BERGHAUS
Verkehrstechnik

Manual

Mobile Pedestrian Controller

FG 2

Version 2.02

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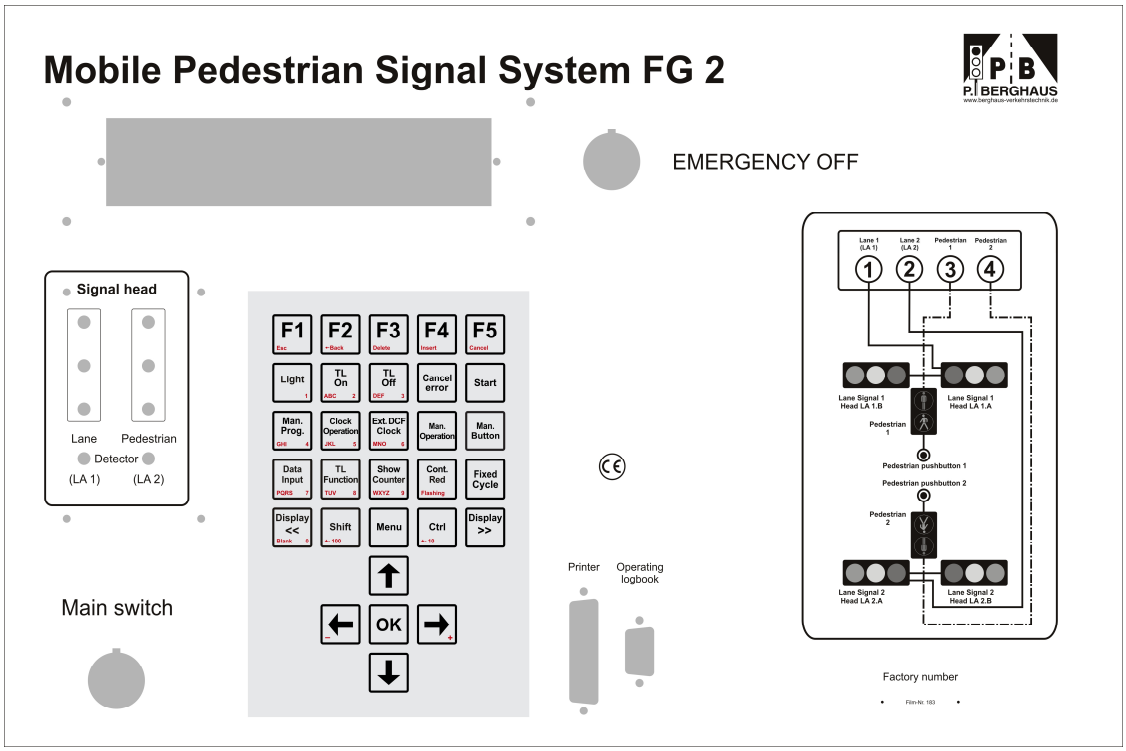
1. Initial commissioning



1.1 Basic use

Every time "**OK**" is pressed, the current selection is adopted and the program moves on to the next input mask. Use ← and → to change the selection; the chosen setting blinks.

1.2 Switching the system on

The traffic light system (TL / TLS) is switched on at the main switch. The following display appears:

```
Peter Berghaus GmbH - 51515 Kürten
FG 2
Version 2.02
```

If the system is on the "**TL OFF**" status, the traffic light system does not start with the existing program data; depending on the setting, the outside system is off or the vehicle signal heads blink.
The system then has to be switched on with the "**TL ON**" button; in this case, the standard display appears.

```
Mode          : Manual      TLS OFF
Program       : 1           Batt: 12.5V
Cycle Time    : 052         01.01.2015
Time          : 000         19:31:00
```

Note:

If the traffic light system is in the "**TL ON**" status and was without supply voltage for more than six minutes, an acoustic signal sounds for 30 seconds together with the following display:

```
                    Change Data ?   TLS ON

  >>                  Yes    No                <<
```

Confirm this query with "**Yes**" to go to the programming mode in order to enter the data for the signal timetable program. ☞ 2.1.6
The system begins to work with the existing program data if the query is confirmed with "**No**" or when the acoustic signal goes off.

This function reminds the user to check the program data after dismantling and recommissioning the traffic light system, as certain local circumstances may be different at the new site, such as lane width, for example. This display does not appear after a short interruption, e.g. after changing the battery.

1.3 Switching the traffic light system off

If the traffic light system is switched off by setting the main switch to "**OFF**", the system is turned off immediately after the main switch is pressed and all signal heads go blank immediately.

Note:

If the "**Shift**" and "**TL OFF**" buttons have been used to switch the traffic light system off, then a corresponding shut-down program is carried out.

1.4 Emergency OFF switch

If the emergency OFF switch is pressed, no signal program is carried out. The outside system is then completely switched off; furthermore, the traffic light system is put in "**TL OFF**" status.
If the emergency off switch is pulled to unlock it, the traffic light system has to be switched on again manually with the "**TL ON** button.

```
                  System Off
              EM-OFF Pressed
```

2. Data input

2.1 Using the programming mode

2.1.1 OK button

Press "**OK**" to adopt the current selection; the program moves on to the next input mask.
If a mask is closed with "**OK**", the data are adopted from this mask.

2.1.2 Esc button

Press "**Esc**" to cancel the current action; the visible input mask is closed without adopting the data and the standard display then appears.

2.1.3 Deleting data

Press "**Shift**" and "**Delete (F5)**" to delete the data of the currently visible input mask; the standard values then appear.

2.1.4 Marking arrows

The marking arrows << and >> mark the current selection in a selection menu. Use the arrow buttons ↑ and ↓ to change, then press "**OK**" to adopt the current selection.
The marking arrows > and < always mark the current input field.

2.1.5 Arrow buttons

Use ← and → to change the selection.
A value that is being queried blinks. When making an input, two arrows mark the input field.
When entering numbers, these buttons can be used to increase or decrease the values.
Holding the buttons increases the speed of change. Press "**Shift**" at the same time to change the 100s, while the button combination with "**Ctrl**" changes the 10s.
Press ↑ to go back to the previous input mask or input field. Press ↓ to go on to the next input field or input mask.
If you are already in the last input field, then the ↓ button has no function. Simply press "**OK**" to move on to the next input mask.

2.1.6 Switching the programming mode on

Use the button combination "**Shift**" and "**Ctrl**" and "**Data input**" to go to the programming mode.
The following display appears if printout is active.

```
Chosen Funct. Not Possible As Print
Nom Signal Time Plan Active

>OK<
```

When the active printout has finished, the system changes to programming mode with the following query:

```
Program Data

>>      Edit                View      <<
```

Your choice then takes you either to the programming or to the viewing mode. In the viewing mode, the current program data can be only viewed but not edited ☞2.10

If you select "**Edit**", the corresponding masks always show the current data for editing. Firstly you will see the input mask for the location.
Press "**Esc**" to cancel the complete action.
The pedestrian and the bottleneck modes have identical input masks for location, clearance times, green interlock and interim time matrix, but different designations are used depending on the particular mode.

Note:

The input masks for location, clearance times, green interlock and interim time matrix are queried first during data input and are not dependent on the number of day programs.
The entered data then apply to all day programs.

2.2 Entering the location

This input mask is used to enter the location or to edit an existing one.

```
Location
>> _                                  <<

>OK<
```

The inputs are made like entering an SMS text on a mobile phone: after the selected button is released, the letter or character is adopted and the cursor moves to the next field. The current position is marked with an underscore (character allocation see red marking on keypad).
Use the arrow buttons ← and → to change the cursor position. Press "**OK**" to adopt the location and change to the next input mask.

Special functions for entering text:

"**Back**"	= goes back one character to the left and deletes the existing character
"**Delete**"	= deletes the current character
"**Insert**"	= inserts a blank at the current position
"**Cancel**"	= cancels the whole text (only if you press and hold "**Shift**")

2.3 Entering clearance times

This input mask is used to enter the two required clearance times. Depending on the system type, the texts change in the input mask, but the procedure is the same.

Clearance times input mask, pedestrian system:

```
                    Clr  Times

Lane            >>  Pedestrian    >006s<    ↑
Pedestrian      >>  Lane            008s    ↓
```

Clearance times input mask, bottleneck TLS:

```
                    Clr  Times

Lane      1     >>  Lane      2     >016s<    ↑
Lane      2     >>  Lane      1      016s     ↓
```

Note:

The minimum values to be entered here are obtained as follows:

In pedestrian mode, the minimum clearance time from lane to pedestrian results from the total of the yellow phase for the lane group plus red-yellow phase for the pedestrian group (if present). The minimum clearance time for the pedestrian group is calculated from the yellow phase for the pedestrian group (if present) plus the red-yellow phase for the lane group. One second is added in each case.

In lane mode, the minimum clearance time from lane 1 to lane 2 results from the total of the yellow phase for lane group 1 plus red-yellow time for lane group 2. The minimum clearance time from lane 2 to lane 1 results from the yellow phase for lane group 2 plus red-yellow time for lane group 1. One second is added in each case.
The highest maximum amount is 350 seconds in each case.

2.4 Green interlock

The green interlock appears for information purposes only and cannot be edited. Depending on the system type, the texts change in the input mask, but the procedure is the same.

Green interlock mask, pedestrian system:

```
              Green  Interlock
                              LA   PE
          Lane          (LA)  --   xx        ↑
          Pedestrian    (PE)  xx   --        ↓
```

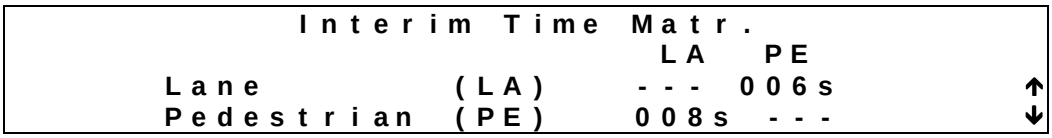
Green interlock mask, bottleneck TLS:

```
              Green  Interlock
                              LA1  LA2
        Lane      1    (LA1)  --   xx        ↑
        Lane      2    (LA2)  xx   --        ↓
```

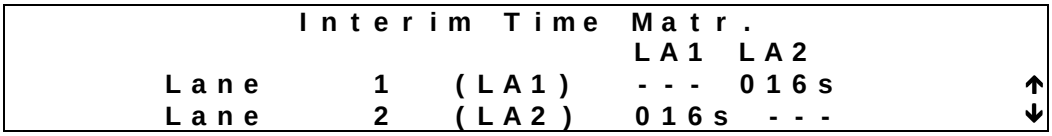
2.5 Interim time matrix

The following mask shows the interim time matrix. These values are shown according to the entered clearance times and cannot usually be edited. Depending on the system type, the texts change in the input mask, but the procedure is the same.

Interim time matrix mask, pedestrian system:



Interim time matrix mask, bottleneck TLS:



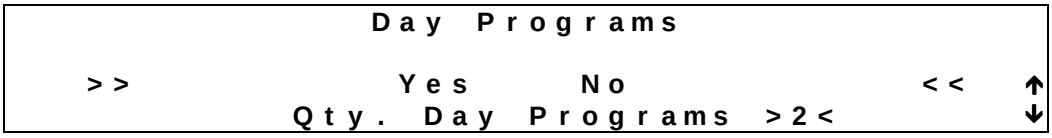
Note:

Use the button combination "**Shift**" and "**Ctrl**" and ← or → to go to the interim time matrix editing mode for test purposes. Interim time monitoring checks in the signal program to see whether the adjusted interim times are observed; usually these correspond to the clearance times.
If the chosen interim times are higher than the existing clearance times, the signal system shuts down with an interim time error.

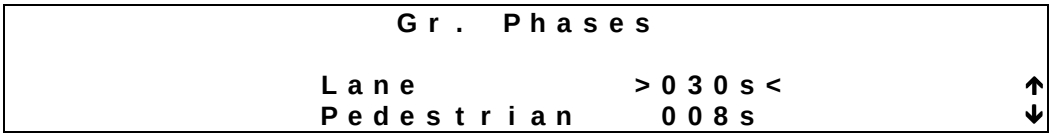
2.6 Input for the pedestrian signal system

2.6.1 Entering green phases

Before green phases can be entered, the system checks whether data should be entered for several day programs. The default is "**No**".



If you press "**Yes**" to confirm this selection, please follow the instructions for entering day programs. ☞ 2.7
If you confirm with "**No**", the input is made without day programs. The following input mask is used to enter the two required green phases.



The selected green phases are then fixed. If the pedestrian group comes on request ☞**2.6.4**, the signal system stays at green at the end of the green phase for the lane groups until a pedestrian request comes.
If the pedestrian group does not switch on request, these phases are implemented as fixed phase program.

Note:

The maximum value for the green phase is 145 seconds in each case.

2.6.2 Special extend vehicle function

This input mask only appears if the function has been activated in the system functions. ☞ **3.9**

The times entered in this mask make it possible to extend the lane group on receiving a pedestrian request. The lane groups then have the possibility of allowing existing vehicles to clear the road.
The extension time defines the time by which the lane green phase can be extended. The value for the time gap defines the time from registering the last vehicle; the extension is then interrupted after this time.
The extension finishes on reaching the maximum extension time or if no more vehicles are registered within the time gap time.

Note:

This function is not available in the "**bottleneck TLS**" mode.

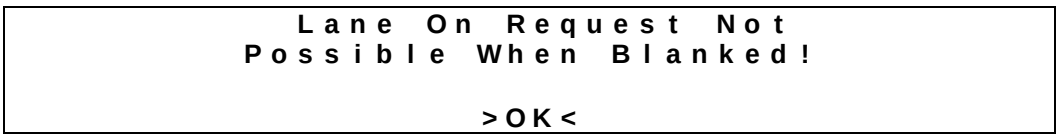
2.6.3 Lane request mode

This selection mask is used to activate the request mode for the lane group.
Default is "**No**".

If the query is confirmed with "**Yes**", the lane group changes its green phase on request.
The signal system then runs through a changed cycle and no longer stops at green-lane.
Depending on the setting in the "**Pedestrian on request**" mask, the system remains in green-pedestrian or in continuous red and waits for the corresponding request.

Note:

If blanking is active, the request mode cannot be switched on for the lane group. The following message appears:



2.6.4 Pedestrian request mode

This selection mask can be used to switch off the request mode for the pedestrian group.

If the query is confirmed with "**No**", the pedestrian group changes its green phase in the fixed cycle.
The signal system then runs through a fixed cycle and no longer stops at green-lane.

2.6.5 Blanking

This input mask only appears if the function has been activated in the system functions. ☞ **3.13**
This mask deals with the required function for "**blanking**".
The following blanking variations are available: "**None**", "**Only Lane Blank**",
"**All Blank**" and "**Lane Blinking**". The default is "**None**".
The selection is made with the arrow buttons ↑ and ↓. Press "**OK**" to adopt the required setting. Then the next input mask appears.
Press "**Esc**" to cancel blanking selection; this brings you back to the previous input mask.

