4: Forced lowering via LOWER button (only with 4 direction buttons). The loading bridge is lowered manually by a continuous command from the lower button, until the sensor mounted on the bridge detects the truck loading bay. (LOWER sensor → Free input X3 / 7-8)	MOD1 – MOD4	MOD1
1. RAISE	From the standby position, the loading bridge must be raised by the first raise time before the lip can be extended. This function serves to protect the mechanism.	0.5 – 5 sec.	3 sec.
AR RAISE 1	Time for first raising from the loading position (floating position) during the AUTO-RETURN process. This ensures that the extendable lip is free.	0.5 – 25 sec.	1 sec.
AR RAISE 2	Time for further raising the loading bridge during the AUTO-RETURN process.	0 - 20 sec.	0 sec.
AR DROP	Time for lowering into the standby position during the AUTO-RETURN process. The time influences switching of the traffic lights and gate release.	0 - 20 sec.	2 sec.
MIN.LIP FOR	Minimum time for which the extendable lip must be extended. This function serves to protect the mechanism.	0.5 – 5 sec.	1 sec.

Functional overviews

Function	Description	Adjustment options	Factory setting
MAX.LIP FOR	Time required to fully extend the extendable lip. After this time has passed, extension stops and the loading bridge lowers. The correct time that the extendable lip requires must be determined in advance (stopwatch). This can take place in AUTOMATIC mode with a stopwatch or in MAINTENANCE mode by reading out the monitor display. → "6.6 Time and current measurement"	0 - 60 sec.	15 sec.
TIME HYDR.	Maximum run-time of the hydraulic power unit. The run-time monitoring of an individual movement serves to avoid an overload with sticking buttons or defective limit switches.	0 – 254 sec.	60 sec.
TRALIGHT MOD	Function of the external traffic lights after the loading process. The loading bridge is back in the standby position (HOME position). MOD 1 out when in standby position MOD 2 in when in standby position MOD 3 out after 5 minutes when in standby position	MOD 1 – MOD 3	MOD 3
HO/FAN/DL	Actuation of warning signal, fan (shelter function) and loading light. The set MOD pertains to the components connected to X4 / 3-7. MOD 1: Horn Produces a warning signal if the wheel block is removed during loading for example. MOD 2: Fan Actuation of a fan for the gate seal during the loading process (shelter function). This MOD sets itself automatically if MOD2 or MOD3 have been selected in the SHELTER parameter. MOD 3: Automatic loading light When lifting for the first time, the light switches on and remains on until the loading bridge is back in the standby position (HOME). MOD 4: Manual loading light The loading light can be manually switched on and off via the LOWER button. A precondition for this is the setting MOD1 in the LOWER parameter.	MOD 1 – MOD 4	MOD 1
AUTO-RETURN	The AUTO-RETURN process describes the automatic resetting of the loading bridge after the loading process in the standby position (HOME). The process is triggered by pressing the AR button (blue). MOD 1: Auto-return function deactivated. MOD 2: Auto-return function activated. MOD 3: Auto-return also via the LIP BACK button. If the button is pressed for longer than 4 seconds, the AUTO-RETURN process also starts. MOD 4: Shortened auto-return cycle without first retraction. → "6.2 Automatic Return (AR)"	MOD 1 – MOD 4	MOD 2
WHEEL BLOCK	MOD 1: Wheel block function deactivated. MOD 2: Wheel block function activated. if the wheel block is removed during the loading process, the traffic lights switch to red and the horn signals this. MOD 3: Wheel block function activated. if the wheel block is removed during the loading process, the keypad is blocked.	MOD 1 – MOD 3	MOD1

