topline

Manual PCS 091

for the operating consoles

PCS 009, 090, 095, 095.1, 095.2

PCS 009plus, 090plus, 095plus

The operating consoles PCS*topline* offer the highest degree on perfection, unparalled in design and function. PCS*topline* keeps every-thing under control - from the PCS*mini* to the PCS*maxi*, with a superior operating culture and an unlimited setup freedom.
PCS, the first programmable operating console with a large selection of "ready-to-use" opera-ting functions or operating tools which are simply selected via instruc-tions. You can realize even the most unuasal operating requests at ease and in a minimum of time.

Today this way and tomorrow that way

One standard hardware for virtually thousands of diffe-rent operating situations. Without ex-tensive wiring and dozens of I/O points.

PCS for operating. What else?

reg 10215/0899

Version 06/08.99
Systeme Lauer GmbH & Co KG

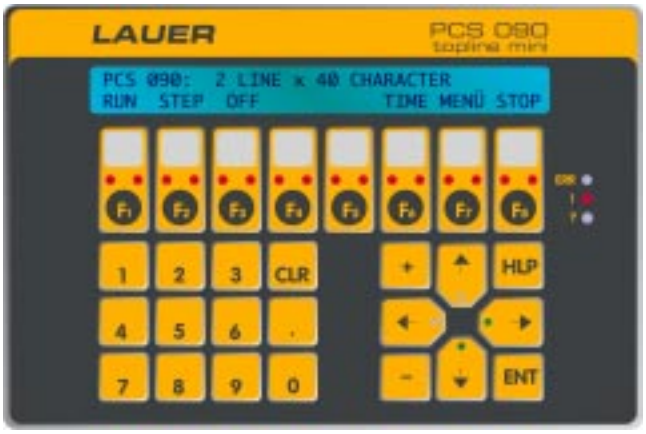
Systeme Lauer GmbH & Co KG
Postfach 1465
D-72604 Nürtingen

Operator reference manual: PCS 091
Version: August 1999
Person responsible: Zoch

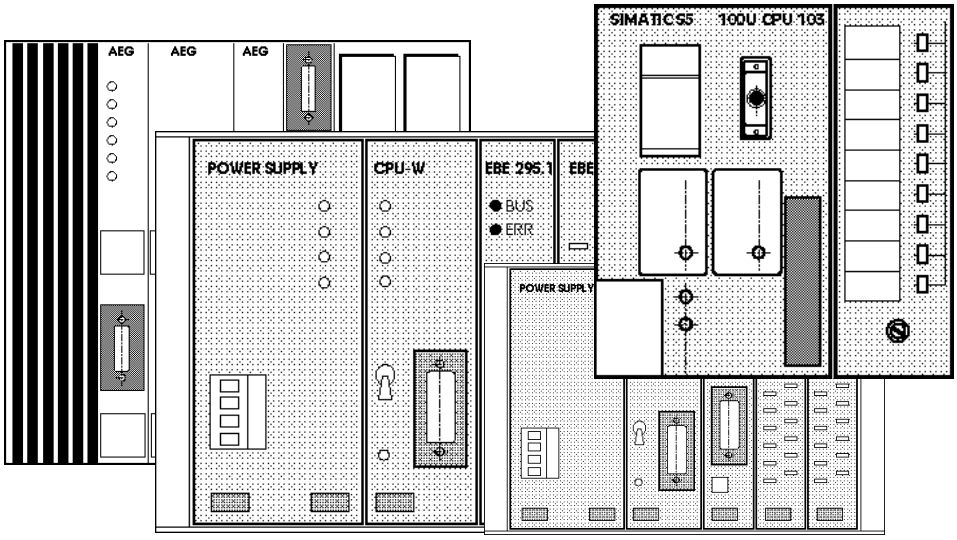
- We reserve the right to make changes to the reference manual without prior notice.
- We can not guarantee the accuracy of the programs and data stored on the diskette and the fault-free state of this information.
- Since diskettes represent manipulatable data media, we can only guarantee the physical completeness. The responsibility is limited to a replacement.
- At any time, we welcome suggestions for improvements and remarks on errors.
- The agreement also applies to the special appendices to this reference manual.

General overview

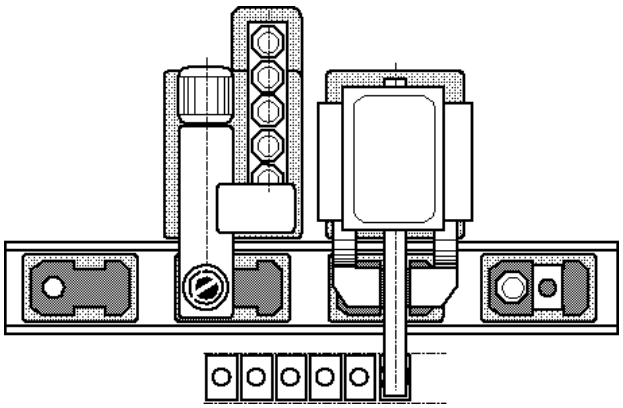
Operate and monitor



Control



Machine



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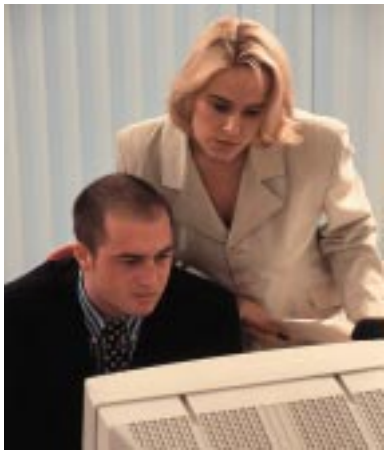
Quality and support

In our company, quality comes first. From the electronics component up to the finished device, the quality assurance tests competently and comprehensively.
National and international test standards (ISO, TÜV, Germanischer Lloyd) are the basis.
Within 48 hours, every device passes a 100% check and continuous test under worst case conditions at changing temperatures (0... 50°C) and test voltages.
A guarantee for maximum quality.



Our products not only feature a maximum economic efficiency and reliability but also a comprehensive complete service.
You not only receive demo devices but we rather make specialists available who support you in person with your first application.

Qualified user consultation by competent sales engineers is obvious for us.
Our support is for you for the side with advice and deed every day.

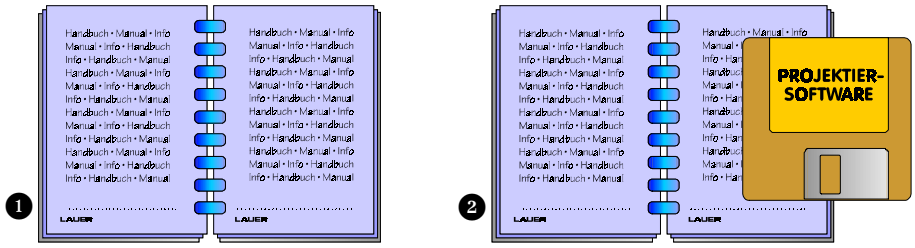
We set up training programs and technical training for you in our modern training center or alternatively also in your house.
Request the current training catalog.

From the consultation up to the user support, from the hotline up to the service, from the reference manual up to the training an all covering and individual service for the entire product line is waiting for you.

Whenever you need us, we are there for you:
dynamically, creatively and enormously efficiently. With the entire experience of a world-wide successful enterprise.

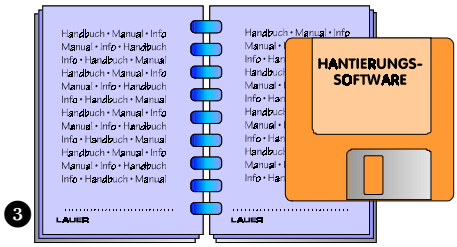
Telephone 07022/9660 -222, -132, -231, -230
eMail: support@systeme-lauer.de
Web site: www.systeme-lauer.de

Manual Organization for the operating consoles and PLC drivers



❶ **Manual PCS 091**
for the operating consoles
PCS 009, 090, 095, 095.1, 095.2
PCS 009plus, 090plus, 095plus

❷ **Introduction PCSPRO**
Setup software for the
PCS 009, 090, 095, 095.1, 095.2
PCS 009plus, 090plus, 095plus



❸ **Appendix to PCS 091**
Handling software
PCS 91.xxx

You need the PCS 091 Technical Manual for the operating consoles PCS 009, 009plus, 090, 090plus, 095, 095.1, 095.2, 095plus (❶).