Note:

This function is not available in the "**bottleneck TLS**" mode.

```
                    Blanking
   >>                None                    <<
              Only Lane Blank                  ↑
                  All Blank                    ↓
```

If programming data are changed during operation, it is not possible to change the current type of blanking. The following display appears:

```
                    Blanking
      Now      : Lane Only Blank
       Change Only When TLS Off                ↑
                     >OK<                      ↓
```

The traffic light system must be in "**TLS OFF**" status to change the type of blanking.
If the request mode has been switched on for the lane group, the following mask appears:

```
          Blanking Not Possible
        Because Lane On Request!

                     >OK<
```

2.6.5.1 None

All signals are always addressed in this setting.

2.6.5.2 Only Lane Blank

In this setting, the lane signal heads are switched to "**Blank**". In this case, the signal heads switch directly from red to blank at the end of the interim time from pedestrian to lane.
On receiving a pedestrian request, the lane groups switch from blank via yellow to red.
At the end of the corresponding interim time, the pedestrian lights then switch to green.

2.6.5.3 All Blank

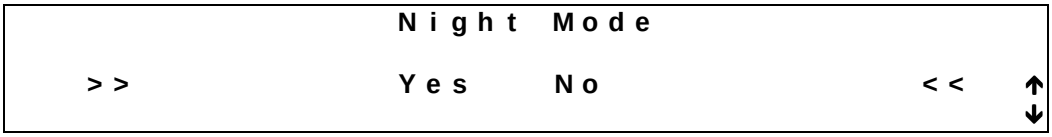
In this setting, at the end of the interim time from pedestrian to lane, the whole traffic light system switches directly from red to "**All Blank**".
When a pedestrian request is received, the pedestrian groups switch immediately to red and the lane groups from dark via 5 seconds yellow to red. At the end of the corresponding interim time, the pedestrian lights then switch to green.

2.6.5.4 Lane Blinking

This setting switches the lane signal heads to "**Yellow Blinking**". In this case, the signal heads switch directly from red to yellow blinking at the end of the interim time from pedestrian to lane.
On receiving a pedestrian request, the lane groups switch from yellow blinking via yellow to red.
At the end of the corresponding interim time, the pedestrian signals then switch to green.

2.6.6 Night Mode

After entering the green phases, the night mode can be activated.
This function is used to switch the traffic light system to OFF (all signals blank) or lane blinking at fixed times (if activated in the system functions ☞ **3.10**).



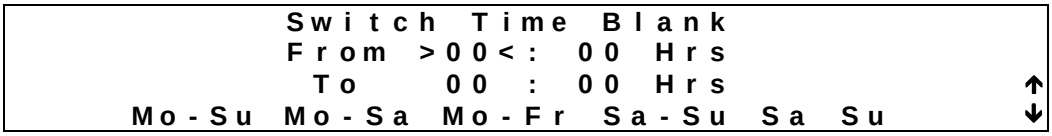
If night mode has been activated, the corresponding input masks are available.

Note:

If this query is confirmed with "**No**", the system goes straight to creating the signal program. ☞**2.6.7**

2.6.6.1 Night Mode Blank

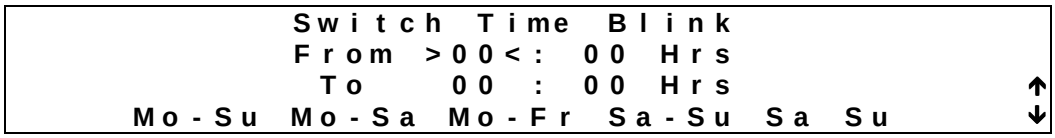
This input mask is used to enter the switching times for changing the signal system to "**Blank**".
For the rest of the time, the entered signal program runs or, if adjusted, the signal system changes to "**Blank**" for the entered period of time.



Only the start and end times are entered, entering hours and minutes separately.
Six week blocks are also available.

2.6.6.2 Night Mode Blinking

This input mask is used to enter the switching times for changing the signal system to "**Blinking**". For the rest of the time, the entered signal program runs or, if adjusted, the signal system changes to "**Blinking**" for the entered period of time.



Note:

Night mode blinking can only be chosen if "**Blinking**" has been activated in the system functions. ☞ **3.10**

Only the start and end times are entered, entering hours and minutes separately.
Six week blocks are also available.
This is the last point for entry without day programs.
The next mask is for "**Creating Signal Timetable Program**". ☞ 2.6.7

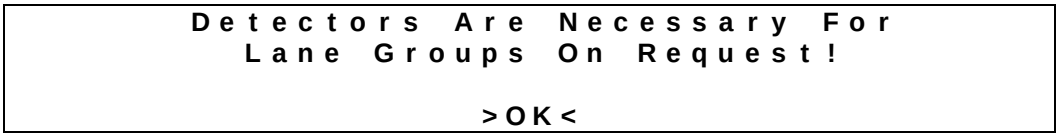
2.6.6.3 Checking date / time

If switching points for blanking are available, you will then see the query for checking the current date and time.

If you confirm this query with "**Edit**", you will then see the input mask for correcting the date and time. ☞ **3.1.6**

2.6.7 Creating Signal Program

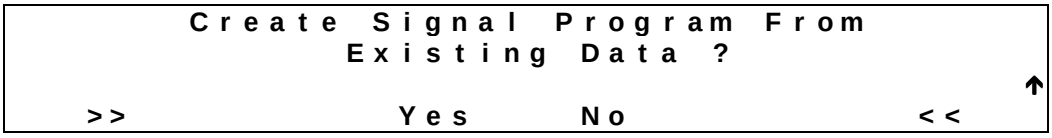
If the request mode has been switched on for the lane group, the following message appears:



Note:

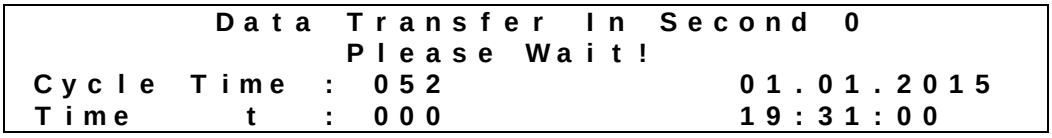
This message is for information only, as the standard lane signal heads are supplied without radar detectors.

After you have entered all program data, the system asks whether the data that you have just entered should be used to create a signal program.



If you confirm this query with "**No**", then the programming mode finishes. The signal program is not created and the standard display appears again. Next time you call up the program, the system will overwrite the data you have just changed with the data of the current program.

If you confirm with "**Yes**", the system creates a signal program from the entered data.
If the signal system is already executing a signal timetable program, the new data are adopted in the current operation. The following message appears until the data have been transferred:

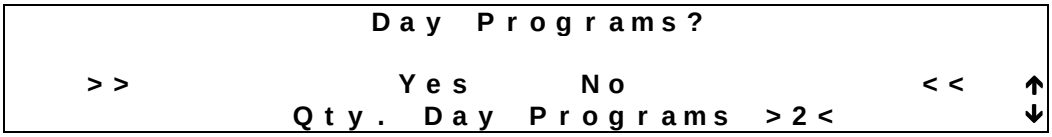


The standard display appears once the data transfer has been completed.

If the signal system is in the "**TLS OFF**" status, then the new data are transferred immediately.
The system starts the signal program when you press "**TLS ON**".

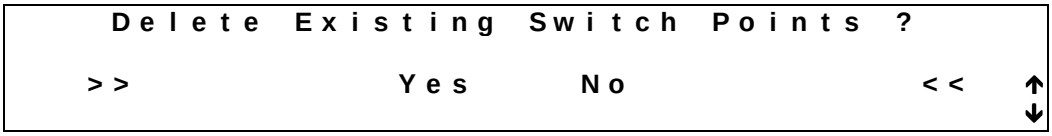
2.7 Input for the Pedestrian Signal System: Day Programs

If the following query that appears on leaving the interim time matrix is confirmed with "**Yes**", you can then enter the data for up to four day programs. The smallest input value for the number of day programs is 2. If no day programs are to be entered, confirm the query "**Qty.Day Programs**" with "**No**".
The individual program data are entered as described under ☞ **2.6.1** .



Note:

Day program input refers only to the corresponding green phases and the relevant switching points in the weekly automatic function. Clearance and interim times were already entered in the previous masks and apply for all day programs.
The following query appears before you can start entering the day programs:



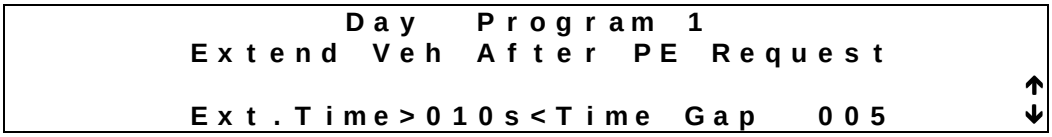
If you confirm this query with "**Yes**", all existing switching points are deleted. This is only recommended when entering a new program. To edit an existing program, please confirm this query with "**No**".

2.7.1 Input of Green Phases

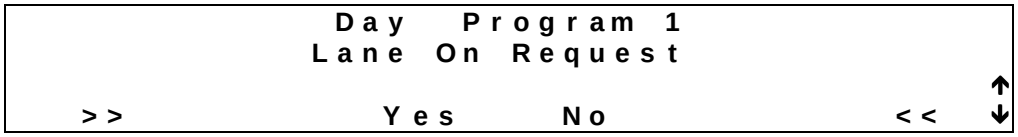
The sequence for data input when entering the day programs is as follows:

1. Green phases

2. Optional extension (if activated in the system functions)

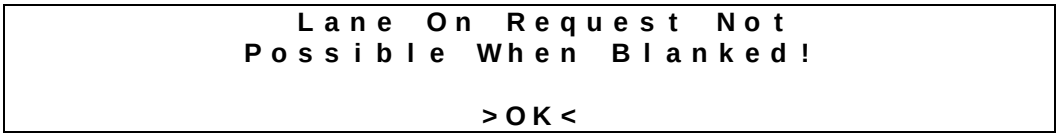


3. Query: request mode for the lane group

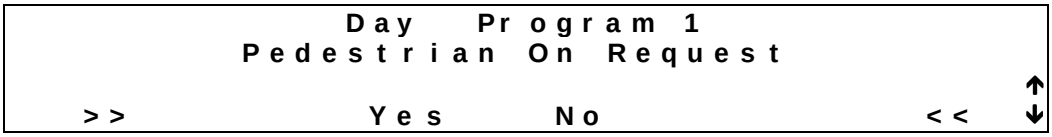


Note:

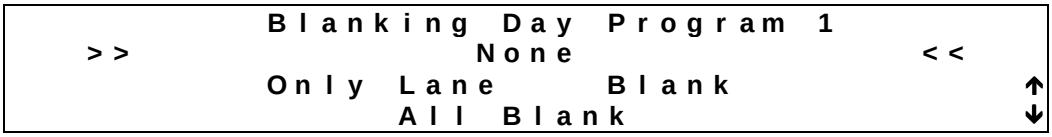
If blanking is active, the request mode cannot be switched on for the lane group and the following message appears:



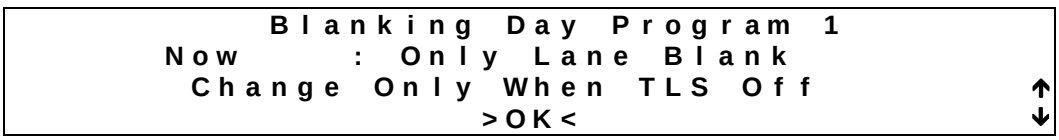
4. Query: request mode for the pedestrian group



5. Optional blanking (if activated in the system functions)

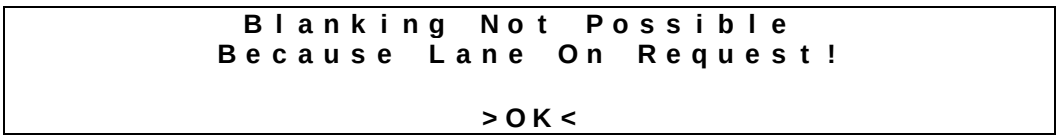


If the programming data are changed during operation, it is not possible to change the current type of blanking and the following message appears.



The traffic light system must be in "**TLS OFF**" status to change the type of blanking.

If the request mode has been switched on for the lane group, the following mask appears:



After entering these data, the switching points are entered (weekly automatic function) for the corresponding day program.☞**2.7.2**

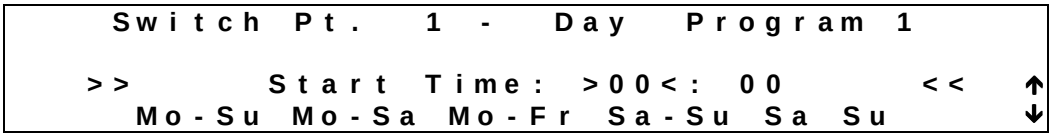
2.7.2 Input of Switching Points

Input of the green phases is followed by a query about the required quantity of switching points for each day program. There is a maximum number of eight switching points for each day program.

Repeat the inputs where applicable for up to eight switching points per day program.

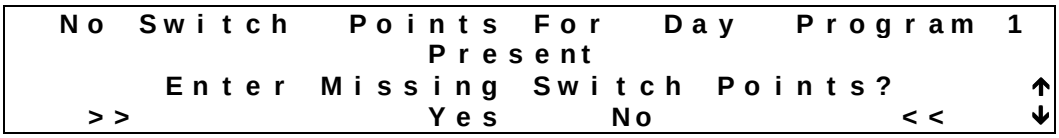
Note:

If you don't want to enter any switching points (perhaps because the program is switched by an external radio clock), enter a zero for "**Qty. switch points**". This then takes you straight to input for the next day program. ☞**2.7.1**



Only the start and end times are entered, with hours and minutes entered separately.
You can also select between six different day blocks for every switching point to specify on which days of the week the particular program is to be switched.
If a switching command has been executed, this program runs until the next switching command triggers the next program change.

If no switching point has been entered for a day program, the following message appears:

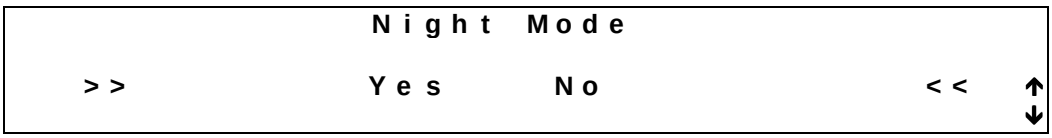


If you confirm this query with "**No**", you will go straight to the input for the next day program.
If you confirm with "**Yes**", you go back to input of the switching points for the particular day program.

