

- Save these images as `splash1.jpg` bis `splashN.jpg` ($N=2,3,\dots$).
The first image to show must have the filename `splash1.jpg`. The numeration has to step up continuously. Leading zeros (z.B. `splash01.jpg`) are not allowed.
- Copy the files into the directory `\application\control\image` on the compact flash of the PLC.

Background and font color can be changed by configuration, see the configuration description, delivered with the system.

7.1.3 7-segment display during start-up of the firmware

The progress in each stage is signaled via the 7-segment display. If errors are detected during the start-up an error message is activated. A long stroke of the CTRL-key will interrupt the start-up operation.

Status displayed	Description
	Voltage supply is available (Power-On), hardware initialization of CPU module occurs. If this state is maintained for an extended period a hardware error exists. (Send module to KEBA).
	Hardware initialization. Check of the consistency of the bootblock has been made.
	Power On Self Test, check of the consistency of the CPU module occurs. The extended boot system is being loaded and started.
	Firmware is loaded from the Compact Flash into the DRAM.
	Firmware is being started.
	Start-up of the bootblock is completed, the operating system is initialized and started.
	Various firmware components (services, I/O system, communication) are started.
	Autostart query: If the autostart function has been deactivated, a keystroke (CTRL key) is expected at this point.
	Start-up of the firmware has been completed. The CPU module is now ready for operation. If an application is already on the Compact Flash, this will be loaded.

11 Diagnosis

11.1 Operating states

During operation the control can be switched into the following operating states:

Main operating states:

State	Display	Description
INIT		The state "Init" is a service mode in which the start-up is stopped due to a serious system error (e.g. hardware error, etc.). In this service mode, it is possible to execute certain actions (e.g. "clear-retain"). Under normal circumstances this state is switched through during the start-up. A run-time system has not been loaded in the "Init" state.
STOP		In this operating state the IEC application program is loaded, but there is no cyclical processing of the application. This is a safety state in which no application (IEC or robotics) can set outputs. That is why this state can only be exited locally via the CTRL key on the control but not remotely via the programming tool.
RUN		The application programs can be processed in this operating state. The process data are exchanged according to the configuration.

It is possible to switch between the operating states by pressing the CTRL key.

11.1.1 Key control during operation

The CTRL key serves as simple operating element of the control. With this key the control can be switched into different operating modes and/or different commands can be issued.

- Distinction is made between short (< 0.5 s), long (> 0.5 s, <10 s) and very long key operations (>10 s).
- Short keystrokes allow the user to switch and selected between the individual commands, while these commands are displayed by flashing in the 7-segment display. Once the initial status has been reached again this will be indicated normally again.
- Long keystrokes are used to execute a command and to change into the new status.
- If the CTRL key is held pressed longer than 10 seconds, a hardware reset of the CPU module is triggered.

11.1.2 Switching between operating states

INIT

Status displayed		Short keystroke		Long keystroke	
	INIT: The control is in the status INIT		To next action: Load application		
	Load application		To next action: Delete retain data		The control will enter the status "STOP".
	Delete retain data and re-initialize		To next action: Delete application		The retain data are deleted and afterwards the system is newly initialized.
	Delete application		To next action: Write status report		The application is being deleted.
	Write status report		To next action: Trigger restart		Status report is being written.
	Trigger restart		On to main operating status INIT		A restart is being executed.

STOP

Status displayed		Short keystroke		Long keystroke	
	STOP: The control is in the status STOP		To next action: Starting the application		
	Starting the application		To next action: Unload application		The control will enter the status RUN.
	Unload application		To next action: Write status report		The control enters the status INIT.
	Delete retain data and re-initialize		To next action: Delete application		The retain data are deleted and afterwards the system is newly initialized.
	Delete application		To next action: Write status report		The application is being deleted.
	Write status report		To next action: Trigger restart		Status report is being written.
	Trigger restart		On to main operating status STOP		A restart is being executed

RUN

Status displayed		Short keystroke		Long keystroke	
	RUN: The control is in the status RUN		To next action: Stop control.		
	Stop control		To next action: Write status report		The control will enter the status STOP
	Write status report		On to main operating status RUN		Status report is being written.

Example: Write status report:

The function "Write status report" can be triggered from any main operating mode (INIT, STOP, RUN).

Sequence:

- 1) Click through the functions by using short keystrokes, until the diagnosis display  is shown.
- 2) Start the writing of the status report by using a long keystroke.
- 3) Once the status report has been written, the system will automatically return into the previous main operating mode.