For the setup of the operating consoles you need the setup software PCS*PRO*. We supply the software with a brief introduction. The extensive help system of PCS*PRO* supports you directly on-screen (❷).

Use the appropriate driver for easy communication of the PCS with your programmable control-ler. As an appendix to the PCS 091 manual you receive a detailed driver description with the handling module which is delivered on a 3.5" floppy disk (❸). The following order numbers apply to the various driver appendixes*):

PCS 91.ABB for ABB-PLC
PCS 91.AEG for AEG-PLC
PCS 91.ALB for Allen Bradley-PLC
PCS 91.B&R for Bernecker & Rainer-PLC
PCS 91.BOS for Bosch-PLC
PCS 91.CEG for Cegelec-PLC
PCS 91.CRO for Crouzet-PLC
PCS 91.EBE for Eberle-PLC
PCS 91.FES for Festo-PLC
PCS 91.GEF for GE-Fanuc-PLC
PCS 91.HIT for Hitachi-PLC
PCS 91.IBS for Interbus S
PCS 91.IPC for IPC-PLC
PCS 91.IZU for Izumi/Idec-PLC
PCS 91.KLM for Klöckner-Moeller-PLC
PCS 91.MAT for Matsushita-PLC
PCS 91.MIT for Mitsubishi-PLC
PCS 91.OMR for Omron-PLC
PCS 91.PDP for Profibus DP
PCS 91.PHI for Philips-PLC
PCS 91.SAI for Saia-PLC
PCS 91.SAM for Samsung-PLC
PCS 91.SEL for Selectron-PLC
PCS 91.SIE for Siemens-PLC
PCS 91.S7 for Siemens MPI
PCS 91.HIT for Sprecher & Schuh-PLC
PCS 91.TEC for Tecomat-PLC
PCS 91.TMQ for Telemecanique-PLC
PCS 91.TOS for Toshiba-PLC

*) Driver state June 1998

Important user notes

The present manual applies to all devices unless explicit reference to devices of the PCS plus series is made.
To distinguish between the series, the following assignment applies:
PCS topline = PCS 009, PCS 090, PCS 095, PCS 095.1, PCS 095.2
PCS plus = PCS 009plus, PCS 090plus, PCS 095plus

The symbols and ideograms shown below are used in this manual:

Warning!

Possibly dangerous situation which can cause death and most serious injuries.

Caution!

Possibly dangerous situation which can cause light and less serious injuries.

Attention!

Possibly harmful situation which can cause damage to the product or its environment.

Mechanical pressure causes damage to the product.

Information concerning safety when using the devices in an ex area.

Information and notes which must additionally be observed.

Text conventions

The information given on the pages below refers to the functions of the PCS 009, PCS 090, PCS 095, PCS 095.1, PCS 095.2 and PCS plus devices. You need the PCSPRO project software to create the user program or to configure the PCS.
The PCS communicates using a word range called “transfer range” (word 0 .. max. word 255) that, depending on the PLC system used, can be configurable. To make the wording in the manual more neutral, the words have been designated W0 .. W255. The appropriate PCS 91.xxx driver manual provides information on how to translate these words for the appropriate PLC system.

The following symbols and abbreviations have been used in the present manual:

$ is an abbreviation for the hexadecimal representation of a number value.

[+] indicates a key on the PCS, in this case the “plus” key.

Safety regulations

This reference manual contains the most important remarks in order to safely operate the device.

- This operator's guide, particularly the safety remarks are to be noted by all persons working with the device.
- Furthermore, the rules and regulations for the accident prevention applying to the application location are to be observed.
- Use as directed. The device is designed for the application in the industrial area.
- The device is manufactured to the state of the art and the official safeguarding regulations. Nevertheless, due to the application, dangers or impairments can result to the machine or to material assets.
- The device meets the requirements of the EMC guidelines and harmonized European standards. Any hardware-related modification of the system can influence the EMC behavior.
- The device may not be used without special protective measures in the hazardous area and in plants requiring a special monitoring.
- Do not heat up the buffer batteries. Danger of explosion. Serious burnings can be the result.
- The installation and operation may only be performed by trained personnel.
- The operating voltage of the device may only be in the specified ranges.
- You find information on this on the type plate and in the specifications of this reference manual.

Function overview of the operating consoles PCS 009, 090, 095, 095.1, 095.2

- **Machine operation using 8 (PCS 009, PCS 090) or 16 (PCS 095, PCS 095.1) freely assignable keys.** These F01 to F08/F16 labeled keys can be application specifically inscribed and are provided to the controller as status bits.
- **Machine operation using 4 (PCS 009), 16 (PCS 090) or 32 (PCS 095, PCS 095.1) freely usable LEDs.** These can be assigned the indicating states ON, DARK, FLASHING, and INVERSE FLASHING. A green and a yellow LED is allocated to each function key.
- **Display of fixed texts with integrated variable values.** The values can be represented selectably as numerical values or in text format.
- **Representation of the contents of 233 words as variables.** In addition, 650 external variables can be defined. 9 variable formats (from bit to timer) are available.
- **3 text groups**, 128 operating texts as menu and idle texts, 128 message texts with up to 332 lines, 5 help texts with up to 32 lines.
- **127 menus with 255 menu nodes** each for any menu configurations.
- **4 different deletion modes**. For every message, 1 of 4 possible deletion modes can be selected.
- **Modification of the content of any word within the transfer area.** Using the integrated editor all possible representation formats can be setup.
- **7 priority levels** for idle text up to help text, 3 message priorities Information, Warning, Fault. This working-condition related management significantly off-loads the programmable controller program.
- **Monitoring of rising or falling edges of 128 consecutive bits.** The assignment of texts, the manage-ment of 3 priority levels (Information, Warnings, and Faults), keeping the timely sequence as much as possible, organization of the FIRST MESSAGE, LAST MESSAGE, and CYCLIC DISPLAY, the individually settable dele-tion behaviour, and the representation formats NORMAL and FLASHING are tasks which are managed by the PCS by itself.
- **Communication monitoring (wire-break, short circuit)**. A very efficient data transfer is secured by the integrated priority management in connection with the intelligent package length optimization, the high thruput rate and the fault tole-rance.

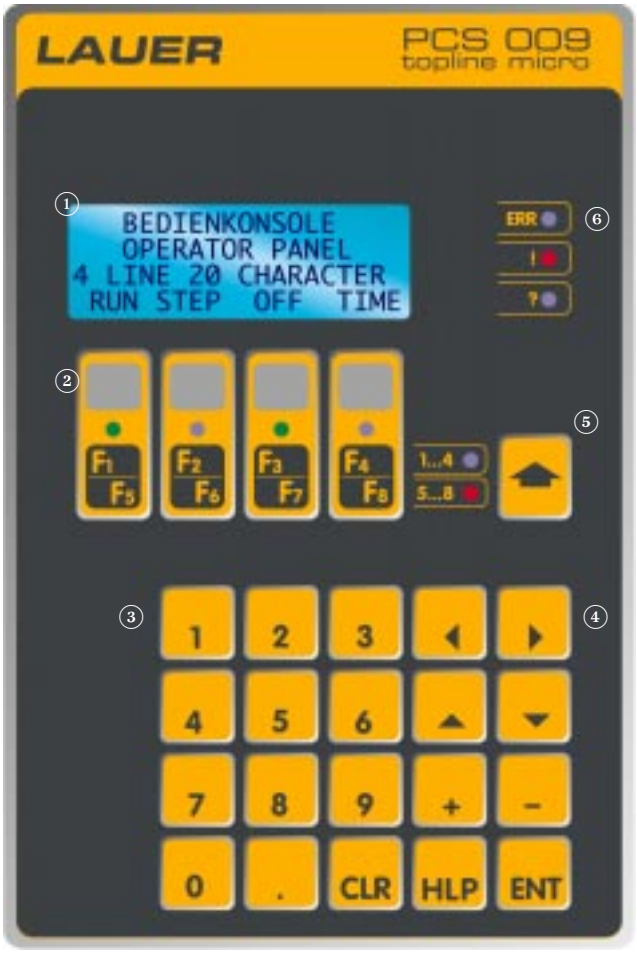
Function overview of operating panels PCS 009plus, 090plus, 095plus