Function	Description	Adjustment options	Factory setting
VEHICLE SEN	<p>Function of the approach sensor (X3/9-10) when driving a vehicle up to the loading bridge.</p> <p>MOD 1: Deactivated. MOD 2: Approach sensor activated. Loading bridge without gate controller connected. Optical and acoustic collision protection through an approach sensor. If a vehicle drives in front of the gate and activates the approach sensor (continuous signal) a warning signal sounds and the red external traffic light switches on and the red internal traffic light flashes. The loading bridge is released for actuation. MOD 3: Approach sensor activated. Loading bridge with gate controller connected. Optical and acoustic collision protection through an approach sensor. If a vehicle drives in front of the gate and activates the approach sensor (continuous signal) a warning signal sounds and the red external traffic light switches on and the red internal traffic light flashes. The gate function is released and it is possible to actuate the loading bridge as soon as the gate is opened. MOD 4: Identical to MOD 2, although the ramp is blocked after the actuation of AR until the next docking instance.</p>	MOD 1 – MOD 4	MOD1
SHELTER	<p>Activation of a seal to prevent temperature fluctuations between the truck loading bay and the inside of the building. This can consist of an inflatable seal (fan) or a winding seal (tubular motor). The shelter function is only expedient in conjunction with a power-actuated gate and a gate controller connected.</p> <p>MOD 1: Deactivated. MOD 2: The sealing function is activated via a button command on the free input (X3 / 7-8). The free input is automatically set to MOD4 (SHELTER button). The parameter HU/LI/SH is automatically set to MOD2 (fan). The output for the tubular motor is also active during the shelter time. The gate can now be opened and the loading bridge can be brought into position. Once the loading process has ended, a CLOSE command (X5 / 1-2) is automatically issued to the gate controller. Deactivation of the shelter function takes place when the gate is closed again. MOD 3: Like MOD2, although the deactivation takes place manually via a second button command on the free input. MOD 4: The sealing function is activated via a button command on the free input (X3 / 7-8). Actuation of the fan takes place for the duration of the set shelter time via an external contactor on the tubular motor output. The HU/LI/SH output can now be otherwise used. The gate can now be opened and the loading bridge can be brought into position. Once the loading process has ended, a CLOSE command is automatically issued as a pulse (X5 / 1-2) to the gate controller. Deactivation of the shelter function takes place again via the external contactor for the duration of the shelter time once the gate is closed again. MOD 5: Like MOD 4, although the gate opens automatically after the shelter time has passed. (Prerequisite: Connection X5/1-2 with programmable input 1 of the controller CS310 / setting MOD4). Automatic closure of the gate by setting the opening time = 1 sec. (CS310).</p>	MOD 1 – MOD 5	MOD1
SHELTER TIME	<p>Delay time for the release of the gate after activation of the sealing function (SHELTER). After the time has passed, the gate can be opened and loading can start. With deactivation of the sealing function after the loading process, the time starts again and once it has passed the external green traffic light signals that the vehicle can leave the loading bridge.</p>	0 – 254 sec.	5 sec.
LI TIME	<p>If the RZ time is activated, after releasing the EXTEND LIP button the lip is automatically retracted for the duration of the RZ time. If the value is 0, the function is deactivated.</p>	0 - 2 sec.	0 sec.