After entering the day programs, you will then see the query for entering the night mode.
☞ **2.7.3**

2.7.3 Night Mode

After the day programs have been entered, the night mode can be activated.
This function is used to switch the traffic light system to "**OFF**" (all signals blank) or "**Lane Blinking**" at fixed times (if activated in the system functions ☞ **3.9**).



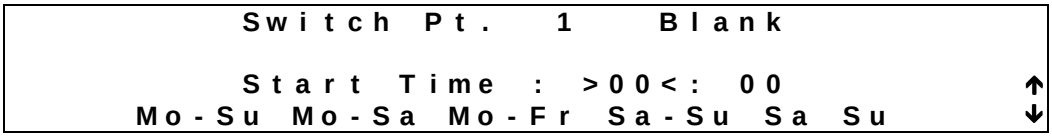
Note:

If this query is confirmed with "**No**", the system goes straight to creating the signal program.
If you don't want to enter any switching points (e.g. if the program is switched by a radio clock), enter a "**Zero**" for the quantity of switching points.

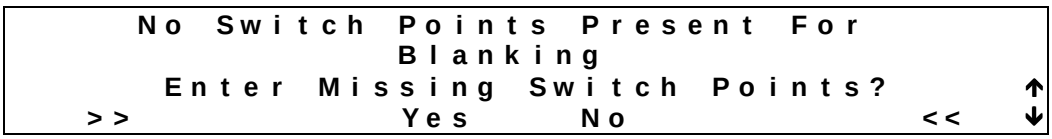
2.7.3.1 Night Mode Blank

In contrast to programming without day programs, up to eight switching points can be entered for "**Blanking**", based on the following query:

Repeat the inputs for up to eight blanking switching points, if necessary.



As with the day programs, only the start times are entered for blanking. Hours and minutes are entered separately.
You can also choose from six different day blocks for each switching point to specify on which days of the week the system is to be switched to blank.
The following message appears if no switching point is entered for blanking:

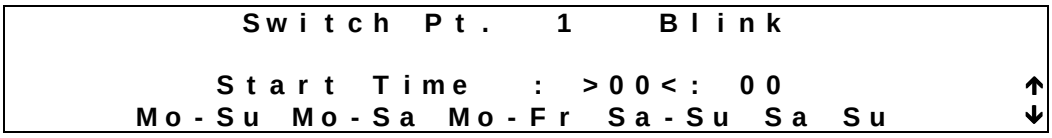


If you confirm this query with "**No**", you will go straight to the input for the blanking switching points (if activated). If you confirm the query with "**Yes**", you will go straight to the input for blanking switching points.

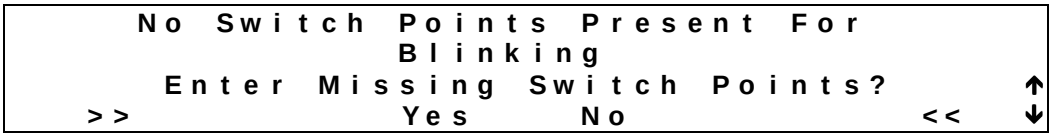
2.7.3.2 Night Mode Blinking

In contrast to programming without day programs, up to eight switching points can be entered for blinking. This is based on the following query:

Repeat the inputs for up to eight blinking switching points, if necessary.



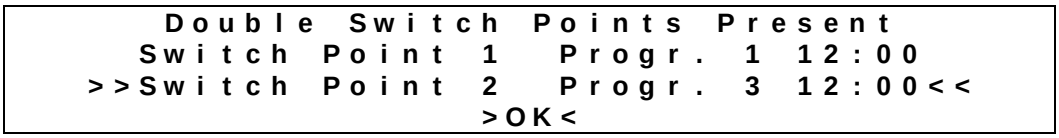
As with the day programs, only the start times are entered for blinking. Hours and minutes are entered separately.
You can also select between six different day blocks per switching point to specify on which days of the week the system is to be switched to blinking.
The following message appears if no switching point is entered for blinking:



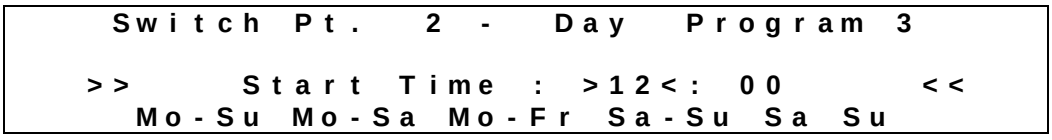
If you confirm this query with "**No**", you will go straight to creating the program data. If you confirm the query with "**Yes**", you will go straight to the input for blinking switching points.
If any switching points are present for day programs, blanking or blinking, after the last switching point has been entered the system checks for double switching points. ☞ 2.7.3.3

2.7.3.3 Checking the Switching Points

If double inputs are found following input of the switching points, then the following mask appears:



The mask shows the first double switching points to be found. Use the arrow buttons ↑ and ↓ to select one of the two double switching points. Press "**OK**" to open the chosen input for editing. The following mask appears:

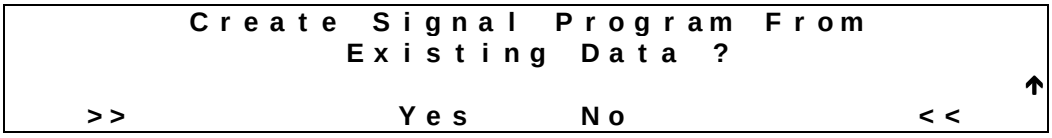


If the switching point is edited, the system does another check. If any more double switching points are present, the editing mask appears again. If there are no more double switching points, you will then see the query for checking the current date and time.

If you confirm this query with "**Edit**" you will then see the input mask for correcting the date and time. ☞ **3.16**
Press "**OK**" to move on to creating the signal program.

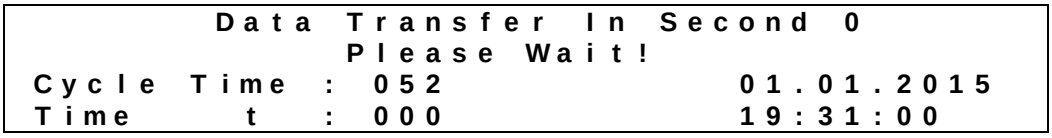
2.7.4 Creating the Signal Program

After you have entered all program data, the system asks whether the data that you have just entered should be used to create a signal program.



If you confirm this query with "**No**", then the programming mode finishes. The signal program is not created and the standard display appears again. Next time you call up the program, the system will overwrite the data you have just changed with the data of the current program.

If you confirm with "**Yes**", the system creates a signal program from the entered data.
If the signal system is already executing a signal timetable program, the new data are adopted in the current operation. The following message appears until the data have been transferred:

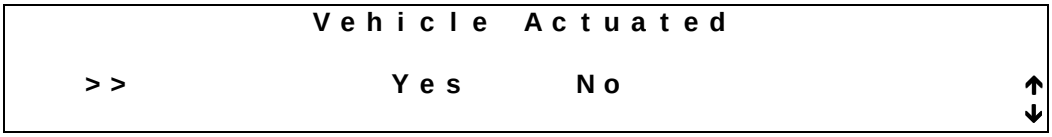


The standard display appears once the data transfer has been completed.

If the signal system is in the "**TLS OFF**" status, then the new data are transferred immediately.
The system starts the signal program when you press "**TLS ON**".

2.8 Input for Bottleneck Signal System

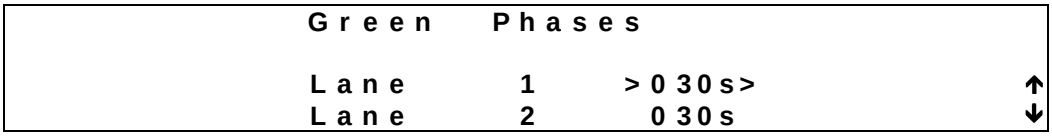
Before the green phases can be entered for bottleneck mode, you will see the query as to whether a vehicle-actuated signal timetable program is to be created.
The default is "**No**".



If you confirm with "**No**", the green phases are entered as signal program with fixed cycle ☞ **2.8.1** .
If you confirm with "**Yes**", you can proceed to enter a vehicle-actuated signal program with green phase extension or a request mode program with green phase extension. ☞ **2.8.2**

2.8.1 Entering Green Phases - Fixed Phase Program

In the fixed phase program, switching of the green phases is fixed. The signal system executes the signal program as a fixed cycle.

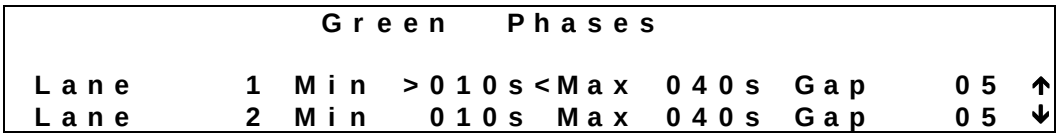


Note:

The maximum value for the green phase is 145 seconds in the fixed phase mode.

2.8.2 Entering Green Phases - Vehicle-Actuated

A minimum and maximum green phase and a time gap is entered for each group.



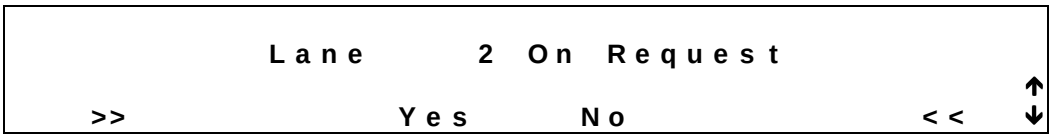
The lane groups generally switch the minimum green phase. The time gap control can be used to extend the green phase to the maximum green phase in each case. The extension finishes on reaching the maximum green phase or if no more vehicles are registered within the time gap time.

Note:

The maximum value for every minimum green phase is 145 seconds in each case.

2.8.3 Lane Request Mode

If you confirm the **vehicle-actuated** query with "**Yes**", once you have entered the green phases separately for each lane group you will then see the query for the request mode.



If "**No**" is chosen for both lane groups, both signal groups switch their green phase in the fixed cycle. If "**No**" is chosen for just one group, then this group switches its green phase to request mode. The signal system then remains at green one second before the end of the green phase for the other signal group and waits for a request from the other signal group.
The signal system runs in continuous red mode when both queries are confirmed with "**Yes**". Both signal groups then switch their green phases on request, taking due account of the interim times.

Note:

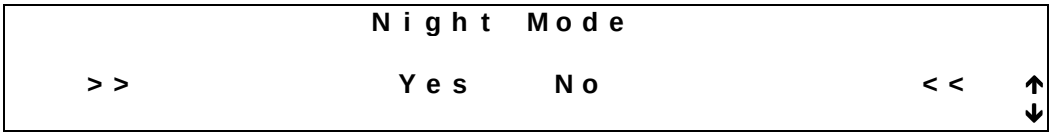
In continuous red mode, the same signal group can switch to green again immediately if it has previously finished its green phase and there is no request for the other signal group. The minimum red phase is one second.

2.8.4 Special Function for Extending Via Max Green

If the request mode has been switched on for both signal groups (continuous red system) and one signal group has green, the green phase for this group can be extended via the maximum green phase if a corresponding detection is present. This group then ends its green phase when there is a request from the other signal group or when no further detection applies.

2.8.5 Night Mode

After entering the green phases, the night mode can be activated.
This function is used to switch the traffic light system at fixed times to OFF (all signals blank) or lane blinking.



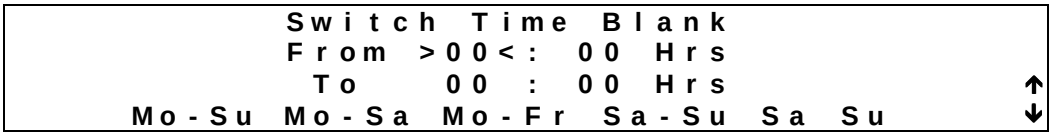
If night mode has been activated, the corresponding input masks are available.

Note:

If this query is confirmed with "**No**", the system goes straight to creating the signal program. ☞**2.9.4**

2.8.5.1 Night Mode Blank

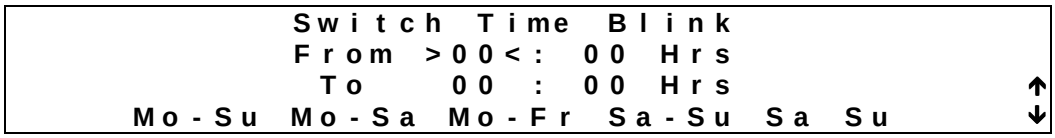
This input mask is used to enter the switching times for changing the signal system to "**Blank**".
For the rest of the time, the entered signal program runs or, if adjusted, the signal system changes to "**Blank**" for the entered period of time.



Only the start and end times are entered, entering hours and minutes separately.
Six week blocks are also available.

2.8.5.2 Night Mode Blinking

This input mask is used to enter the switching times for changing the signal system to "**Blinking**". For the rest of the time, the entered signal program runs or, if adjusted, the signal system changes to "**Blinking**" for the entered period of time.



Note:

Night mode blinking can only be chosen if "**Blinking**" has been activated in the system functions. ☞ **3.10**

Only the start and end times are entered, entering hours and minutes separately.
Six week blocks are also available.
This is the last point for entry without day programs. The next mask is for "**Creating Signal Timetable Program**". ☞ **2.8.6**

2.8.5.3 Checking date / time

If switching points for blanking are available, you will then see the query for checking the current date and time.

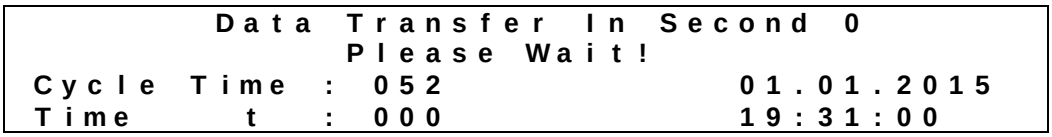
If you confirm this query with "**Edit**", you will then see the input mask for correcting the date and time. ☞ **3.1.6**

2.8.6 Creating the Signal Program

After you have entered all program data, the system asks whether the data that you have just entered should be used to create a signal program.

If you confirm this query with "**No**", then the programming mode finishes. The signal program is not created and the standard display appears again. Next time you call up the program, the system will overwrite the data you have just changed with the data of the current program.

If you confirm with "**Yes**", the system creates a signal program from the entered data.
If the signal system is already executing a signal timetable program, the new data are adopted in the current operation. The following message appears until the data have been transferred:



The standard display appears once the data transfer has been completed.

If the signal system is in the "**TLS OFF**" status, then the new data are transferred immediately.
The system starts the signal program when you press "**TLS ON**".