In addition to the standard functions, the PCS plus offers the following features:

- **Print function (RS 232)** for all devices of the PCS plus series.
- **Display with international character set.** The character set of the PCS plus also contains (like the PCS 095.2) international characters.
- **Extended data record memory.** The PCS plus features twice as much memory for each data record (max. 64k). Or you can choose to work with a larger number of data records than before (e.g. for multi-lingual data record). In this case, 32k of memory are available per data record.
- **Recipe memory management.** The PCS plus series has a recipe memory; up to 127 recipe texts can be created. The recipe data can be edited in the PCS and they can be transferred to the PLC (downloaded) or from the PLC (uploaded) to the PCS. An individual help text is available for the recipe management.
- **Software clock.** A programmable software clock (with date) is available. Time and date are sent to the PLC (upon request). It is also possible to have the PLC update the time (useful if the PLC has a hardware real-time clock).
- **Extended off-line menu.** DIL switches are no longer required to set up the device; instead, an off-line menu is used.
- **1024 message texts** of which the first 128 messages can be used as in the past whereas the other 896 messages are divided into 7 blocks of 128 messages each. The temporal sequence is not stored for the additional messages.
- **Daily history with 50 memory locations** for displaying the last messages that are no longer active (the created message texts are shown).
- **Doubleword binary variables** can be scaled as an option.

Note!
The PCS plus series does not feature an integrated buzzer. This means that no warning sound is heard if an error message is issued.
TTY operation is not possible during printing.

View of the micro operator panel PCS 009



Operator panel PCS 009

① = LCD-Display, 4 lines each with 20 characters

② = Function keys (also as soft keys) F1...F8 with a greem message LED

③ = 10 key keyboard for nominal value input

④ = cursor and control keys for menus and nominal value input

⑤ = Switch key (Shift key) for function keys (F1..F4, F5..F9)

⑥ = Important information LEDs on the PCS status

⑦ = Reset key

⑧ = DIL switch for the PCS 009

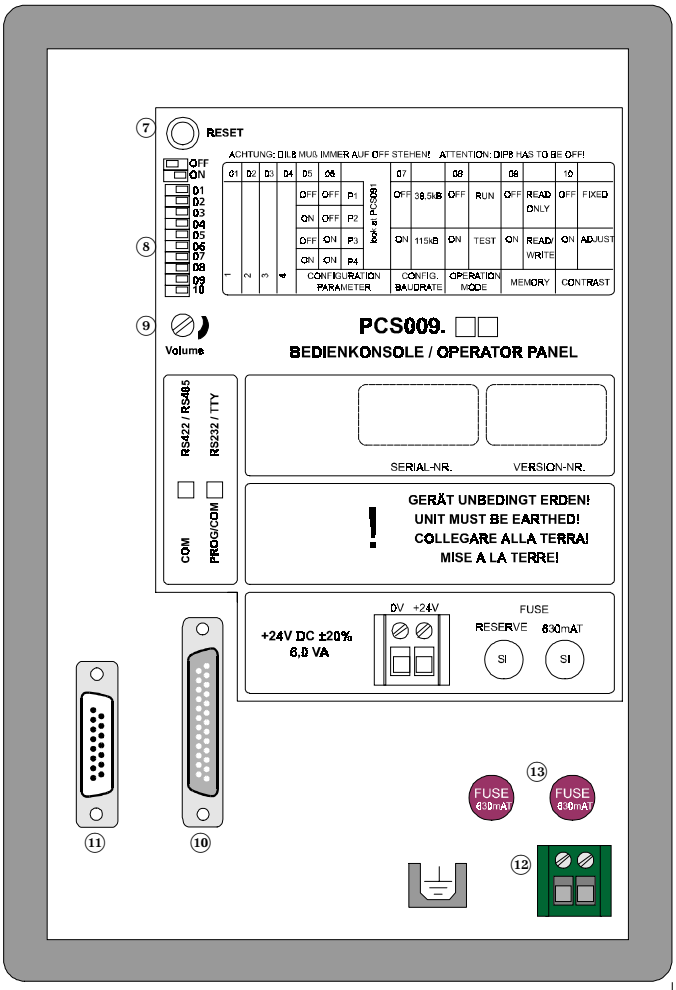
⑨ = Volume for acoustic signal

⑩ = Serial interface RS 232/TTY for communication

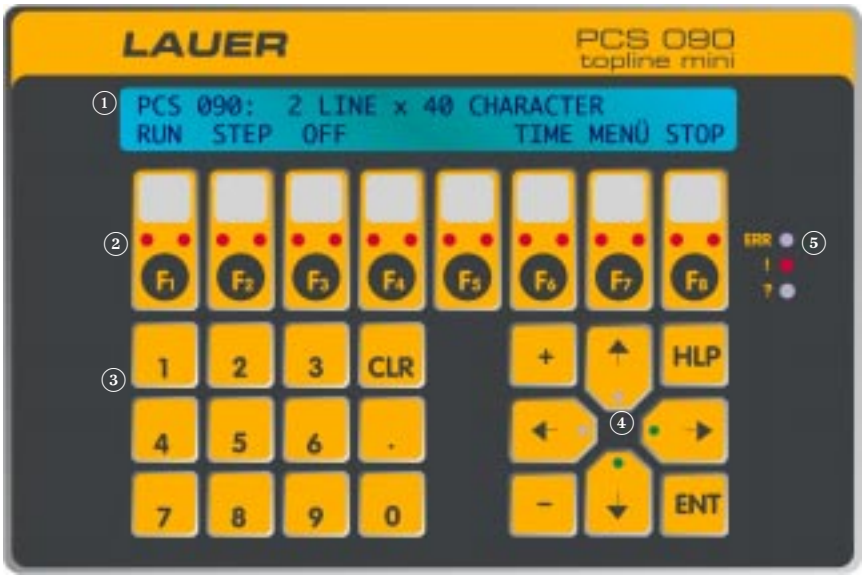
⑪ = Serial interface RS 422/RS 485 for communication

⑫ = Operating voltage terminals

⑬ = Fuse with reserve fuse



View of the mini operator panel PCS 090



Operator Panel PCS 090

① = LCD-display, 2 lines each with 40 characters

② = Function keys (also as soft keys) F1...F8 with a yellow and green message LED

③ = 10 key keyboard for nominal value input

④ = Cursor keys with LED and cursor control keys for menus and nominal value input