Functional overviews

Function	Description	Adjustment options	Factory setting
INTERLOCK POL	<p>Selection of the release contact. The function of the loading bridge can be blocked or released with the aid of a potential-free contact for the gate controller or an external sensor, and can therefore not be moved with a closed door.</p> <p>MOD 1: NC contact MOD 2: NO contact</p>	MOD1 – MOD2	MOD1
INTERLOCK	<p>Function with a blocking of the loading bridge during the loading process.</p> <p>MOD 1: If the loading bridge release is withdrawn during the loading process, the bridge remains in the floating position, the hydraulic power unit is switched off, the keypad for the loading bridge is deactivated and both traffic lights switch to red. If the signal horn is activated, an acoustic warning signal is issued.</p> <p>MOD 2: If the loading bridge release is withdrawn during the loading process, the bridge remains in the floating position and both traffic lights switch to red. If the signal horn is activated, an acoustic warning signal is issued.</p>	MOD1 – MOD2	MOD1
FREE 1	<p>Function of the freely programmable input (X3/7-8).</p> <p>MOD 1: Deactivated MOD 2: Traffic light acknowledgement. Connection of an acknowledge button with NO contact. The external green traffic light (release of the truck) is only active if the loading bridge is back in the standby position (HOME), the wheel base is removed and the acknowledge button has been actuated. <i>Only in conjunction with an HGV sensor!</i></p> <p>MOD 3: Safety fence with NC contact. If the safety fence is closed, it is not possible to operate the loading bridge.</p> <p>MOD 4: Shelter function. Seal between the truck loading bay and the building interior. Connection of a button with NO contact. If the button is pressed, activation of the sealing function takes place (see SHELTER / SHELTER TIME parameter).</p> <p>MOD 5: LOWER sensor. Connection of a sensor with NO contact. Prerequisite: The LOWER parameter is automatically set to MOD4. The loading bridge only assumes the floating position once the sensor has detected the loading bay of the truck.</p>	MOD1 – MOD5	MOD1
CURRENT CTRL	<p>The value (in %) is the maximum permissible overshooting of the motor current of the hydraulic power unit when arriving in a limit position. With an overshoot, the unit switches off and the loading bridge assumes the floating position. This parameter must be aligned with the respective unit. If the setting is 0%, current monitoring is deactivated.</p>	0% – 35 %	20%
TIMEBASE	<p>With this parameter, different speeds of the extendable lip can be set when retracting and extending. A negative value must be selected if the lip is retracted faster.</p>	- 50 % – 50%	0%

9.3 Function tables for valve actuation

MODE 1		3 valves / Standard / Stertil / Hafa / Rite Hite		
		Stop	Extend lip	Lip back
Function	Contactator	Y1	Y2	Y3
Raise	1	1	0	0
Lower	0	1	0	0
Extend lip	1	0	1	0
Lip back	1	0	0	1
Floating position	0	1	0	0
Emergency stop	0	0	0	0

MODE 2		3 valves / Special		
		Raise	Lip	Lower
Function	Contactator	Y1	Y2	Y3
Raise	1	1	0	0
Lower	0	0	0	1
Extend lip	1	0	0	0
Lip back	1	0	1	1
Floating position	0	0	0	1
Emergency stop	0	0	0	0

MODE 3		2 valves / Standard	
		Stop	Lip
Function	Contactator	Y1	Y2
Raise	1	1	0
Lower	0	1	1
Extend lip	1	0	0
Lip back	1	0	1
Floating position	0	1	1
Emergency stop	0	0	0

MODE 4		2 valves / HAFA	
Function	Contactator	Y1	Y2
Raise	1	0	1
Lower	0	1	0
Extend lip	1	0	0
Lip back	1	0	1
Floating position	0	1	0
Emergency stop	0	0	0

Functional overviews

MODE 5		3 valves / Zuccaro		
		Stop	Extend lip	Lip back
Function	Contactor	Y1	Y2	Y3
Raise	1	1	0	0
Lower	0	1	0	0
Extend lip	1	0	1	0
Lip back	1	0	0	1
Floating position	0	1	0	0
Standby position	0	0	0	0
Emergency stop	0	0	0	0

MODE 6		3 valves / LAWECO		
		Stop	Extend lip	Lip back
Function	Contactor	Y1	Y2	Y3
Raise	1	1	0	0
Lower	0	1	0	0
Extend lip	1	0	1	0
Lip back	1	0	0	1
Floating position	0	1	0	1
Standby position	0	0	0	0
Emergency stop	0	0	0	0

MODE 7		3 valves / COBELUX		
		Stop	Extend lip	Lip back
Function	Contactor	Y1	Y2	Y3
Raise	1	0	0	0
Lower	0	1	0	0
Extend lip	1	0	1	0
Lip back	1	0	0	1
Floating position	0	1	0	0
Standby position	0	1	0	0
Emergency stop	0	0	0	0