2.9 Input for Bottleneck Signal System: Day Programs

If the following query that appears on leaving the interim time matrix is confirmed with "**Yes**", you can then enter the data for up to four day programs. The smallest input value for the number of day programs is 2. If no day programs are to be entered, confirm the query "**Qty.Day Programs**" with "**Yes**".
The individual program data are entered as described under ☞ **2.9.1**

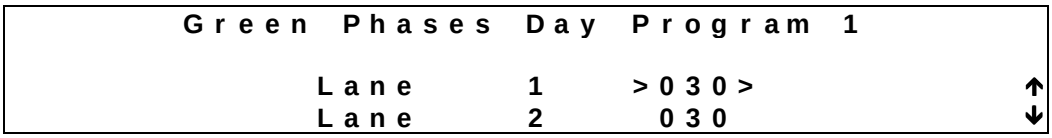
2.9.1 Entering green phases

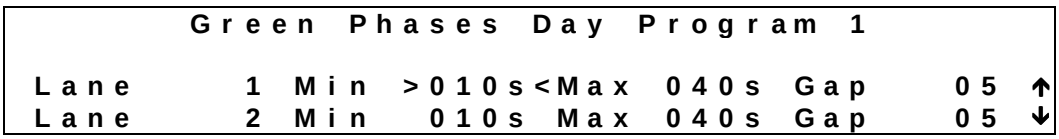
Before the green phases can be entered for bottleneck mode, you will see the query as to whether a vehicle-actuated signal timetable program is to be created.
The default is "**No**".

The sequence for data input when entering the day programs is as follows:

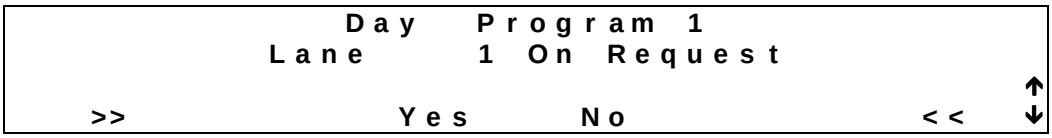
1. Green phases

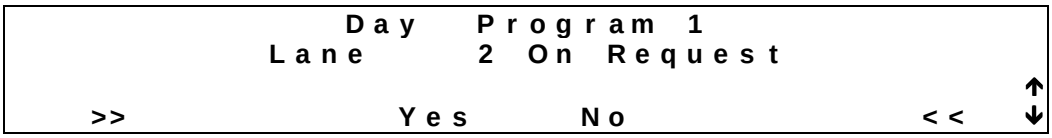
Depending on how you confirm the query, you will see the input mask for entering the green phases either for fixed phase mode or for vehicle-actuated mode.





2. Query for request mode (only when vehicle-actuated)





This is followed by entering the switching times (weekly automatic function) and the switching points for the corresponding day programs. ☞**2.9.2**
After entering the necessary data for all active day programs, you will see the query for night mode. ☞**2.9.3**

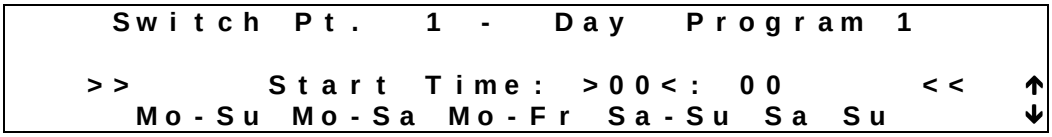
2.9.2 Input of Switching Points

Input of the green phases is followed by a query about the required quantity of switching points for each day program. There is a maximum number of eight switching points for each day program.

Repeat the inputs where applicable for up to eight switching points per day program.

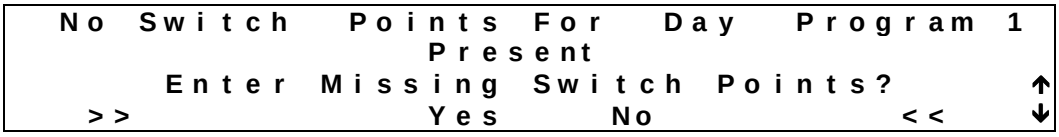
Note:

If you don't want to enter any switching points (perhaps because the program is switched by an external radio clock), enter a zero for "**Qty. switch points**". This then takes you straight to input for the next day program.
☞**2.8.1**



Only the start and end times are entered, with hours and minutes entered separately.
You can also select between six different day blocks for every switching point to specify on which days of the week the particular program is to be switched.
If a switching command has been executed, this program runs until the next switching command triggers the next program change.

If no switching point has been entered for a day program, the following message appears:

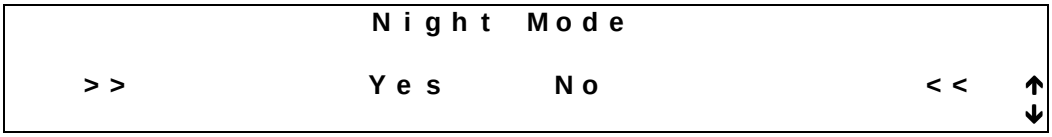


If you confirm this query with "**No**", you will go straight to the input for the next day program.
If you confirm with "**Yes**", you go back to input of the switching points for the particular day program.

After entering the day programs, you will then see the query for entering the night mode.
☞ **2.8.5**

2.9.3 Night Mode

After the day programs have been entered, the night mode can be activated.
This function is used to switch the traffic light system to "**OFF**" (all signals blank) or "**Lane Blinking**" at fixed times (if activated in the system functions ☞ **3.10**).



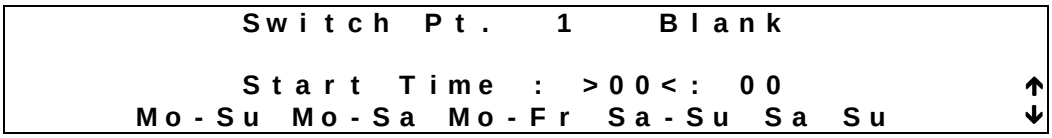
Note:

If this query is confirmed with "**No**", the system goes straight to creating the signal program.
If you don't want to enter any switching points (e.g. if the program is switched by a radio clock), enter a "**Zero**" for the quantity of switching points.

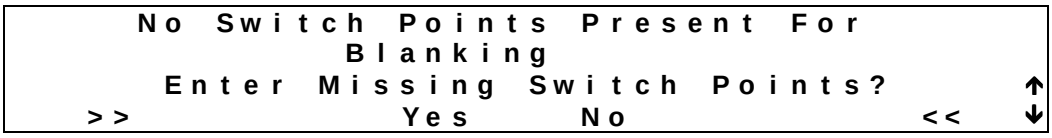
2.9.3.1 Night Mode Blank

In contrast to programming without day programs, up to eight switching points can be entered for "**Blanking**", based on the following query:

Repeat the inputs for up to eight blanking switching points, if necessary.



As with the day programs, only the start times are entered for blanking. Hours and minutes are entered separately.
You can also choose from six different day blocks for each switching point to specify on which days of the week the system is to be switched to blank.
The following message appears if no switching point is entered for blanking:

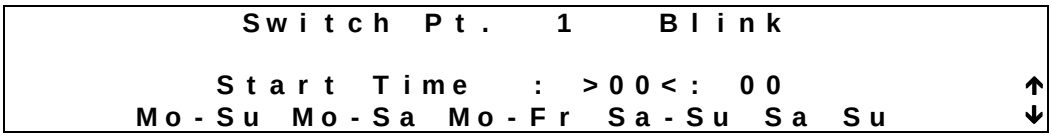


If you confirm this query with "**No**", you will go straight to the input for the blanking switching points (if activated). If you confirm the query with "**Yes**", you will go straight to the input for blanking switching points

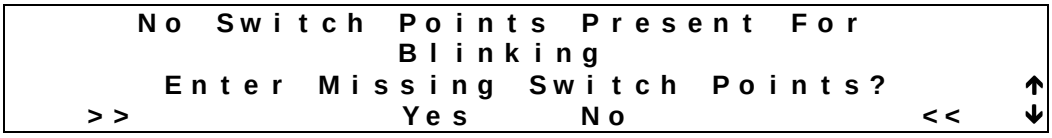
2.9.3.2 Night Mode Blinking

In contrast to programming without day programs, up to eight switching points can be entered for blinking. This is based on the following query:

Repeat the inputs for up to eight blinking switching points, if necessary.



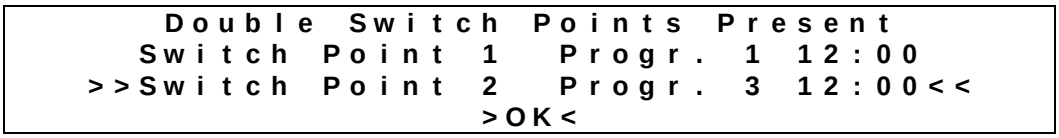
As with the day programs, only the start times are entered for blinking. Hours and minutes are entered separately.
You can also select between six different day blocks per switching point to specify on which days of the week the system is to be switched to blinking.
The following message appears if no switching point is entered for blinking:



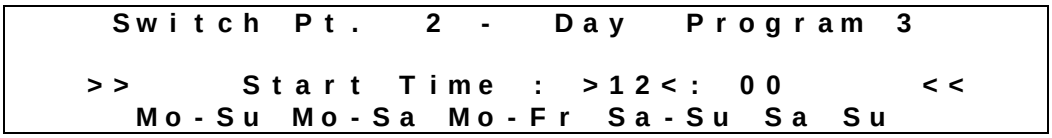
If you confirm this query with "**No**", you will go straight to creating the program data. If you confirm the query with "**Yes**", you will go straight to the input for blinking switching points.
If any switching points are present for day programs, blanking or blinking, after the last switching point has been entered the system checks for double switching points. ☞ 2.9.3.3

2.9.3.3 Checking the Switching Points

If double inputs are found following input of the switching points, then the following mask appears:



The mask shows the first double switching points to be found. Use the arrow buttons ↑ and ↓ to select one of the two double switching points. Press "**OK**" to open the chosen input for editing. The following mask appears:

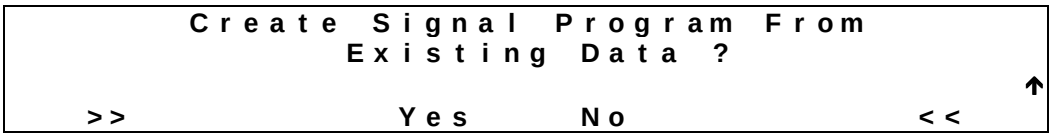


If the switching point is edited, the system does another check. If any more double switching points are present, the editing mask appears again. If there are no more double switching points, you will then see the query for checking the current date and time.

If you confirm this query with "**Edit**" you will then see the input mask for correcting the date and time.
☞ **3.16**
Press "**OK**" to move on to creating the signal program.

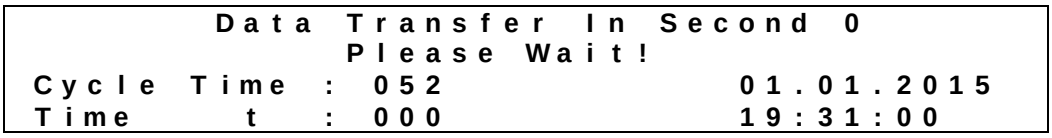
2.9.4 Creating the Signal Program

After you have entered all program data, the system asks whether the data that you have just entered should be used to create a signal program.



If you confirm this query with "**No**", then the programming mode finishes. The signal program is not created and the standard display appears again. Next time you call up the program, the system will overwrite the data you have just changed with the data of the current program.

If you confirm with "**Yes**", the system creates a signal program from the entered data.
If the signal system is already executing a signal timetable program, the new data are adopted in the current operation. The following message appears until the data have been transferred:



The standard display appears once the data transfer has been completed.

If the signal system is in the "**TLS OFF**" status, then the new data are transferred immediately.
The system starts the signal program when you press "**TLS ON**".

2.10 Viewing Mode

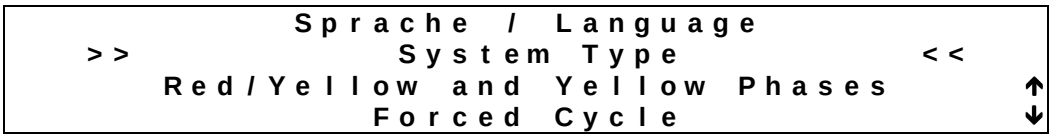
If you select "**View**" in the selection menu of the programming menu, then you will see all entered program data.
Press "**OK**" to move on to the next display window. Use the ↑ and ↓ buttons to scroll forwards and backwards. Press "**Esc**" to finish the viewing mode.

Note:

The program data cannot be changed in the viewing mode!

3. System Functions

Press the "**System Functions**" button to go to the settings menu of the signal system where all system functions can be changed.

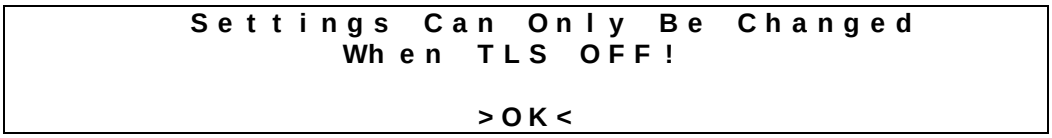


Note:

The following system functions cannot be changed during operation ("**TLS ON**").

- Selection of menu language
- System type
- OFF program
- Blanking
- Factory setting
- Green blinking

The following message will appear if you select one of these menu points:



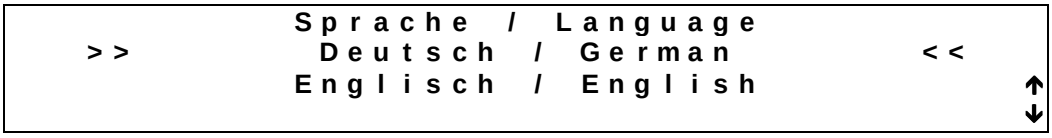
To change the system functions, firstly the signal system must be switched off with the key combination "**Shift**" and "**TLS OFF**".

3.1 Using the system functions menu

You can navigate through and use the menu as described in the "**Programming mode**" chapter. ☞ **2.1**
Use the ↑ and ↓ buttons to scroll through the selection menu and settings masks. Press "**OK**" to confirm the marked selection and move on to the corresponding sub-point. The current position is marked with >> <<. The current setting blinks in some menus.
The ←→ buttons can be used to change the values in the individual settings masks, and the ↑ and ↓ buttons are used to move between the individual input fields. Press "**OK**" to adopt the current input value; the cursor now moves to the next input field. If you are in the last input field, press "**OK**" to adopt the data in this settings masks; the system then takes you back to the selection menu.
Press "**Esc**" to cancel the input mode in the current input mask without data transfer; the cursor then goes back to the selection menu.