⑤ = Important information LED's on the PCS status

⑥ = Reset key

⑦ = DIL-switch for the PCS 090

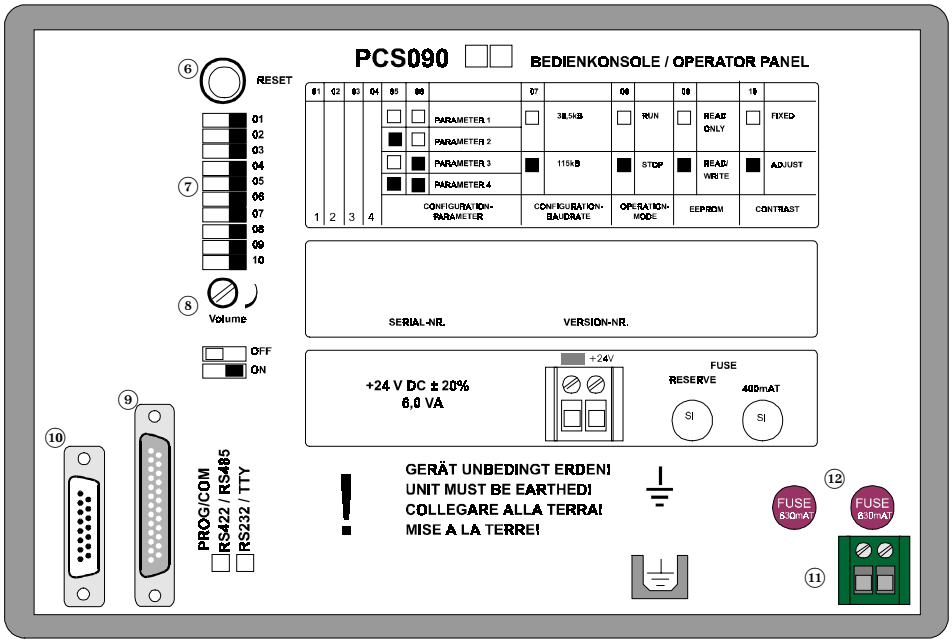
⑧ = Volume for acoustic signal

⑨ = Serial interface RS 232/TTY for the communication

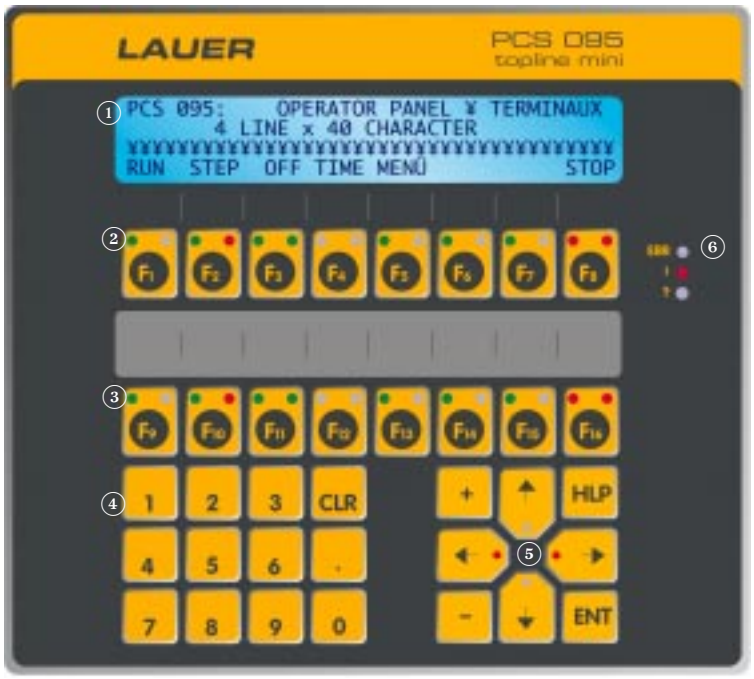
⑩ = Serial interface RS 422/RS 485 for the communication

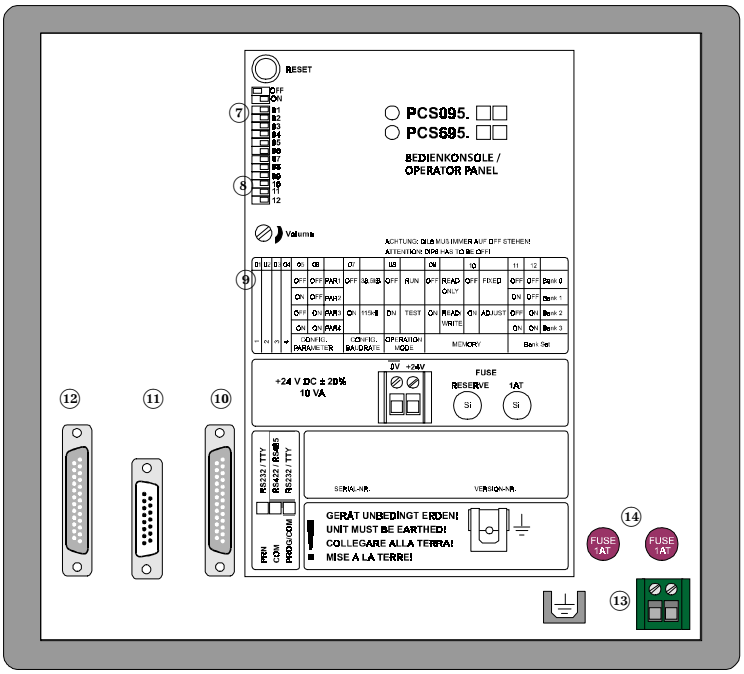
⑪ = Operating voltage terminals

⑫ = Fuse with reserve fuse



View of the mini operator panel PCS 095, PCS 095.1, PCS 095.2





Operator Panel PCS 095 (with 1 data set) Operator Panel PCS 095.1 (with 4 data sets for different machines and languages)

① = LCD-display, 4 lines each with 40 characters

② = Function keys (also soft keys) F1...F8 each with a yellow and a green message LED

③ = Function keys F9...F16 each with a yellow and a green mesage LED

④ = Ten key keyboard for nominal value input

⑤ = Cursor key with LED and control key for menu and nominal value input

⑥ = Important information LEDs on the PCS status

⑦ = Reset key

⑧ = DIL switch for the PCS 095

⑨ = Volume for acoustic signals

⑩ = Serial interface RS 232/TTY for the communication

⑪ = Serial interface RS 422/RS 485 for the communication

⑫ = Serial interface RS 232/TTY for the programming and for the PCS 095.1 as Printer interface

⑬ = Operating voltage terminals

⑭ = Fuse with reserve fuse

View of the micro operator panel PCS 009plus

Operator Panel PCS 009plus

① = LCD-Display, 4 lines each with 20 characters

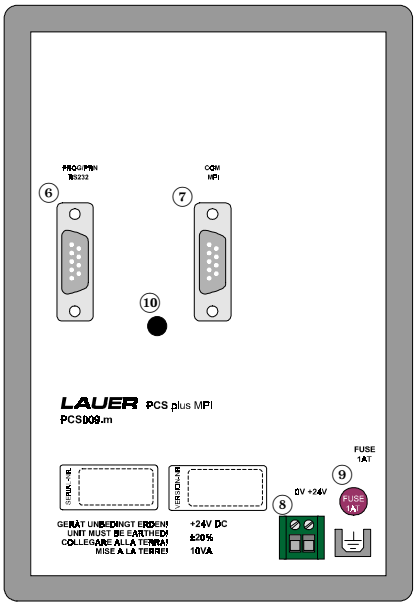
② = Function keys (also as soft keys) F1…F8 with a greem message LED

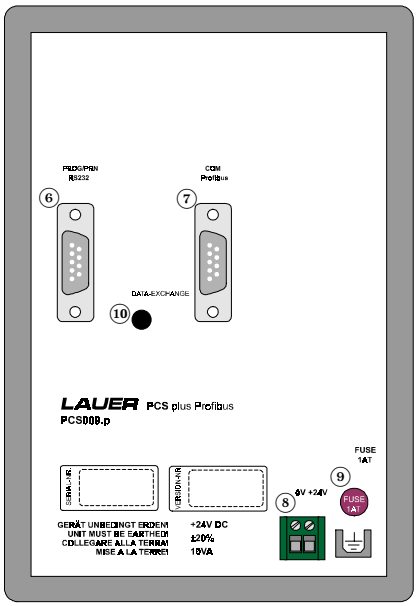
③ = 10 key keyboard for nominal value input

④ = cursor and control keys for menus and nominal value input

⑤ = Switch key (Shift key) for function keys (F1..F4, F5..F9)