MODE 8		2 valves / Special	
		Stop	Lip
Function	Contactor	Y1	Y2
Raise	1	1	0
Lower	0	1	1
Extend lip	1	0	1
Lip back	1	0	0
Floating position	0	1	1
Emergency stop	0	0	0

9.4 Diagnostics operating mode



Display	Meaning	Condition
TOP INPUT	Safety circuit (X2 / 1+2)	ON: closed OFF: interrupted (fault)
WHEEL BLOCK	Wheel block (X3 / 1+2)	ON: actuated (vehicle detected) OFF: not actuated
INTERLOCK	Release of the loading bridge through the gate controller (X3 / 3+4)	ON: active (release) OFF: not active (blocked)
HOME LS	Loading bridge limit switch for querying the standby position (X3 / 5+6)	ON: actuated (HOME position) OFF: not actuated
FREE 1	Programmable input (X3 / 7+8)	ON: active OFF: not active
VEHICLE SEN	Loading bridge approach sensor (X3 / 9+10)	ON: actuated (vehicle detected) OFF: not actuated
LIP OUT	EXTEND LIP button (X6 / 2 keypad)	ON: actuated OFF: not actuated
LIP IN	LIP BACK button (X6 / 3 keypad)	ON: actuated OFF: not actuated
DECK UP	RAISE button (X6 / 4 keypad)	ON: actuated OFF: not actuated
AUTO-RETURN	AUTORETURN (AR) button (X6 / 5 keypad)	ON: actuated OFF: not actuated
DECK DOWN	LOWER button, if available (X6 / 6 keypad)	ON: actuated OFF: not actuated
CYCLE	Loading bridge cycle counter	Display of the cycles that have run through

10. Fault display and remedial measures

10.1 Fault display on the LCD monitor

Fault / fault message	Cause	Rectification
System does not react.	<ul style="list-style-type: none"> – No voltage present. 	<ul style="list-style-type: none"> – Check power supply.
Loading bridge does not lift when RAISE button is actuated.	<ul style="list-style-type: none"> – If no release of the loading bridge is issued by the gate controller or a sensor (X3 / 3+4). 	<ul style="list-style-type: none"> – Check potential-free output of the controller. – Check sensor.
Loading bridge does not lift when RAISE button is actuated and LED 1 is off.	<ul style="list-style-type: none"> – No clockwise rotating field at the feed. 	<ul style="list-style-type: none"> – Check rotating field and change if necessary (Exchange 2 phases on the mains connection).
Loading bridge does not lift when RAISE button is actuated, LED 1 is on and the hydraulic power unit is running.	<ul style="list-style-type: none"> – Hydraulic power unit is incorrectly connected. 	<ul style="list-style-type: none"> – Exchange 2 phases on the connection to the hydraulic power unit.
HYERROR RUNTIME	<ul style="list-style-type: none"> – The programmed maximum run-time of the hydraulic power unit was exceeded. 	<ul style="list-style-type: none"> – Check buttons und cabling. – Measure run-time and readjust if necessary.
ERROR ROTATION	<ul style="list-style-type: none"> – No clockwise rotating field at the feed. 	<ul style="list-style-type: none"> – Check rotating field and change if necessary (Exchange 2 phases on the mains connection).
EMERGENCY STOP	<ul style="list-style-type: none"> – The safety circuit (X2 / B1+B2) is interrupted or power failure during an undefined position. 	<ul style="list-style-type: none"> – Check safety circuit. – Press the RAISE button and then the AR button and hold both down (loading bridge returns to the standby position).
INTERLOCK MISS.	<ul style="list-style-type: none"> – No release of the loading bridge is issued by the gate controller or a sensor (X3 / 3+4). 	<ul style="list-style-type: none"> – Check position of the gate. – Check potential-free output of the controller or sensor.
ERROR	<ul style="list-style-type: none"> – Switch / sensor for bridge release, approach or wheel block monitoring are not in a permissible state during the loading process. → (X3 / 3+4 and 9+10) 	<ul style="list-style-type: none"> – Check switch / sensor.