3.2 Language

In this input mask, you can select the required menu language from the range of languages provided.



3.3 System Type

The required system type is selected in this selection mask. The default is "**Pedestrian System**".

```
                 System Type
   >>          Pedestrian System          <<
      Pedestrian Syst One-Way Street        ↑
              Bottleneck TLS                ↓
```

For each mode, up to four day, blanking and blinking programs are available with four switching times each. The following message appears on changing over between "**Pedestrian System**" and "**Bottleneck TLS**":

```
      System Type Has Been Changed.
          Defaults Have Been Set
      And The Fault Memory Deleted!
                    >OK<
```

If you quit the system functions after changing the system type, the following mask appears to check the current data:

```
                 Program Data

   >>      Edit                View        <<
```

You can now either edit or just view the program data, depending on what you select. ☞ **2.1.6**

3.3.1 Pedestrian System

In this mode, the controller acts as pedestrian protection system with the following options:

- Pedestrian on request
- Lane extension
- Progressive signalling
- Blind and waiting signals
- Blanking

The system operates with four lane and two pedestrian signals.

3.3.2 Pedestrian System One-Way Street

Functions as for the pedestrian system but in this case with two lane signals and two pedestrian signals.
In this mode, the output socket for lane 2 is not used.

3.3.3 Bottleneck TLS

In this mode, the controller operates as bottleneck signal system, either in "**fixed phase mode**" or with "**green phase extension based on time gaps**“. "**Request mode**" and "**progressive signalling**" are also possible.

Note:

In this case, "**lane extension**", "**blind and waiting signals**" and "**blanking**" are not available.

3.4 Red/Yellow and Yellow Phases

This input mask is used to enter the red/yellow and yellow phases. The defaults vary according to system type and special functions.

3.4.1 Pedestrian System

Separate values can be entered for the lane and pedestrian groups.

```
          RedYell and Yell Phases
                RedYell    Yell
Lane             >1s<       4s
Pedestrian        0s       00s
```

Note:

In the pedestrian signal mode, the yellow phase for the pedestrian group can be entered in double figures.

If a red/yellow or yellow phase is entered for the pedestrian group, an activated waiting signal is deactivated and the following message appears:

```
    Red/Yellow Or Yellow Phases Present
    For Pedestrian. Waiting Signal
        Function Deactivated !
                    >OK<
```

3.4.2 Bottleneck TLS

In the bottleneck TLS mode, the red/yellow or yellow phases can be entered separately for each signal group.

```
          RedYell and Yell Phases
                RedYell    Yell
Lane      1      >1s<       4s
Lane      2       1s        4s
```

3.5 Forced Cycle

This mask deals with the forced cycle in request mode. The default is "**No**". If the forced cycle is switched on, then a time is shown.

```
                 Forced Cycle

  >>              Yes      No                <<
             Every 10 Minutes
```

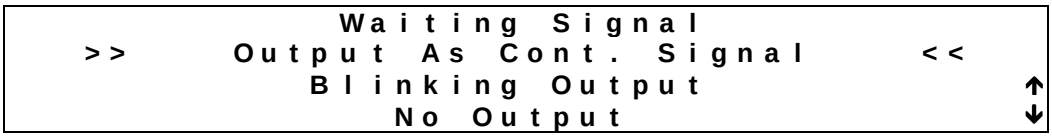
After the entered time, a forced cycle is carried out for groups that switch to green on request. This means that after the last green phase finishes in the corresponding group, an internal request is triggered at the end of the adjusted time. The corresponding signal group then switches once to green as programmed. The forced cycle counter is reset at the end of every green phase.

Note:

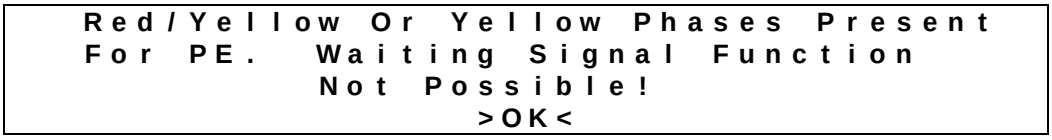
In the "**pedestrian**" mode, this function is only available for the pedestrian group as the request mode can only be activated for this group. In the "**bottleneck TLS**" mode, every lane group has its own forced cycle counter as the request mode can be activated separately for each lane group.

3.6 Waiting Signal

This mask deals with the waiting signal for pedestrians. The default setting is "**Output Cont. Signal**".



The waiting signal can appear as a "**continuous signal**" (default) or "**blinking**".
The waiting signal appears immediately in response to a pedestrian request, using the yellow output of the pedestrian group, and goes off automatically at the start of the green phase for the pedestrian group. The button illumination is also activated accordingly.
If a red/yellow or yellow phase has been entered for the pedestrian group, then the waiting signal cannot be activated and the following message appears:



Note:

This function is not available in the "**bottleneck TLS**" mode.

3.7 Blind Signals

This mask deals with the "**blind signals**" function (tactile).
The default is "**No**".

If this function is switched on, the corresponding signals are activated with continuous output of a guidance signal (pilot signal). The clearance signal then sounds together with the pedestrian green phase. There is no longer any signal output when the signal system shows an error.

Note:

This function is not available in the "**bottleneck TLS**" mode.

3.8 Progressive Signalling

This mask deals with the progressive signalling function. The default is "**No**".

How progressive signalling works:

In the "**pedestrian**" system, the waiting point for progressive signalling is one second before the start of the yellow phase for the lane groups. In pedestrian request mode, the signal system waits for a pedestrian request for two seconds before the start of the yellow phase for the lane groups. If there is a pedestrian request, the signal system switches to the progressive signalling waiting point one second later. Here the controller then waits for the synchronisation pulse - max. calculated cycle time plus 5 seconds - to warrant synchronisation of the current signal program within a cycle.

```
                    Prog. Sign.

   >>                Yes      No                 <<
```

If the progressive signalling function is activated, there are three input masks for this mode. Press "**Esc**" to go back to the previous mask from any point in the progressive signalling menu.

The value entered for "**automatic bridge**" after xxx-times "missing" means that when the synchronisation pulse is missing, the signal system no longer waits for the synchronisation pulse.

```
                    Prog. Sign.

   Automatic Bridge After   >03< Miss.
```

The system then continues to operate normally as soon as the progressive signalling point is reached. This function ceases as soon as the synchronisation pulse is present again. When a radio clock is used for synchronisation, it is usually not necessary to enter this parameter as the radio clock issues the synchronisation pulse continuously in the event of failure.

The recalculation procedure is selected in the following mask.

```
        Prog. Sign. - Recalculation
   >>          Beg Year        (R2)        <<
               Beg Day
               01.01.1980      (R3)
```

The following options are available: beginning of the year, beginning of the day, 01.01.1980 and beginning of the month.
The required recalculation method is to be stipulated by the customer. The required radio clock type is selected in the following mask. The inputs for external program changeover are evaluated differently according to the choice made.

```
        Prog. Sign. - Type DCF Clock

        >Type V4 (LAN)<   Type BCD                ↑
                                                  ↓
```

Enter the offset times in the following input mask, if required.

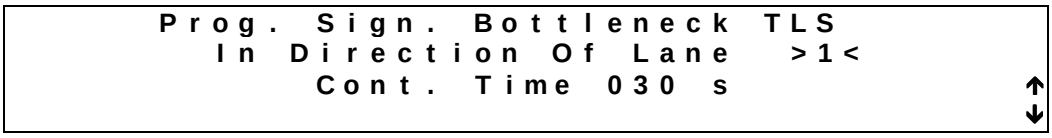
```
          Prog. Sign - Offset Times
Program              1       2       3       4
Offset Times    >000s<  000s    000s    000s  ↑
                                        >OK<  ↓
```

The offset times implement an adjustment to integrate the pedestrian system in existing progressive signalling. The incoming synchronous pulse is delayed by the time entered as offset.
In the pedestrian system, the green phase for the vehicle group always begins in second 0, so that this mask is used to generate the offset.

Example:

The cycle time is 90 seconds; the green phase for the vehicle group should begin in second 77.
Enter 77 seconds as offset time. This value is obtained as follows:
Difference between begin of the green phase FG 2 (second 0) until begin of the green phase as per intersection time plan (77).

In the "**bottleneck TLS**" mode, the choice of recalculation method is followed by a query in which direction the signal system is to be synchronised.

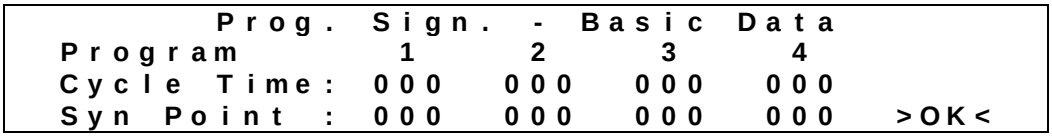


The synchronisation point is always one second before the end of the green phase in the selected signal group. The entered continuation time defines how long the system will wait for the synchronisation pulse. When this time expires, the message "**Syn Pulse 1 Missing**" appears until it is received again.

Note:

The longer the continuation time, the faster the signal system goes into progressive signalling after being switched on. Cycle time divided by continuation time results in the maximum number of cycles until the signal system is synchronised.

The last mask for progressive signalling shows the corresponding parameters. These cannot be changed as they are calculated from the entered program data.



Note:

The display always only shows the data for the active programs (max. four).

3.9 VEH Extension

This mask deals with the "**Vehicle extension after pedestrian request**" function.
The default is "**No**".

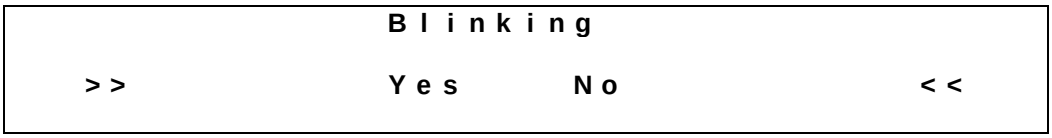
When this function is switched on, the corresponding values are entered after entering the green phase.

Note:

This function is not available in the "**bottleneck TLS**" mode.

3.10 Blinking

This mask deals with the "**blinking**" function. The default varies depending on system type: for pedestrian systems the default is "**No**" and for "**bottleneck TLS**" the default is "**Yes**".



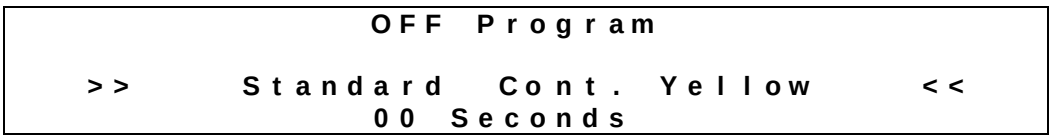
Note:

According to the current RiLSA, the lane signal heads do not blink in pedestrian signal systems.

If the blinking function is activated in the "**pedestrian**" mode, then the switching times for blinking are shown during programming, but only if the "**night mode**" function ☞ **2.7.3 / 2.9.3** has already been activated.

3.11 Switch-Off Program

This mask is used to adjust the "**OFF program**" function.
The default is "**Standard**".



3.11.1 Standard

This setting activates a fixed switch-off program according to the chosen mode.

3.11.2 Continuous Yellow

This setting activates a switch-off program with "**Cont. Yellow**" for the adjusted time. At the end of this time, the signals switch to blinking or blanking.

Note:

- If the "**Cont Yellow**" switch-off program is chosen, this switch-off program is also implemented when the signal system shuts down because of an error.
- If the time is set to "**0**", the signal system switches off immediately on reaching the common switching point or when there is an error.
- The pedestrian group only switches to yellow in the switch-off program if a yellow phase is present for the pedestrian group, otherwise it switches to red.

3.12 Output Request Counter

When this function is activated, the counter status for the number of pedestrian requests is sent to the operating log every hour on the hour. The default is "**No**".

```
                Output Request Counter

   >>                 Yes      No                 <<
```

Note:

To evaluate this information, the system needs to be equipped with the operating log book (order no.: EP4849). This function is not available in the "**bottleneck TLS**" mode.

3.13 Blanking

This mask deals with the options for the "**blanking**" function. The default is "**No**". This function is not available in the "**bottleneck TLS**" mode.

```
                        Blanking

   >>                 Yes      No                 <<
```

Note:

If "**blanking**" is activated, the yellow phases of the lane group are set to the defaults as per RiLSA. The following message then appears:

```
Red/Yellow and Yellow Phases for Blank

  Lane            >1s<        5s
  Pedestrian       0s         0s          >OK<
```

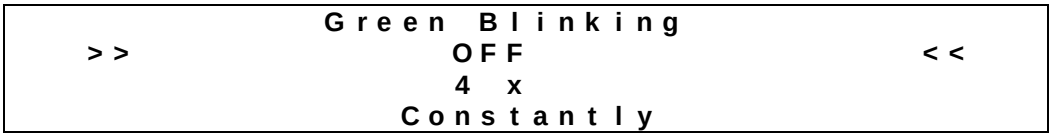
If other red/yellow and yellow phases are needed, they must be entered in the input mask.

Note:

The red/yellow and yellow phases of the pedestrian group cannot be changed in this mask; such changes can only be made in the mask for adjusting red/yellow and yellow phases ☞ 3.4.1

3.14 Green Blinking

This mask is used to activate the "**green blinking**" function. The default is "**OFF**".



3.14.1 Four Times

In this setting, the green signal blinks four times after the end of the green phase.

Note:

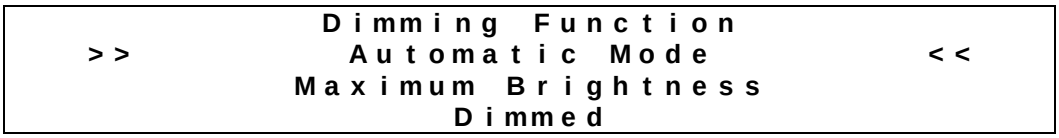
The green blinking time does not belong to the green phase. If this function is activated, the minimum green phase is 9 seconds (green and blinking green).

3.14.2 Constantly

If this setting is chosen, the green outputs of the signal groups blink constantly.

3.15 Dimming Function

This mask deals with the options for the "**dimming function**".
The default is "**Automatic mode**".



3.15.1 Automatic Mode

In this setting, the ambient brightness is measured with the fitted light sensor and the brightness of the traffic light signal head is then adjusted automatically all the time.

3.15.2 Maximum Brightness

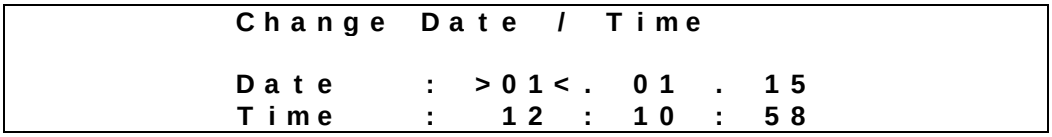
In this setting, all signal heads are always activated with maximum brightness.