⑥ = Important information LEDs on the PCS status





Backside of the PCS 009plus.m

⑥ = Serial interface RS 232 for projecting/ printing (9pin female connector)

⑦ = MPI-interface (9pin female connector)

⑧ = Operating voltage terminals

⑨ = Fuse

⑩ = Communication-LED (without function)

Backside of the PCS 009plus.p

⑥ = Serial interface RS 232 for projecting/ printing (9pin female connector)

⑦ = Profibus-interface (9pin female connector)

⑧ = Operating voltage terminals

⑨ = Fuse

⑩ = Communication-LED

View of the micro operator panel PCS 009plus

Backside of the PCS 009plus.s

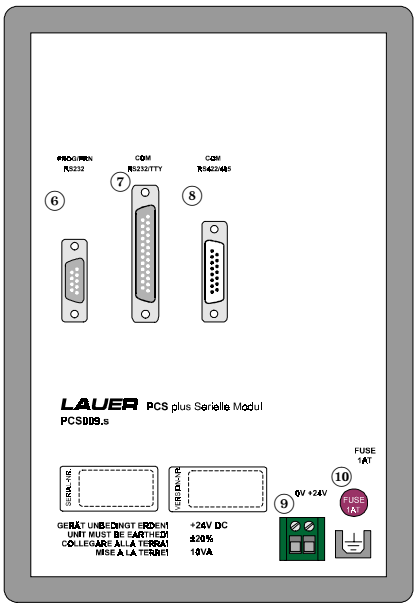
⑥ = Serial interface RS 232 for projecting/printing (9pin female connector)

⑦ = Serial interface RS 232/TTY for projecting/ communication (25pin female connector)

⑧ = Serial interface RS 422/RS 485 (15pin male connector)

⑨ = Operating voltage terminals

⑩ = Fuse



Warning!
When the cable PCS 733 is in use (with 9- and 25pin connectors) **never** connect both connectors simultaneous!

Backside of the PCS 009plus.i

⑥ = Serial interface RS 232 for projecting/printing (9pin female connector)

⑦ = Serial Interbus-interface (Remote-Bus OUT) (9pin female connector)

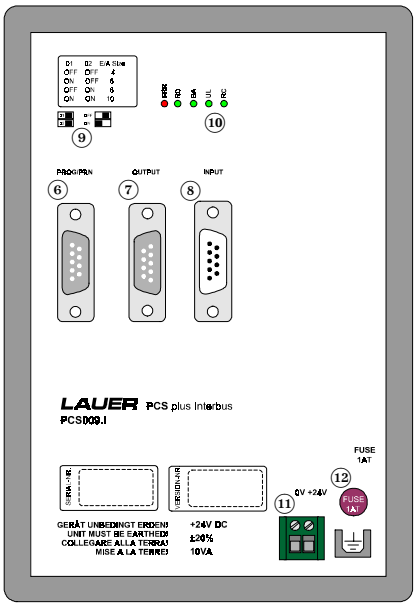
⑧ = Serial Interbus-interface (Remote-Bus IN) (9pin male connector)

⑨ = DIL-switch to adjust the size of the transfer area

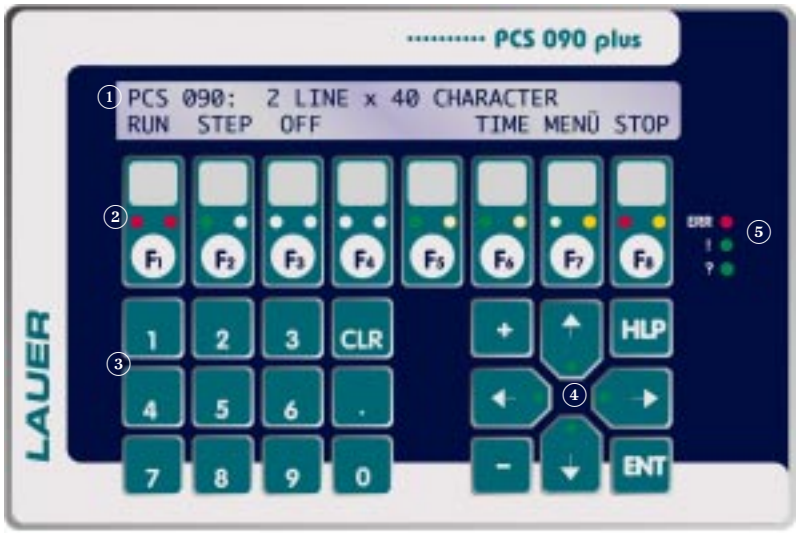
⑩ = Bus-LEDs

⑪ = Operating voltage terminals

⑫ = Fuse



View of the mini operator panel PCS 090plus



Operator Panel PCS 090plus

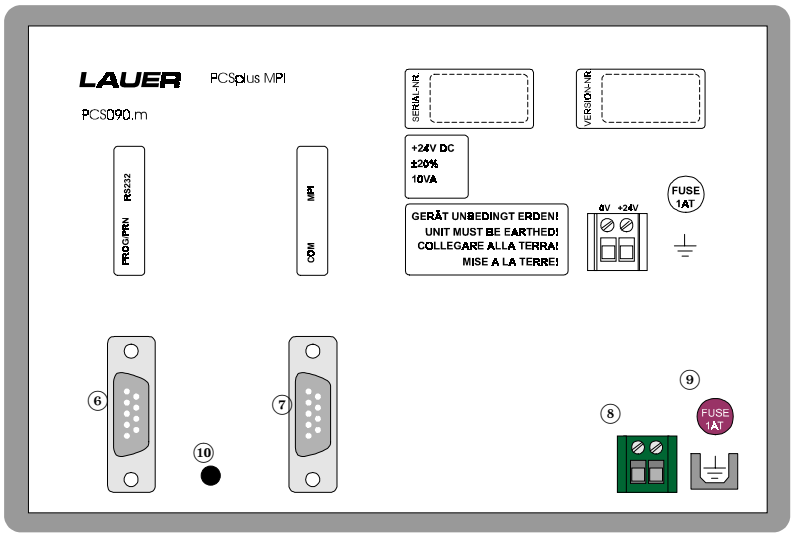
① = LCD-Display, 2 lines each with 40 characters

② = Function keys (also as soft keys) F1…F8 with a green message LED

③ = 10 key keyboard for nominal value input

④ = cursor and control keys for menus and nominal value input

⑤ = Important information LEDs on the PCS status



Backside of the PCS 090plus.m

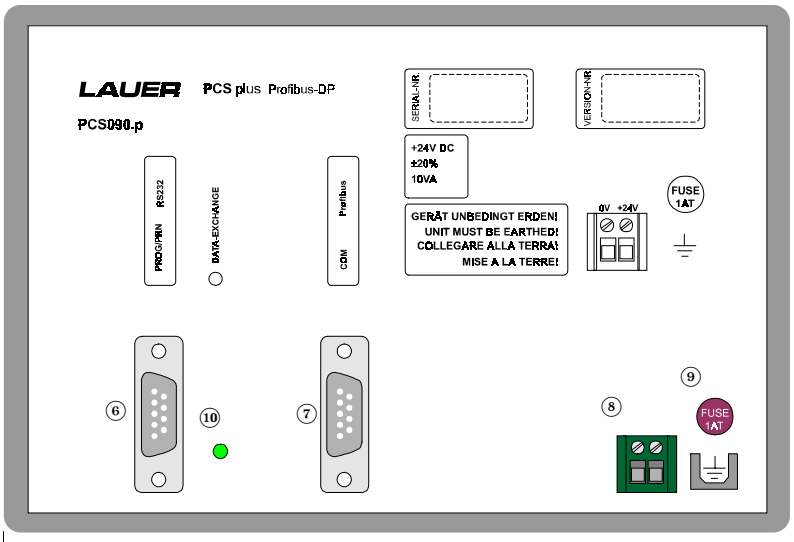
⑥ = Serial interface RS 232 for projecting/printing (9pin female connector)