Information

The status report is stored on the CompactFlash card on the following path: [CompactFlash]:\protocol\statusreport with the filename Star-ep_XXXX.tpz, "XXXX" is a consecutive number for the status report. See chapter 10.2 "Data structure on compact flash card" on page 101.

Example: Delete retain data:

The function "Delete retain data" can only be triggered in the main operating status INIT.

Sequence:

- 1) Click through the functions by using short keystrokes, until the diagnosis display  is shown.
- 2) Start deleting of retain data with a long keystroke.
- 3) Once the retain data has been deleted, the system will automatically return to the main operating mode INIT.

11.1.3 Additional status displays

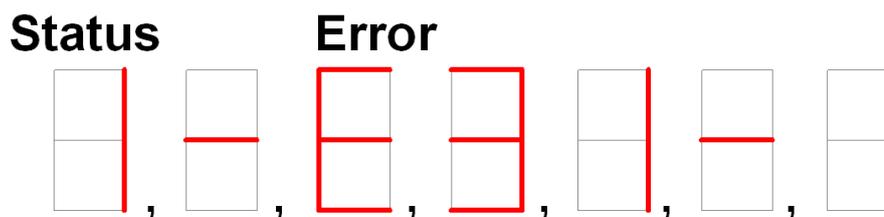
State	Display	Description
Battery weak		The control tests the battery capacity at regular intervals. If the battery is weak, a 'b' will be displayed alternatingly with the current operating state on the 7-segment display.

11.2 Control diagnosis

11.2.1 Display of errors in the 7-segment display

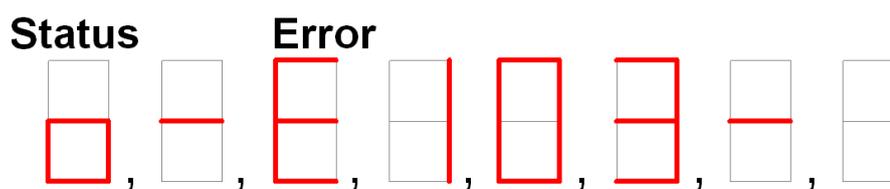
Errors can occur and/or be pending in and/or during the transition between the different operating modes of the control (e.g. STOP on RUN). These errors are signaled in the 7-segment display parallel to the status display. The latest error in a character sequence is always displayed at full second intervals. It consists of the status and the error status.

Display during the start-up of the boot block or the firmware:



signals, for example, the error 31 in status "Hardware initialization" ("FPGA could not be loaded")

Display during the start-up of the application:



signals for example the error 103 in Status Init ("Initialization error runtime system")

The display of the error can be confirmed by activating the CTRL-key after which the normal status display re-appears.

Given the limited range of display options the errors are summarized into main- and sub-groups, so as to enable the user to make an initial diagnosis without having to read out the full error log.

11.2.2 Touch control for error display during operation

If the 7-segment display indicates an error, the CTRL key can be used to confirm this with a short keystroke.

11.2.3 Error codes

Depending on the CPU module, different error messages can be displayed.

Startup error

Error display	Cause	Measures
1 – E 31 1 – E 301	FPGA could not be loaded (Missing or incorrect FPGA data programmed in the OnBoard flash)	Contact KEBA (reprogram FPGA data or have hardware repaired)
1 -- E 32 1 -- E 302 2 -- E 32	Hardware defective: An error occurred during the hardware scan	Send in hardware for repair
3 – E 51 3 – E 501	Firmware could not be loaded (no Compact Flash available or no firmware on the Compact Flash)	Check whether a Compact Flash with valid firmware is available and, if necessary, restart Compact Flash.
3 -- E 52 3 -- E 502	CRC error during loading of the firmware: An error occurred during the copying of the firmware	Reinstall the control firmware
3 -- E 53 3 -- E 503	wrong firmware: A Compact Flash with incompatible firmware was used	Reinstall the control firmware

Operating error

Error display	Cause	Measures
o – E 103	Initialization error runtime system	Contact KEBA
o – E 401	Error during starting of the IO system	Check add-on modules and cable connections
o – E 402	Error during enabling of the IO-system	Contact KEBA
o – E 404	Error during stopping of the IO system	Contact KEBA
o – E 501	Error during writing of the status report.	Contact KEBA
o – E 701	Error message class 3 ... *)	Remedy cause for error and confirm the error
o – E 901	No or invalid license information	A license update may be required. Please contact your supplier.
o – E 902	Invalid license version	A license update may be required. Please contact your supplier.
o – E 903	Error or invalid component license	A license update may be required. Please contact your supplier.
II – E 501	Error during writing of the status report.	Contact KEBA