3.15.3 Dimmed

In this setting, all signal heads are always dimmed and activated with minimum brightness.

3.16 Change Date / Time

This input mask is used to change the internal time and date of the signal system.



Note:

If a signal program runs with several day time programs or switching points for blanking/blinking, the correct date and the current time are necessary. This is the only way for the corresponding switching functions to be carried out at the right point in time.

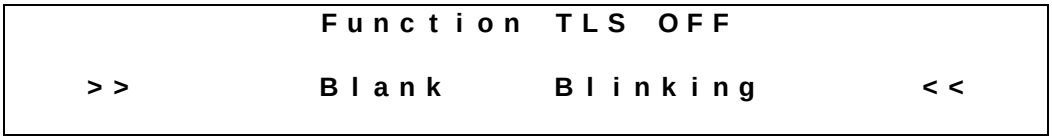
3.17 Restart After Power Failure

This mask deals with the "**restart after power failure**" function.
The default is "**Yes**".

If the setting is "**Yes**", then the signal system starts up automatically after a power failure with the current signal program if it is in the "**TLS ON**" state. However, if the signal system was previously switched off with the "**TLS OFF**" function, it does not start up again automatically after a power failure. The outside system is then set to blanking or yellow blinking (depending on the adjustment). In this case, the signal system has to be switched on with the "**TLS ON**" button.

3.18 Function TLS OFF

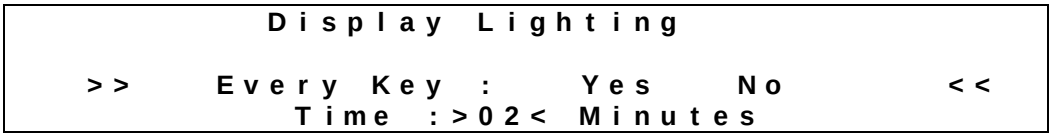
This mask deals with the "**TLS OFF**" function. The default varies depending on the system type.



In the pedestrian mode, the default is "**Blanking**"; in the bottleneck system, the default is "**Blinking**".

3.19 Display Lighting

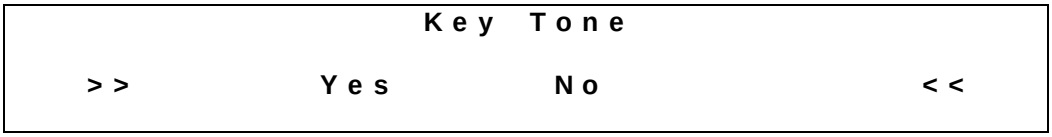
This menu is used to adjust the functionality of the display lighting.



If the function "**every key**" is switched on (default is "**No**"), then you can press any key to switch the display lighting on. If this function is switched off, the display lighting has to be switched on manually with the "**light**" button.
The display lighting goes off automatically after the time entered under "**time**".

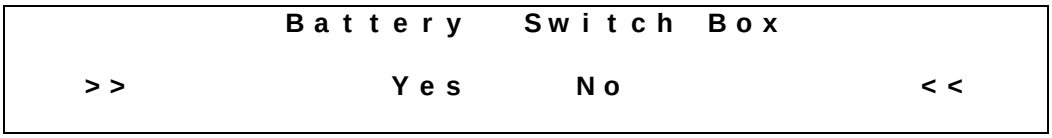
3.20 Key Tone

This menu is used to switch off the key tone that is heard whenever a key is pressed. Default is "**Yes**".



3.21 Battery Switch Box

If the signal system is running on batteries connected via a battery switch box (article No. A46502 / A46503), please select "**Yes**".



Note:

If the "**No**" setting is chosen by mistake for operation with a battery switch box, the battery warning will be issued too soon because of the protective diodes in the battery switch box.
However, it is vital to adjust the "**No**" setting for operation without a battery switch box, as otherwise the battery warning will come too late.

3.22 Error Blinking for Undervoltage

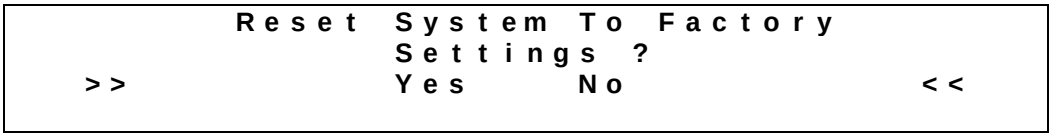
This menu is used to adjust the "**error blinking for undervoltage**" function with a default of "**Yes**".
If this function is activated, the signal system switches to yellow blinking when the supply voltage falls below 10.6 volt, until the final switch-off limit of 10.2 volt is reached.

Note:

In the pedestrian mode, this function only works when the "**blinking**" function is activated ☞ **3.10**

3.23 Factory Setting

This menu point resets the signal system to the factory settings with the following query:



If answered with "**Yes**", **all settings** and **all existing program data** are reset to the defaults.
The following confirmation then appears:

Press "**OK**" to close the message and return to the first menu point in the settings menu.

4. Operating the traffic light system

4.1 Keypad

4.1.1 Function buttons

The function buttons "**F1**" to "**F5**" are reserved for special functions. The following functions are currently available:

1. Shift + Ctrl + F1 = this bridges the progressive signalling input ON
2. Shift + F1 = this bridges the progressive signalling input OFF
3. F5 = this shows the clearance and green phases of the currently active program
4. Shift + Ctrl + F5 = this checks outside system (allocation), only in "**TL OFF**"

4.1.2 Light

Switches the display lighting on for the adjusted time.

4.1.3 TL On

Switches the signal system to "**TL On**". The signal system starts with the switch-on program and then executes the current signal program.

4.1.4 TL Off

Switches the signal system to "**TL Off**" with the switch-off program. Depending on the setting, the outside system is blanked or the lane signal heads blink. In this case, the signal system does not automatically start the current signal system after a power failure.

Note:

This function is only executed if you press the key combination "**Shift**" and "**TL Off**".

4.1.5 Cancel error

This button deletes the displayed error messages.

4.1.6 Start

If the signal system is in "**TL On**" status, the current signal program starts when you press this button.

4.1.7 OK

Press "**OK**" to execute always the function currently marked by the marking arrows > <.

4.1.8 Cursor buttons

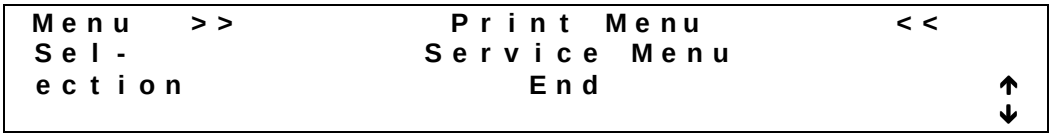
Use the cursor buttons ↑ ↓ to scroll in the current display mask.

4.1.9 Display, Shift and Ctrl

Press "**Display** <<" and "**Display** >>" to scroll back and forth one display page at a time in the main mask. If you also press and hold the Shift button, this brings you straight to the first or last page.

4.1.10 Menu

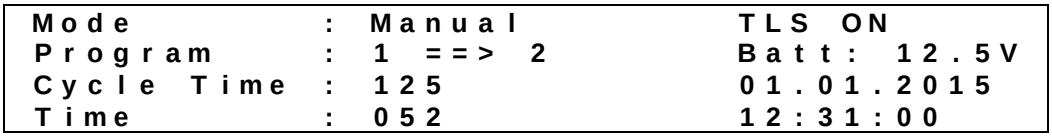
Press "**Menu**" to go to the print menu ☞ **4.2** or to the service menu ☞ **4.3.**
Press again or press "**End**" to go back to the standard display.



4.1.11 Man. Prog.

Press "**Man. Prog.**" to see all enabled programs for manual selection in the display. The selection is made with the arrow buttons ↑ and ↓. Press "**OK**" to confirm the chosen program; the controller automatically changes to the program.

The choice for "**blanking**" and "**blinking**" is also available. This is shown in the display until the program is changed.



4.1.12 Clock Operation

In this mode, the program is switched by the internal computer clock.

4.1.13 Ext. DCF Clock

Press this button to have the program switched by an externally connected device, such as a radio clock.
The signal system then changes according to the day time programs.

4.1.14 Man. Operation

Press "**Man. Operation**" to activate the manual mode; the signal system then runs automatically to the manual lock-in point. The following message appears "**System runs to waiting point**".
As soon as the waiting point is reached, the signal system remains at this point. The following message appears "**System at waiting point**". The "**Man. Button**" is used to control manual operation. Press the "**Man. Operation**" button again to switch this function off. When manual operation is activated, the system works with a fixed cycle; in manual operation, there is no request mode, green phase extension or progressive signalling.

Note:

The program is abbreviated in manual mode. If the green phase is less than 10 seconds, then the adjusted green phase is switched as minimum green phase. The signal system then remains at the corresponding waiting point. If the green phase is longer than 10 seconds, the minimum green phase in manual operation is 10 seconds. Here again, the signal system then remains at the corresponding waiting point.

4.1.15 Blinking

To switch the signal system to "**blinking**", either press "**Shift**" and "**Cont. Red**" or use the "**Man. Prog.**" button and then select "**Blinking**" in the following selection menu.
In pedestrian mode, the blinking selection only appears if this function has been activated in the system functions. This function is automatically activated in the bottleneck TLS mode. ☞ **3.9**

Remarks:

According to the current RiLSA, the lane signal heads in pedestrian systems do not blink so a separate "**blinking**" button has not been provided.

4.1.16 Show Counter

This mask shows the counted requests in pedestrian mode (total counter status, counter status for yesterday, counter status for today).
Today's counter is deleted at every day change (24:00 h) and the requests counted up to that point in time are then shown under "**Yester.**".
Press the key combination "**Shift**" and "**Delete Error**" to delete the displayed counter statuses.
Press "**Esc**" to close the mask; otherwise this happens automatically after ten seconds.

Note:

The counter statuses are deleted automatically every time the signal system changes type between "**Pedestrian mode**" and "**bottleneck TLS**" and whenever the system is reset to the factory setting.

4.1.17 Cont. Red

Press this button to switch the signal system as soon as possible to continuous red for all systems (at the end of the minimum green phase). "**Cont. Red**" is then displayed as mode. Press the button again to switch the continuous red function off again; the signal system then continues to operate in the last chosen mode.

4.1.18 Fixed Cycle

On selecting this mode, the signal system switches to a fixed cycle and the pedestrian request mode is switched off. The system now works rigidly with the green phases of the current signal program. A corresponding message appears in the display when the fixed cycle is activated.

Note:

In vehicle-actuated bottleneck mode, the fixed cycle always works with the maximum green phases.

4.2 Print Menu

This menu offers a choice of different print functions:

4.2.1 Print Nom.

Prints all current program data.

4.2.2 Print Error Report

Prints the last five errors from the error memory.

4.2.3 Print Last Program Changes

Prints the last five program changes from the program change memory.

4.2.4 Print Act. On/Off

Switches "**Print Act.**" on or off with a print-out of the current status for the outside system in one-second intervals.

4.2.5 Print Error Report Line-By-Line On/Off

Switches the line-by-line "**Print error report**" function on or off; any errors that occur are printed in list format (e.g. for monitoring tests).

4.2.6 Print Program Changes Line-By-Line On/Off

Switches the line-by-line "**Print program changes**" function on or off; any program changes that have been made are printed in list format (e.g. for testing the individual day programs).

4.3 Service Menu

In this menu, the SMS output can be deactivated, and the fault and program change memory can also be deleted. Similarly, troubleshooting monitors can be disabled for a specified period of time.

```
Ser-     >>          SMS-Output          <<
vice          Delete Error Memory
Menu            Switch Monitoring
                End Service Menu
```

4.3.1 SMS-Output

This function can be used to deactivate the SMS output for a specified period of time so that no corresponding fault SMS is sent, for example, when a battery is changed (without battery switch box).
The selection menu is displayed if this function is chosen. The default is always "**Disable**" (indicator flashes).

```
                SMS-Output
        Disable          Enable

                    >OK<
```

After confirming with "**OK**," a selection menu appears for choosing the period of deactivation (15/60 minutes). The default is always "**15 minutes**" (indicator flashes).

```
        SMS-Output Disable For
        15 Minutes  60 Minutes

                    >OK<
```

After confirming with "**OK**" the SMS output will be deactivated for the selected period time and no SMS error messages will be sent. If the specified time period has expired, the SMS output is automatically reactivated. As an alternative, you can also activate the SMS output manually via the selection menu.
If the SMS output is deactivated, a corresponding indicator appears on the display.

Notes:

If the deactivation period of time is not sufficient, deactivate the SMS output again.
The specified time is restarted.
The SMS output is reactivated after a power failure, switching the controller off/on or switching the SMS output back on after pressing the emergency stop switch.

4.3.2 Deleting Error Memory

Selection of this function is followed by a query whether the error and program change memory should be deleted.

```
      Error And Prog Change Memory
          Confirm Delete With

                    >OK<
```

Press "**OK**" to delete the memories, then the following message appears:

```
      Error And Prog Change Memory
                Deleted !

                    >OK<
```

Press "**OK**" to go back to the service menu.

4.3.3 Switching the Monitoring Functions

This menu can be used to deactivate the monitoring functions for a defined time for testing or maintenance purposes. This function is generally blocked; more information is available on request.

```
        Switch Monitoring Functions
Lamp   Monitoring   Off  For  00  Minutes
Status Monitoring   Off  For  00  Minutes
```

The lamp monitoring and status monitoring functions can be deactivated separately for a maximum period of 60 minutes in each case. At the end of the adjusted time, the corresponding monitoring functions are activated again automatically. A corresponding message appears in the display when a monitoring function has been deactivated.