⑦ = MPI-interface (9pin female connector)

⑧ = Operating voltage terminals

⑨ = Fuse

⑩ = Communication-LED (without function)



Backside of the PCS 090plus.p

⑥ = Serial interface RS 232 for projecting/printing (9pin female connector)

⑦ = Profibus-interface (9pin female connector)

⑧ = Operating voltage terminals

⑨ = Fuse

⑩ = Communication-LED

View of the mini operator panel PCS 090plus

Backside of the PCS 090plus.s

⑥ = Serial interface RS 232 for projecting/printing (9pin female connector)

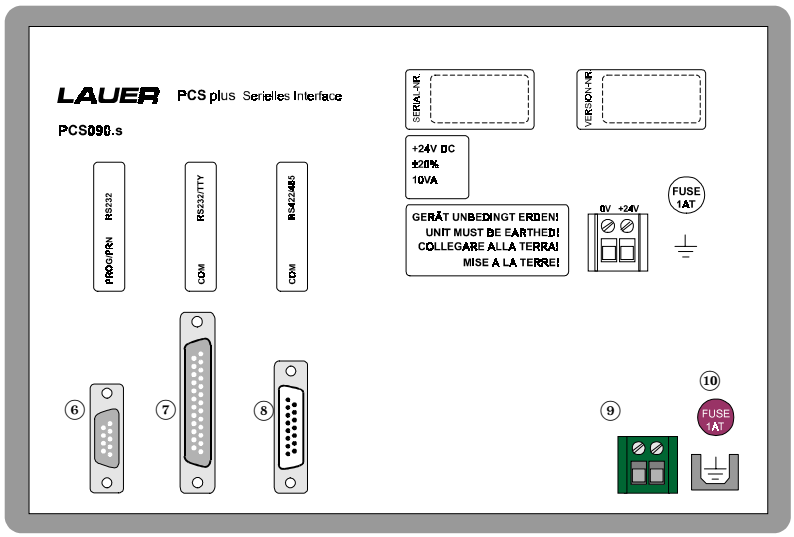
⑦ = Serial interface RS 232/TTY for projecting/ communication (25pin female connector)

⑧ = Serial interface RS 422/RS 485 (15pin male connector)

⑨ = Operating voltage terminals

⑩ = Fuse

Warning!
When the cable PCS 733 is in use (with 9- and 25pin connectors) **never** connect both connectors simultaneous!



Backside of the PCS 009plus.i

⑥ = Serial interface RS 232 for projecting/printing (9pin female connector)

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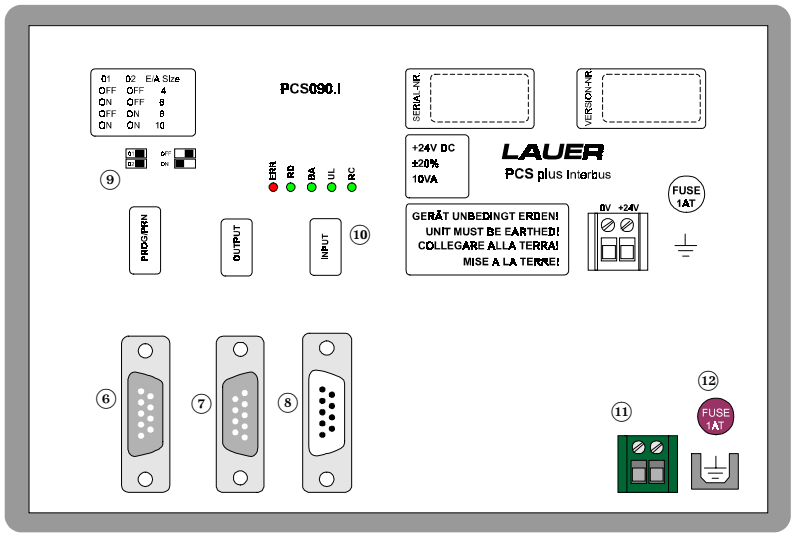
⑧ = Serial Interbus-interface (Remote-Bus IN) (9pin male connector)

⑨ = DIL-switch to adjust the size of the transfer area

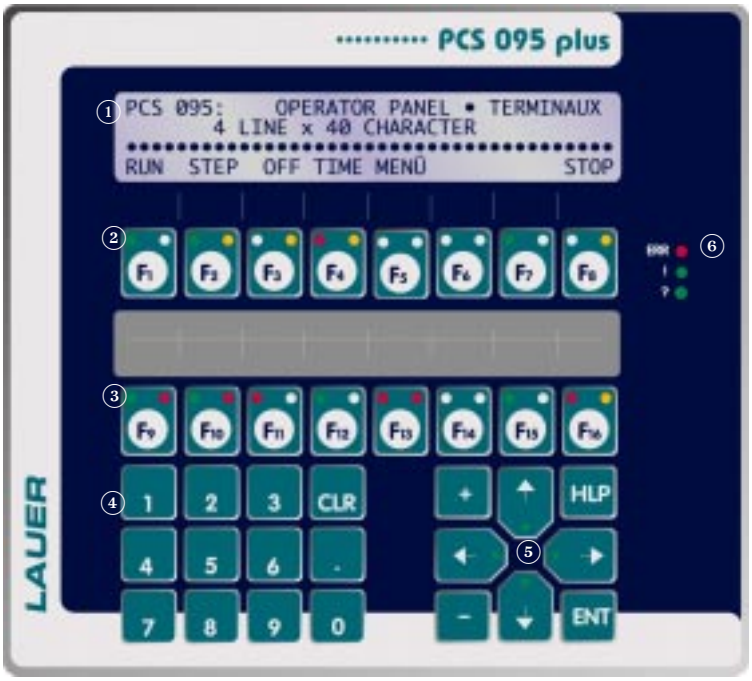
⑩ = Bus-LEDs

⑪ = Operating voltage terminals

⑫ = Fuse



View of the mini operator panel PCS 095plus



Bedienkonsole PCS 095plus

① = LCD-Display, 4 lines each with 40 characters

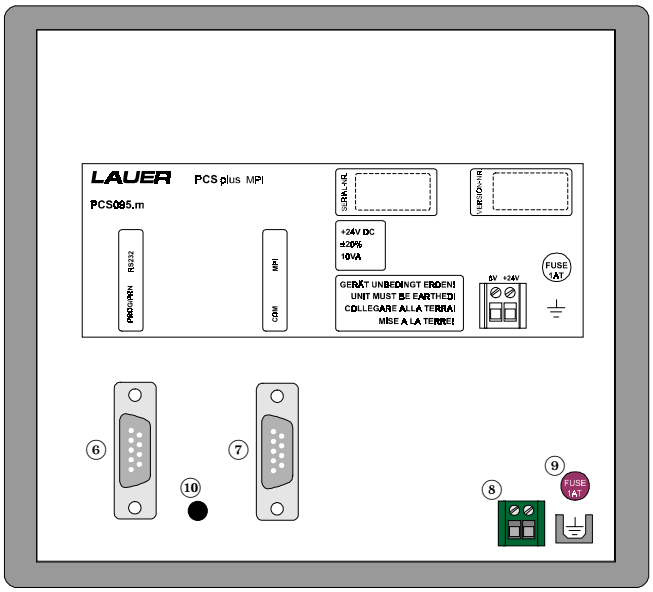
② = Function keys (also as soft keys) F1...F16 with a green and a yellow message LED each time