10.2 Fault display via LED 1

Fault / fault message	Cause	Rectification
LED off	<ul style="list-style-type: none"> – No clockwise rotating field at the feed. 	<ul style="list-style-type: none"> – Check rotating field and change if necessary (Exchange 2 phases on the mains connection).

11. Technical data / Maintenance

11.1 Mechanical and electrical data

Housing dimensions:	215 x 275 x 190 mm
Mounting:	Vertically, on the wall; Min. height of 1,100 mm
Supply via:	400V/3~, 50/60 Hz
L1, L2, L3, N, PE :	230V/3~, 50/60 Hz
Customer-provided fuse/ breaker:	max. 10 A K-characteristic
Hydraulic power unit connected load:	max. 2.2 kW / 8 A Factory fuse protection 3.15 A T must be aligned with the respective hydraulic power unit.
Controller internal consumption:	max. 300 mA
Control voltage:	24 V DC, max. 2.5 A; Protected by automatically resetting fuse for external sensors
Controller inputs:	24 V DC; All inputs are to be connected potential-free. Minimum signal duration for input controller command >100 ms
Controller outputs:	24 V DC, max. 2.2 A incl. Valves
Valves:	24 VDC, max. 0.6A / 100% ED
LCD monitor:	Only an original LCD monitor from MFZ may be used Article no. 91447
Relay outputs:	If inductive loads are connected, these must be equipped with corresponding interference suppression measures (e. g. Free-wheeling diodes, varistors, RC elements). Work contact potential-free; min. 10 mA; max. 230 V _{AC} / 4A. <i>Contacts that have been used for power switching can no longer be used for switching low currents.</i>
Temperature range:	Operation: -10°C to +55°C Storage: -20°C to +80°C
Humidity:	Up to 80% non-condensing
Vibrations:	Low-vibration mounting, e.g. on a masonry wall
Protection grade:	IP 65
Weight:	ca. 5.5 kg

11.2 Maintenance

The RS 300 V controller is maintenance free.

12. Manufacturer's declaration

MFZ Antriebe GmbH & Co.KG
Neue Mühle 4
D - 48739 Legden

Declaration of Incorporation

in accordance with the Machinery Directive 2006/42/EC for the incorporation of an incomplete machine per Annex II, Part 1B

Declaration of Conformity

in accordance with the directives:

- Electromagnetic Compatibility Directive 2014/30/EU
- RoHS Directive 2011/65/EU
- RoHS Directive 2015/863/EU
- RoHS Directive 2017/2102/EU

We hereby declare that the product cited below

Product designation: **Controller for loading bridge**
Type designation: **RS 300 V / RS 300 K**

as an incomplete machine is intended exclusively for incorporation in a loading bridge and has been developed, designed and produced in accordance with the following directives:

- Machinery Directive 2006/42/EC
- Electromagnetic Compatibility Directive 2014/30/EU
- RoHS Directive 2011/65/EU
- RoHS Directive 2015/863/EU
- RoHS Directive 2017/2102/EU

Furthermore, it also satisfies the requirements of the Low Voltage Directive 2014/35/EU per Annex I Part 1.5.1 of the Machinery Directive 2006/42/EC.

Applied standards:

- EN 61000-6-2 Electromagnetic compatibility (EMC) - Part 6-2: Generic standards – Immunity for industrial environments
- EN 61000-6-3 Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - emitted interference for residential, commercial and light-industrial environments

The relevant technical documentation has been compiled in accordance with Annex VII, part B of the Machinery Directive (2006/42/EC). We undertake to transmit, in response to a reasoned request by the market surveillance authorities, this information in electronic form within a reasonable term.