5. Displays During Operation

5.1 Standard Displays

5.1.1 Standard Display

As a rule, the standard mask is always shown. Use "**Display** <<" and ">>" to scroll between the individual masks.

```
Mode          : Manual          TLS On
Program       : 1               Batt : 12.5V
Cycle Time    : 125             01.01.2015
Time          : 052             12:31:00    >
```

The following information is shown:

- "**TLS ON**" or "**TLS OFF**"
- Operating mode
- Current program
- Current cycle time and current point in time
- Battery voltage - this blinks when battery voltage is too low (from approx. 11.5 V)
- Date and time

Note:

In the position where "**TLS ON**" or "**TLS OFF**" appears, the display changes at intervals to show the current mode.

```
Mode          : Manual          PE Mode
Program       : 1               Batt: 12.5V
Cycle Time    : 125             01.01.2015
Time          : 052             12:31:00    >
```

The following displays are possible:

PE Mode	=	pedestrian system
PE Onew.	=	pedestrian system oneway street
Bottleneck	=	bottleneck TLS

5.1.1.1 Special Displays

The following additional information appears in the standard display where applicable:

- (Start) - signal system must be started with the "**Start**" button
- (ON-PG) - signal system performs the switch-on program
- (OFF-PG) - signal system performs the switch-off program
- At waiting pt. - system is at manual lock-in point
- Running to waiting pt. - system is running to manual lock-in point.
- 01 ==> 02 - program change in progress
- CT - current continuation time "**progressive signalling**"

5.1.2 Detector Memory

This mask shows saved requests and active detector/request inputs. When requests have been made, the display shows an "**x**" at the corresponding point. The expressions used in the display have the following meaning:

Lane / pedestrian	=	a request is present for the respective group (PE mode)
Lane 1 / lane 2	=	a request is present for the respective group (bottleneck mode)
LA1 / LA2 / PE	=	current status detector / request input

In addition, the synchronisation input, the BCD inputs (for external program changes) and the dimming function are shown together with the current program with cycle time and point in time.
The expressions used in the display have the following meaning:

Syn	=	active input for synchronisation pulse
BCD	=	current value BCD input (0-15)
LDR	=	display automatic dimming as a %

Switching status of the internal micro-switches (used to activate special functions):

D1 to D4	=	"**x**" = closed, "-" open

Pedestrian signal display:

```
   Program : 1   Time      : 125 (000)
Lane        : x   LA1: x   Syn: x
Pedestrian  : x   LA2: x   BCD: 15
D1x D2- D3- D4- PE : x   LDR: xxx%    < >
```

Bottleneck signal display:

```
   Program : 1   Time      : 125 (000)
Lane    1   : x   LA1: x   Syn: x
Lane    2   : x   LA2: x   BCD: 15
D1x D2- D3- D4- PE : x   LDR: xxx%    < >
```

In groups that switch on request, a saved request is deleted at the start of the green phase. Groups switching in the fixed cycle are given an internal request again automatically at the end of the green phase.

Note:

If the display shows "**z**" for a group, the forced cycle has triggered a request for this group.

5.1.3 Error Memory

This mask shows the internal error memory. Press ↑ and ↓ to change between the individual entries.

```
          Error Memory (1 of 5)
01.01.15  19:31:00  Prg. 01  Time 008
Red A Defective                    ↑
Lane    1                          ↓ < >
```

Note:

Maximum five errors are managed in the error memory. When a new error is reported, the oldest is deleted (shift register).

5.1.4 Program Change Memory

This mask shows the internal program change memory. Press ↑ and ↓ to change between the individual entries.

```
        Last Program Change (1 of    5)
01.01.2015   19:31:00
Prg. 01   (025)   >>   Prg. 02   (052)   ↑
                                        ↓<>
```

Note:

Maximum five program changes are managed in the error memory. When a new program change is reported, the oldest is deleted (shift register).

5.1.5 Info Page

The information page shows the current version of the control software and the keypad controller, together with the version of the serial radio clock, if connected.

```
   Peter Berghaus GmbH - 51515 Kürten
                  FG 2
       Version  2.02    06.07.2018
       Keypad   1.30    DCF-Cl.  ----
```

Note:

If no serial radio clock is connected, "----" appears instead of the version number.

5.2 Error Messages

5.2.1 Triggering Errors

If the signal system shuts down because of an error, a corresponding error message appears.
This is shown in the display with priority over all other messages.

```
Mode          : Clock Mode      Error
Program       : 1               Batt: 12.5V
Red A Defective
Lane
```

The display always shows the error or the cause.
Possible errors are:

- red lamps defective
- status red, yellow or green
- green / green
- red / green
- interim time
- status error in the blind modules

Note:

When an error occurs, the signal system does an auto-start, but only if it was running error-free for four minutes previously. If the same error is present after the auto-start, the signal system then no longer starts automatically. The error must be remedied before it can be acknowledged by pressing "**Delete Error**". Then press "**Start**" for the signal system to function again.

5.2.2 Battery Voltage Too Low

If the battery voltage falls below 10.6V, the signal system switches to lane yellow blinking.
The lane groups in the signal system then blink until the shut-down limit is reached.

```
Mode          : Clock Mode      Error
Program       : 1               Batt: 10.5V
Battery Voltage
Too Low
```

Note:

This function is only performed if "**Blinking**" and "**Error blinking for undervoltage**" have been activated in the system functions. ☞ **3.10 / 3.22**

5.2.3 Undervoltage

If the signal system shuts down because of undervoltage, the following display appears; it is then no longer possible to operate the signal system.

```
                                  Error
Undervoltage                      Batt:  9.2V
Operation Not Poss.
```

Note:

Undervoltage monitoring is triggered at a battery voltage of about 10.2 volt. Once the battery voltage reaches more than 11.5 volt, the signal system starts working again.

5.2.4 Internal Error

When controller monitoring finds an error, the following message appears in the display.

```
Internal Error
```

This error can only be acknowledged by switching the signal system off and on again. If the same error message appears after switching the signal system on again, this indicates a hardware fault. In this case, the control board has to be replaced (or repaired in the factory).

5.2.5 Informative Error Messages

These errors do not cause the signal system to shut down and are displayed just as informative messages. The informative error messages alternate with the standard display every two seconds.
If there are several informative error messages, they are displayed in sequence. Then the standard display appears for two seconds, followed by the sequence of informative error messages again.

No informative error messages appear during the switch-on or switch-off program.

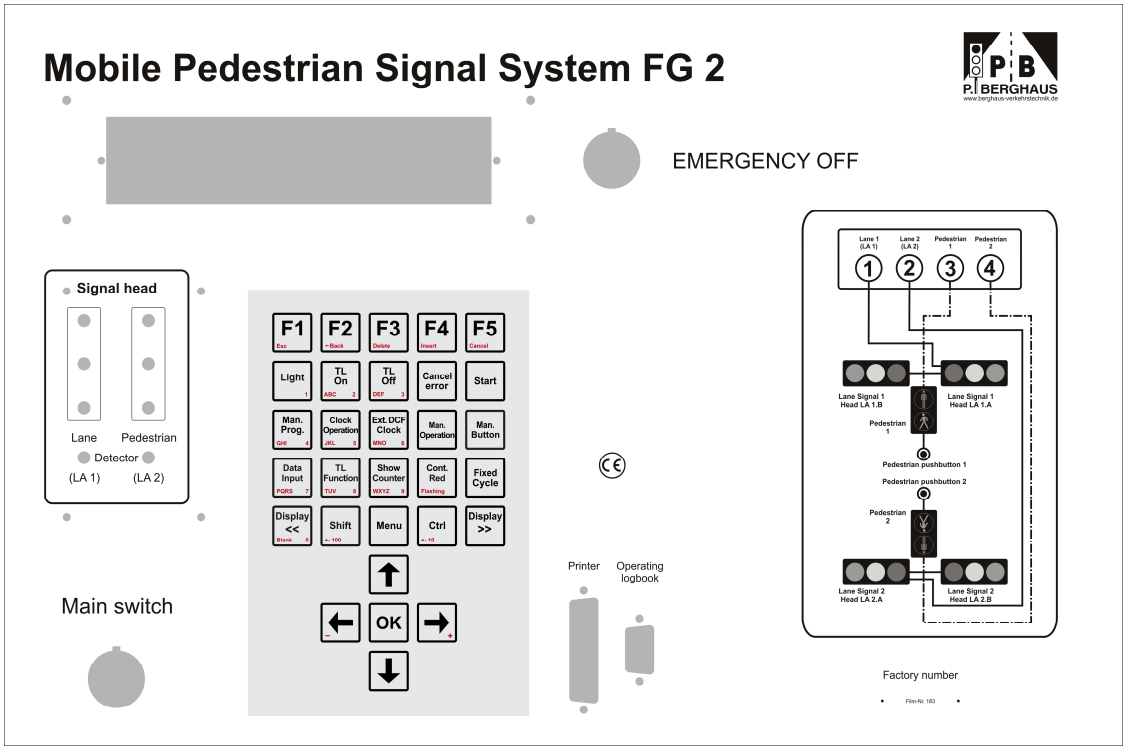
```
Mode          : Clock Mode      PE Mode
Program       : 1               Batt: 12.5V
Yellow Defective                01.01.2015
Lane                            12:31:00
```

The following informative error messages are possible:

- Yellow defective - all lamps at this output are defective
- Green defective - all lamps at this output are defective
- Power failure - press "**Delete error**" to delete
- Syn pulse missing - no pulse for progressive signalling
- Syn pulse bridging active - automatic bridging active for progressive signalling
- Fixed cycle on - system performing fixed cycle
- Change battery! - battery voltage too low

6. Controller layout

6.1 Controls



6.1.1 Main Switch

The main switch is used to switch the signal system on or off. ☞ **1.2**

6.1.2 Emergency-Off Switch

Switches the outside system off immediately. ☞ **1.4**

6.1.3 Control Panel (Keypad)

Keypad for operating the signal system.

6.1.4 LCD Display

This display shows current information and control functions.

6.1.5 Signal Head Display

The signal head display provides information about the current nominal status of the signal groups and active detector or button inputs. In the "**Pedestrian**" mode, "**Lane**" shows the signal statuses of the lane signals and "**Pedestrian**" shows the pedestrian signals.
In bottleneck mode, "**LA 1**" and "**LA 2**" show the nominal statuses of the respective lane groups.

6.1.6 Printer

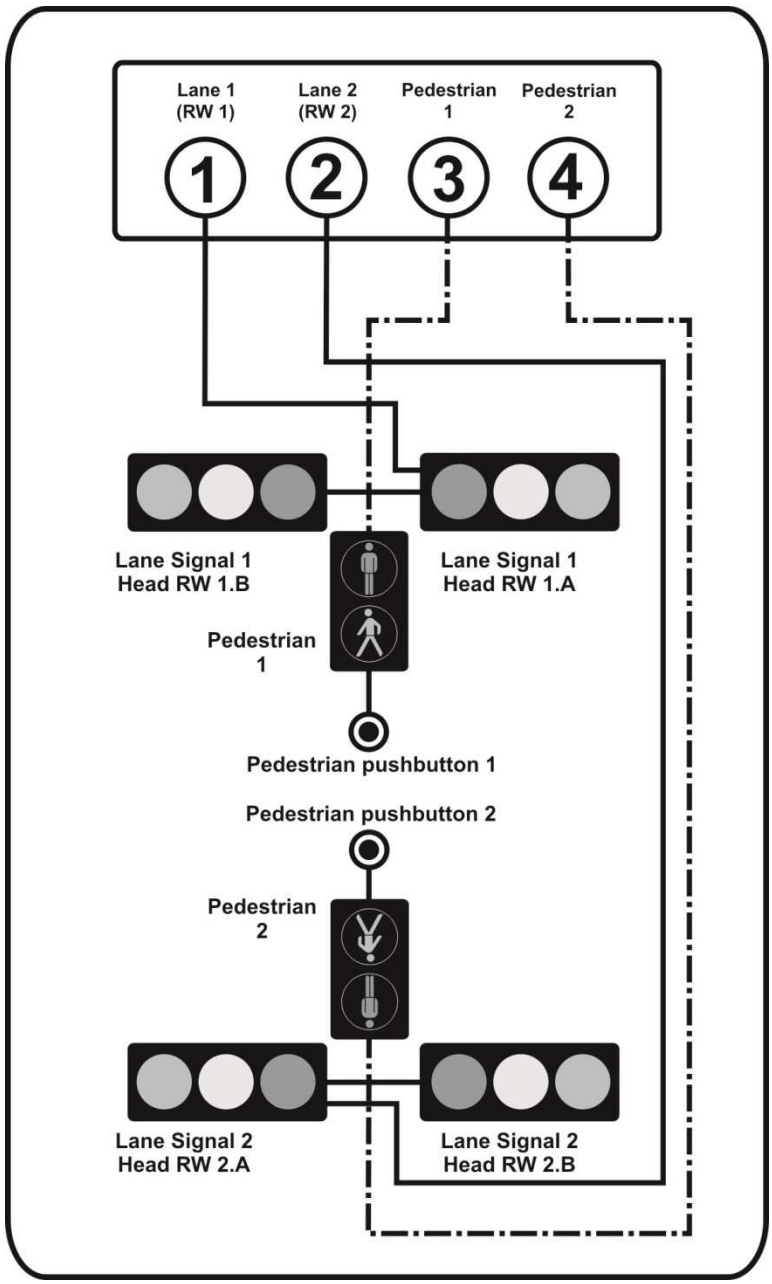
Socket for a serial printer. All print functions are activated via this socket. ☞ **4.2**.

6.1.7 Operating Log Book

Socket for exporting the operating log book (optional accessory).

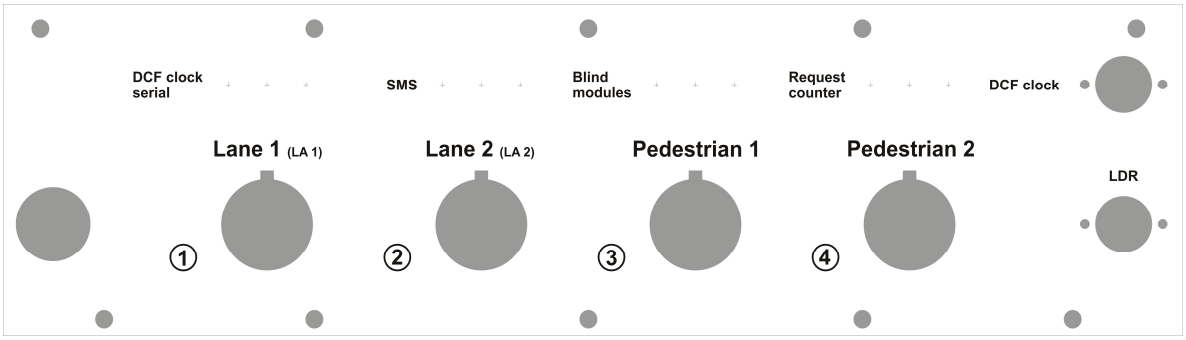
6.1.8 Wiring Diagram

Simple diagram for wiring the signal system as pedestrian system.



6.2 Connections

6.2.1 Standard Connections



6.2.1.1 Lane 1 (LA1)

Socket for lane signal head: main signal in direction of travel and repeat signal for opposite direction (both signal heads are mounted above the controller).
In "**bottleneck TLS**": socket for lane signal head in direction of travel 1.

6.2.1.2 Lane 2 (LA2)

Socket for lane signal head: main signal in direction of travel and repeat signal for opposite direction (both signal heads are mounted on the side of the road opposite the controller).
In "**bottleneck TLS**": socket for lane signal head in direction of travel 2.