③ = 10 key keyboard for nominal value input

④ = cursor and control keys for menus and nominal value input

⑤ = Cursor key with LED and control key for menu and nominal value input

⑥ = Important information LEDs on the PCS status



Backside of the PCS 095plus.m

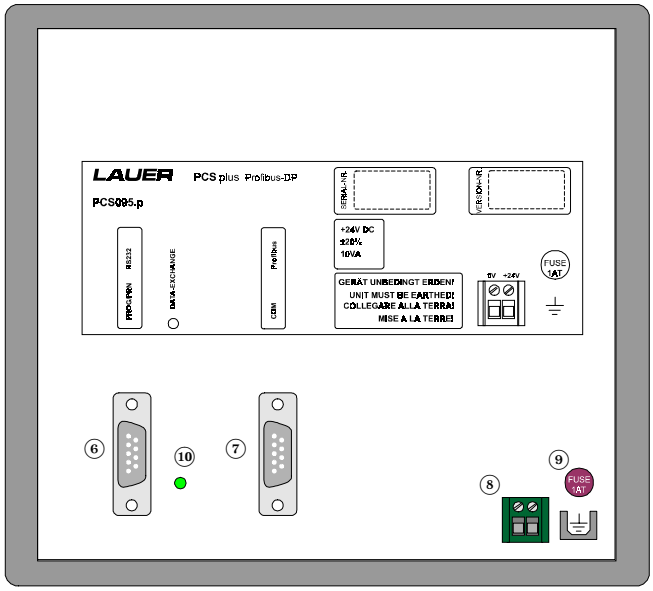
⑥ = Serial interface RS 232 for projecting/printing (9pin female connector)

⑦ = MPI-interface (9pin female connector)

⑧ = Operating voltage terminals

⑨ = Fuse

⑩ = Communication-LED (without function)



Backside of the PCS 095plus.p

⑥ = Serial interface RS 232 for projecting/printing (9pin female connector)

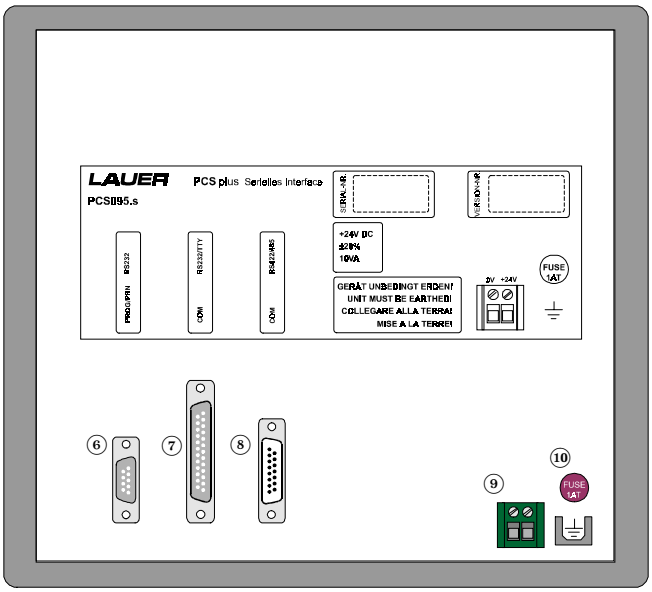
⑦ = Profibus-interface (9pin female connector)

⑧ = Operating voltage terminals

⑨ = Fuse

⑩ = Communication-LED

View of the mini operator panel PCS 095plus



Backside of the PCS 095plus.s

⑥ = Serial interface RS 232 for projecting/printing (9pin female connector)

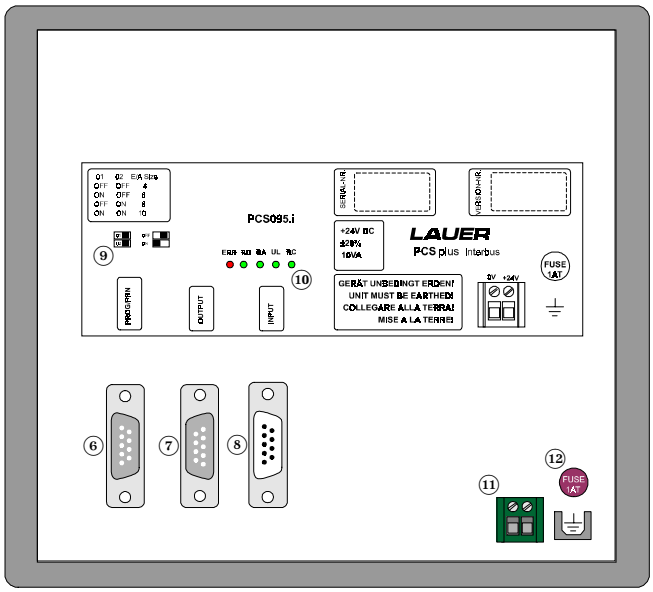
⑦ = Serial interface RS 232/TTY for projecting/ communication (25pin female connector)

⑧ = Serial interface RS 422/RS 485 (15pin male connector)

⑨ = Operating voltage terminals

⑩ = Fuse

Warning!
When the cable PCS 733 is in use (with 9- and 25pin connectors) **never** connect both connectors simultaneous!



Backside of the PCS 009plus.i

⑥ = Serial interface RS 232 for projecting/printing (9pin female connector)

⑦ = Serial Interbus-interface (Remote-Bus OUT) (9pin female connector)

⑧ = Serial Interbus-interface (Remote-Bus IN) (9pin male connector)

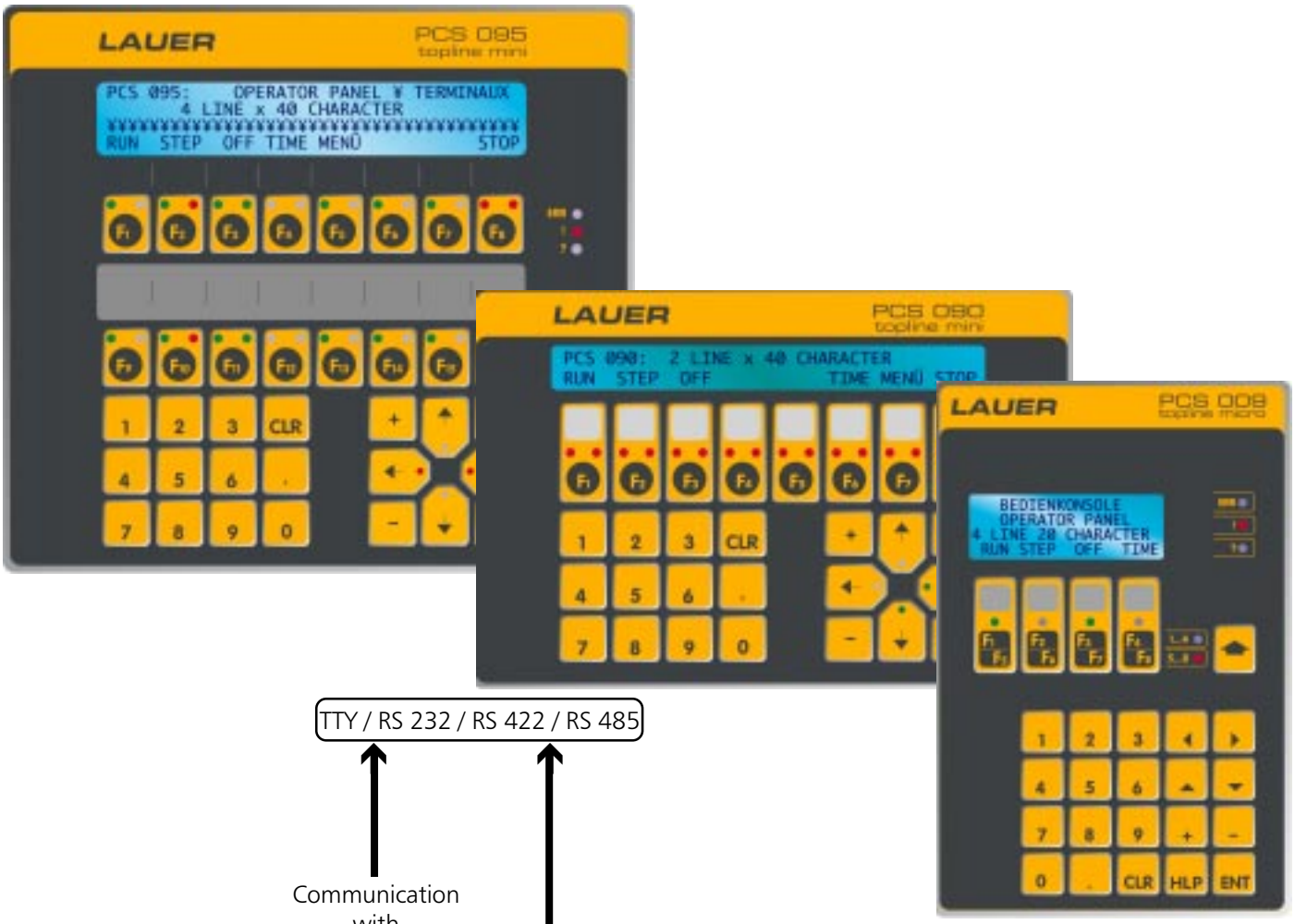
⑨ = DIL-switch to adjust the size of the transfer area