Person authorised to compile the technical documentation:
MFZ Antriebe GmbH & Co. KG - Neue Mühle 4 - 48739 Legden - Germany

Incomplete machines in accordance with the EC directive 2006/42/EC are only intended for incorporation in other machines or incomplete machines or systems or for combination with them, in order to form a machine with them in accordance with the aforementioned directive. This product must therefore not be put into service until the complete machine / system into which it is incorporated is compliant with the provisions of the aforementioned EC directives.

A change to this product that has not been approved by us results in this declaration losing its validity.

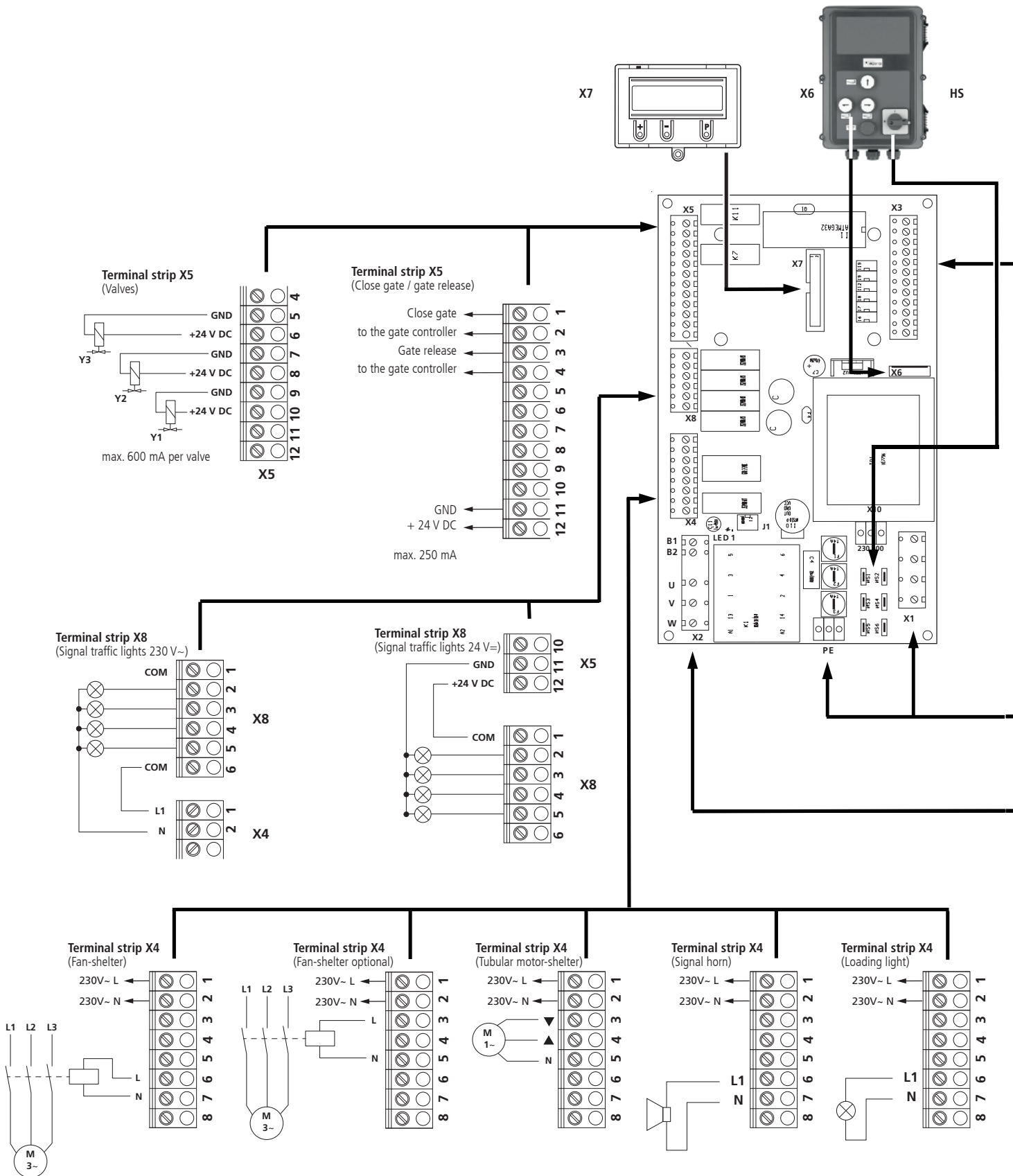