Note:

This socket is not used in the "**pedestrian system one-way street**" mode.

6.2.1.3 Pedestrian 1

Socket for pedestrian signal head 1. This signal head is mounted directly above the controller.

Note:

This socket is not used in the "**bottleneck TLS**" mode.

6.2.1.4 Pedestrian 2

Socket for pedestrian signal head 2. This signal head is mounted on the opposite side of the road.

Note:

This socket is not used in the "**bottleneck TLS**" mode.

6.2.1.5 LDR

Socket for the standard dimming sensor (LDR).

6.2.1.6 DCF Clock

Socket for an external radio clock with GPS receiver (LAN version), alternatively also a DCF77 clock, e.g. for progressive signalling and program changeover.

6.2.2 Connections for Special Equipment

6.2.2.1 Serial DCF Clock

Socket for a serial radio clock (LAN version)

6.2.2.2 SMS

Socket for the SMS error reporting system.

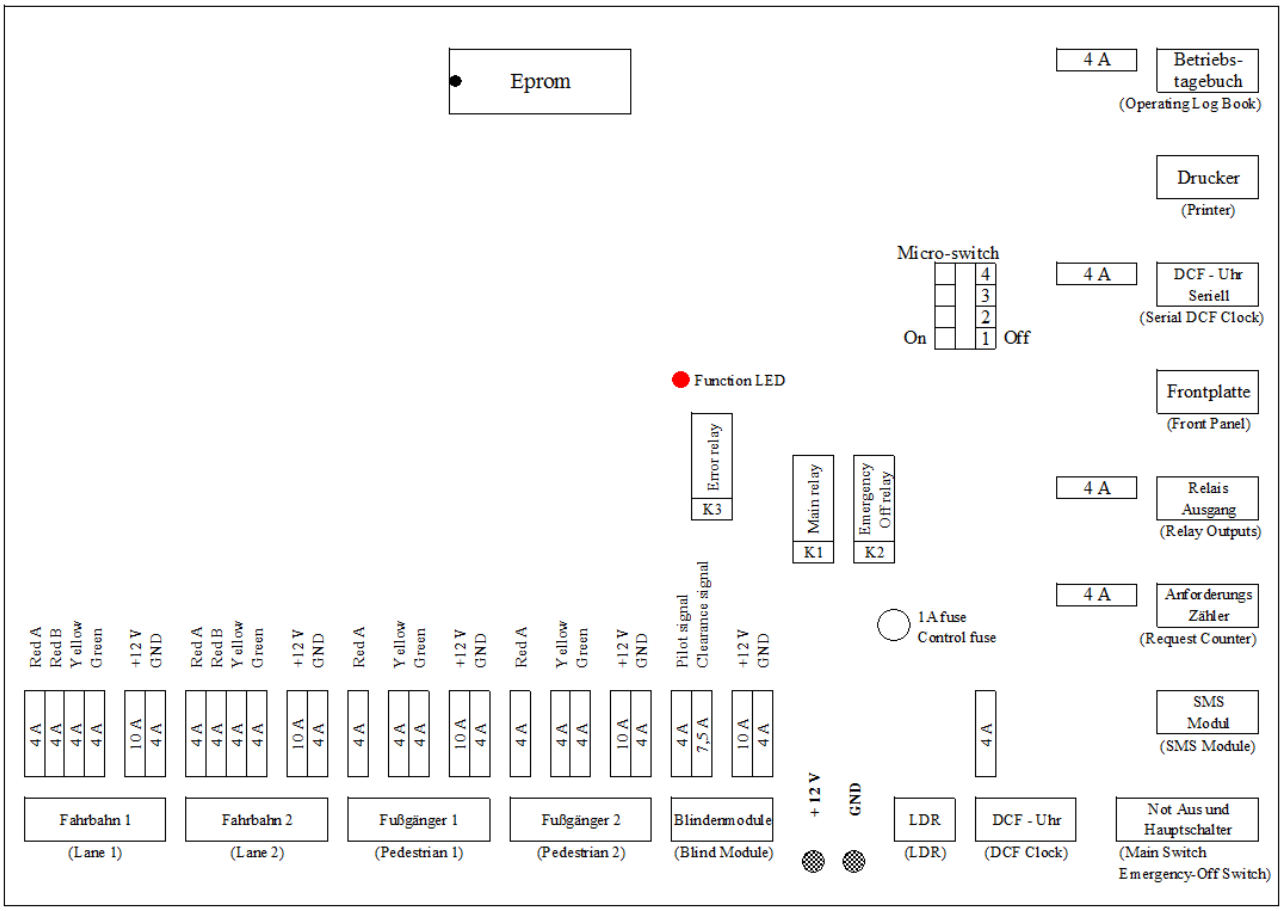
6.2.2.3 Blind Modules

Sockets for blind modules (tactile signal heads).

6.2.2.4 Request Counter

Socket for external counters for extended evaluation of pedestrian requests.

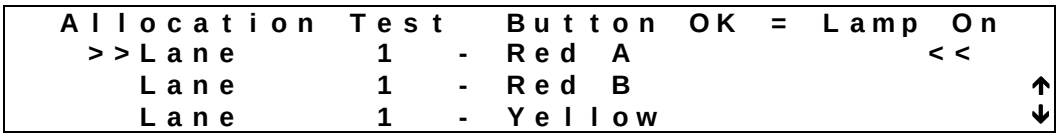
6.3 Control board diagram



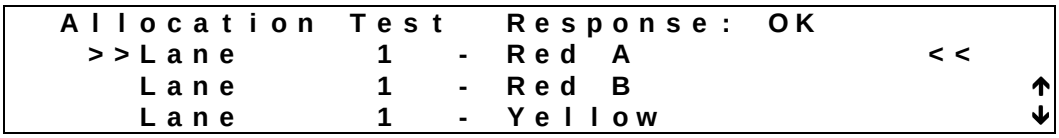
7. Special Functions

7.1 Outside System (Allocation) Test

This function is used to check the connected outside system.
The signal system must be in "**LSA OFF**" status to activate the test mode.
Then press "**Shift**", "**Ctrl**" and "**F5**" together for the following mask to appear:



Use the cursor buttons ↑ ↓ to select the required lamp output. This scrolls through the display. The current selection is marked with double arrows >> << . Press "**OK**" to go to the selected lamp output. This goes off again as soon as you release the "**OK**" button again.



After "**Response**", you will see the status of the respective output with the following meanings:

"**OK**" = at least one light bulb is on at the lamp output
"**Error**" = no light bulb is on at the lamp output
"**Status**" = at least one light bulb is on at an output that has not been switched on

Press "**Esc**" to end the test mode again. Press "**TLS ON**" to start the signal system again.

Note:

If "**Status**" appears after "Response", then as soon as an output is selected, there is a "**Status Error**"“ at this output.
In this case, the light bulb of the selected lamp output is already on without it being switched on directly by pressing "**OK**".
Possible causes:

- error in the outside system (signal head, connection cable)
- defective output stage on control board

7.2 Request Relay Outputs

The request relay output can be adjusted with micro-switch No. 1. ☞ **6.3**.

7.2.1 Output as Continuous Signal

In the "**ON**" setting (default), the relay is energised as soon as a pedestrian request is triggered. The relay is released again as soon as the pedestrian group switches to green.

Note:

The relay does not trigger any switching action during the green phase of the pedestrian group.

7.2.2 Output as Pulse

In the "**OFF**" setting, the relay switches once for two seconds as soon as a pedestrian request is triggered.

Note:

The relay does not perform this function again until the pedestrian group had green and then another pedestrian request is triggered.

8. Technical Data

8.1 Connected Load

The maximum power for each lamp output is 20 watt.

8.2 Power Consumption

Controller without signal head: approx 0.8 amps

Controller in "**pedestrian**" mode (4 lane + 2 pedestrian signals)
LED: approx. 1.7 A or approx. 1.4 A without waiting signal
10 W: approx. 6.3 A or approx. 5.1A without waiting signal

Controller in "**pedestrian one-way street**" mode (2 lane + 2 pedestrian signals)
LED: approx. 1.5 A or approx. 1.3A without waiting signal
10 W: approx. 4.9 A or approx. 3.6A without waiting signal

Controller in "**bottleneck TLS**" mode
LED: 1 signal head per group approx. 1.1 A; 2 signal heads per group approx. 1.3 A
10 W: 1 signal head per group approx. 2.3 A; 2 signal heads per group approx. 3.6A

Note:

The power consumption increases depending on the connected accessories (waiting signal, blind signals, SMS module, etc.)

8.3 Dimensions

Controller dimensions:	540 x 530 x 220 mm (W x H x D)
Weight:	approx. 13.5 kg, depending on version

8.4 Connector Assignment

8.4.1 Lane Signal Head

1	=	red A
2	=	red B
3	=	yellow
4	=	green
5	=	detector input
6	=	+ 12 V
7	=	GND

8.4.2 Pedestrian Signal Head

1	=	red A
2	=	button lighting
3	=	yellow
4	=	green
5	=	button input
6	=	+ 12 V
7	=	GND

8.4.3 DCF Clock

Contact assignment:

1	=	synchronous input (+12 V)
2	=	GND
3	=	synchronous input
4	=	BCD 1
5	=	BCD 2
6	=	BCD 4
7	=	BCD 8

8.4.4 LDR

Contact assignment:

1	=	not in use
2	=	not in use
3	=	LDR
4	=	LDR

8.4.5 Printer

2	=	TXD
3	=	RXD
7	=	GND

Parameters:

Baud rate:	1200 Baud
Stop bits:	2
Data bits:	8
Parity:	none
Handshake:	none

8.5 Spare Parts List

Article: Pedestrian signal system FG 2

Order No.	Description
PB411030	Control unit, complete, type FG 2
ESP 910	Control unit board FG 2
ES 2030	Vehicle flat fuse (please state size in amps)
EI 0041 M	Battery clamp + (red)
EI 0042 M	Battery clamp – (blue)
EK 0002	Battery bridging set for parallel connection of two 12V batteries (battery clamps not included)
ES 5010	Controller housing lock, compl., type Himel (without three-sided socket wrench)
ES 5011	Three-sided socket wrench for controller housing type Himel
FÜE 300 F	Signal head compl., wired with cable and 2 connectors, 210 mm, 3 aspects
FÜE 301 F	Signal head compl., wired with cable and 1 connector, 210 mm, 3 aspects
FÜE 302 F	Signal head compl., wired with cable, plugs and EVG coupling for push buttons, lens 210 mm, 2 aspects with pedestrian symbols
FÜE 300 LF	Signal head, compl. wired with cable and plugs, 210 mm, 3 aspects, halogen technology
FÜE 301 LF	Signal head, compl. wired with cable, plugs and coupling, 210 mm, 3 aspects, halogen technology
FÜE 302 LF	Signal head, compl. wired with cable, plugs and EVG coupling for push buttons, lens 210 mm, 2 aspects with pedestrian symbols, halogen technology
FÜE 320	Pedestrian request push-button with holder, compl. wired, 1 m cable with EVG connector
EA 2010	Signal head back part, 1-piece
EA 2012	Cover plug red/yellow/green chamber
EA 2016	Signal head door without lens, 210 mm
EA 2017	Signal head door with red lens, 210 mm
EA 2018	Signal head door with yellow lens, 210 mm
EA 2019	Signal head door with green lens, 210 mm
EA 2030	Lens hood
EA 2020	Lens red, 210 mm
EA 2021	Lens yellow, 210 mm
EA 2022	Lens green, 210 mm
EA 2048	Lens with pedestrian symbol (please choose: red standing or green walking)
EA 2040	Reflector, 210 mm, for socket G4
EA 3041	Socket G4
EG 0041	Halogen bulb 12V / 10W / G4 (standard)
EK 0230	Traffic light connection lead for FG 2, 30 m long, with coupling and plugs
ES 3010	7-pin plug for FG2
ES 3011	7-pin coupling for FG2
ES 3020	4-pin EVG plug (straight)
FÜE 400 A	Battery casing, orange, for 4 batteries without mounting mast, with holder for controller
FÜE 401 A	Battery casing, orange, for 4 batteries without mounting mast
FÜE 402	Door for traffic light stand with 4 batteries
FÜE 414	Warning marking 80 x 800 mm red/white, hatched
FÜE 405	Cover for cable leadthrough at signal head stand
EE 0026 A	Pole 60 x 60 x 3000 mm, Aluminium, plug-in (bottom of plug-in mast)
EE 0027 A	Pole 60 x 60 x 3000 mm, Aluminium, plug-in (top of plug-in mast)
EE 0032	Cable wreath for signal mast 60 x 60 mm
EE 0030	Holder for signal head and request push-button 60 x 60 mm with three tubes
EE 0006	Solid rubber wheel 260 mm
MP 4024	Special drawbar for towing battery casing with 4 batteries
FÜE 413	Sticker "Pedestrian please press"
A 46000	Battery 12 V/ 170 Ah
A 45000	Power adapter N2 / 20-25 A

9. Accessories

Various special accessories are possible; it may then be necessary to install a separate connection socket, depending on the specific option.

Note:

Retrofitting is only possible in the factory in Kürten!

9.1 Operating Log Book

Order No.: EP4849
The signal system can be equipped with an operating log book as an optional feature. This can be used to record all events such as errors, program switching, program changes, control actions on the keypad etc. Separate PC software is used for evaluation.

9.2 SMS Module

Order No.: FUE599
An SMS reporting system can be connected to this additional connection. It is used for sending battery warnings and any possible error messages as an SMS text immediately to the mobile phone of the maintenance technician (up to four recipients, also by e-mail or fax).

Contact assignment:

1	=	+ 12 V DC (max. 1 A)
2	=	GND
3	=	not in use
4	=	signal output

9.3 Blind Module

Order No.: FUE598
Used for connecting blind modules (tactile signal heads) with pilot signal and clearance signal.

Contact assignment:

1	=	+ 12 V DC (max. 1 A)
2	=	GND
3	=	pilot signal
4	=	clearance signal
5	=	blind button

9.4 Request Counter

This additional connection is used for external counters to record pedestrian requests for extended evaluation. A potential-free NO contact (normally open) produces the counting pulses.

Contact assignment:

1	=	+ 12 V DC (max. 1 A)
2	=	GND
3	=	middle contact
4	=	NO contact
5	=	NC contact
6	=	button input (pedestrian request)
7	=	button input (pedestrian request)

9.5 Serial DCF Clock

For connecting a serial DCF clock. This is used for program switching and for synchronising progressive switching. The power supply comes directly from the signal system.

Contact assignment:

1	=	+ 12 V DC (max. 1 A)
2	=	GND
3	=	TXD
4	=	RXD
5	=	not in use
6	=	not in use
7	=	not in use
8	=	GND