Legden, 01.07.2018



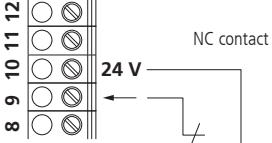
Dirk Wesseling, Management

13. Annex

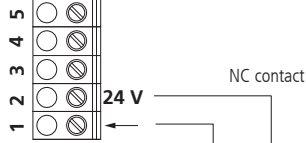
Overview of the connections



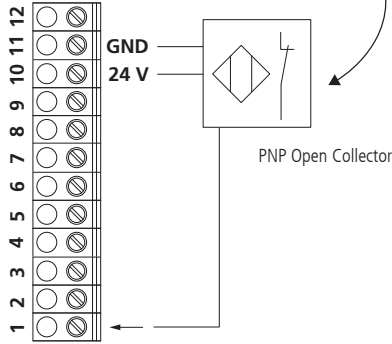
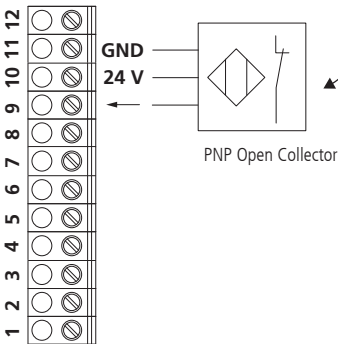
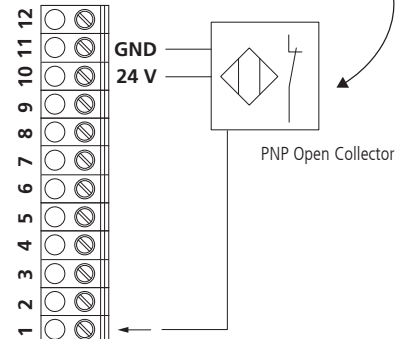
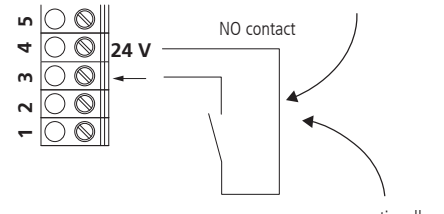
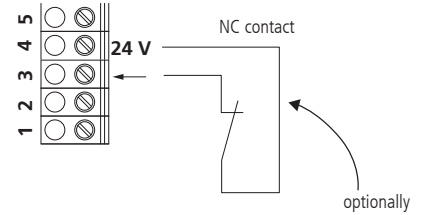
Terminal strip X3
(Approach sensor)



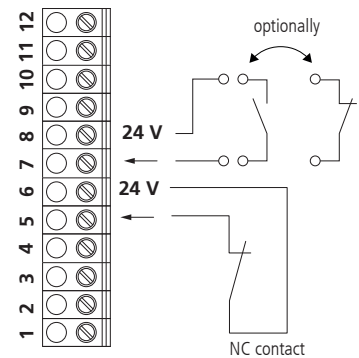
Terminal strip X3
(Wheel block)



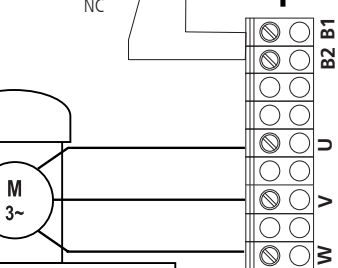
Terminal strip X3
(Bridge release
from the gate controller or sensor)



Terminal strip X3
(Limit switch bridge / free input)



Terminal strip X2
(Unit / emergency stop)



Terminal strip X1 / PE
(Power supply)