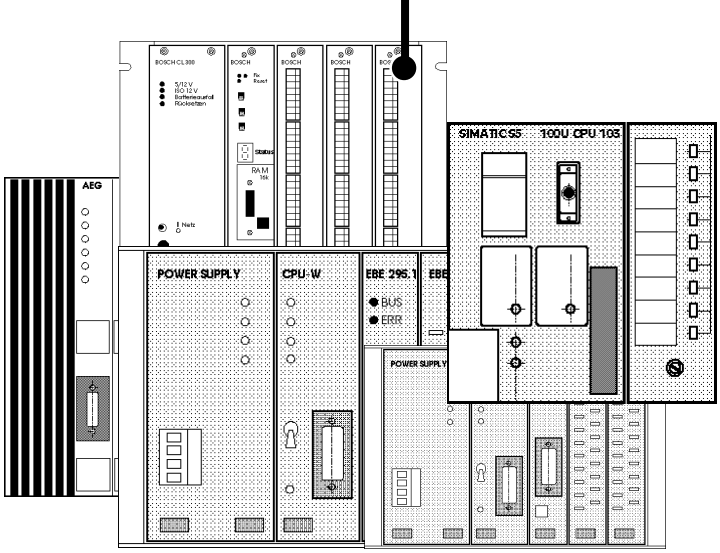
⑩ = Bus-LEDs

⑪ = Operating voltage terminals

⑫ = Fuse

Programming and communication of the PCS topline

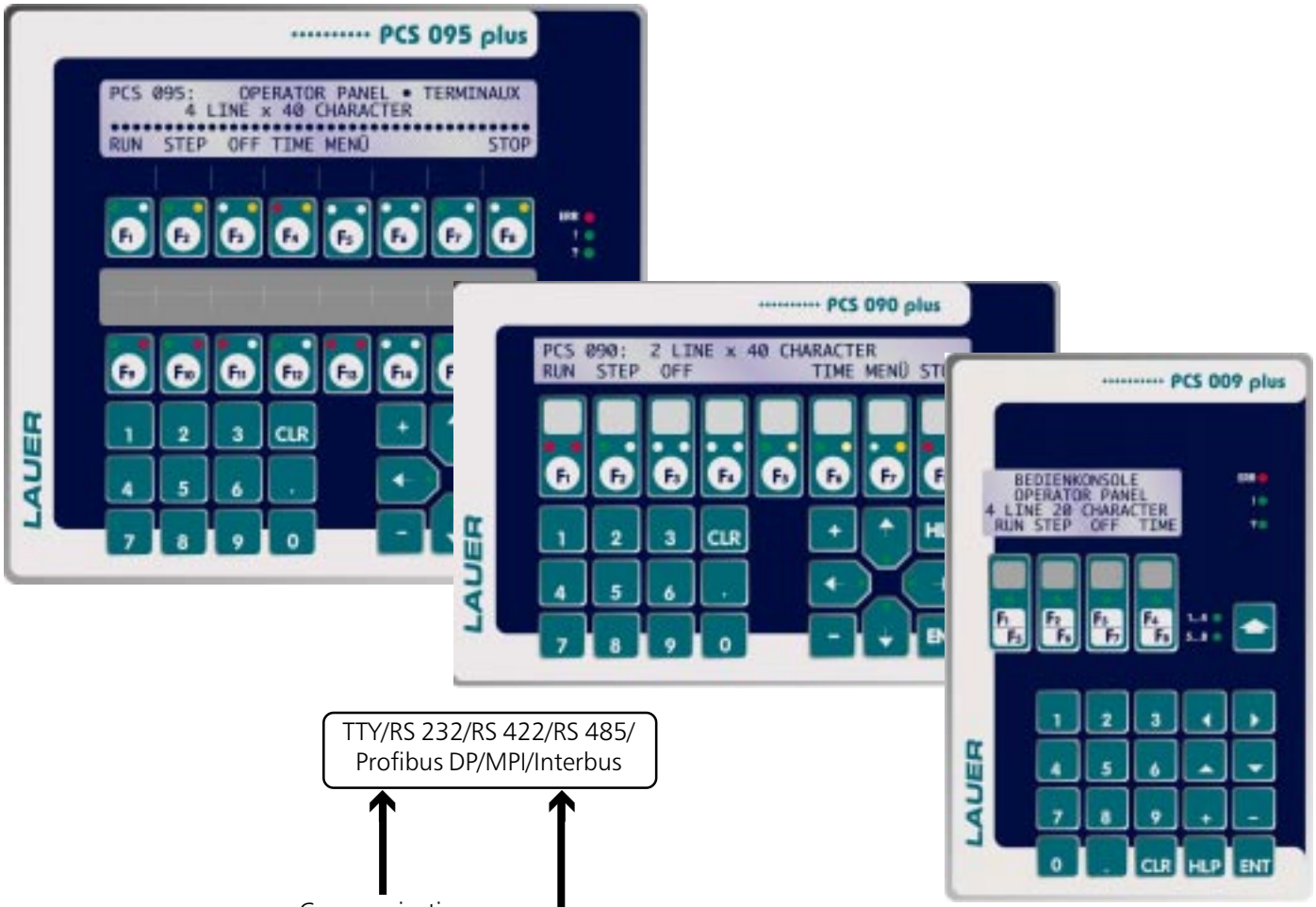


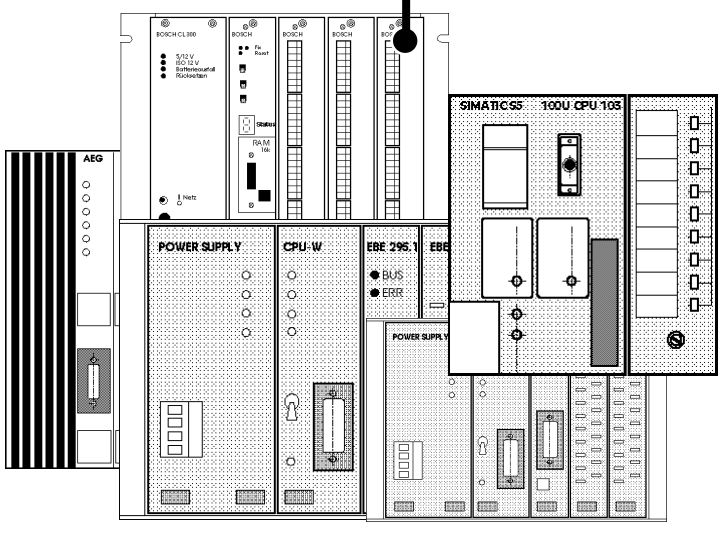


PC-MSDOS, DRDOS PG 7nn (MSDOS)

Programming with the software
PCSPRO

Programming and communication of the PCS plus





PC-MSDOS, DRDOS PG 7nn (MSDOS)

Programming with the software
PCSPRO

Functions and tools of the PCS topline

PCS is a universal operating concept for a variety of PLC systems. The operating panels come with a large number of predefined operating and monitoring functions and tools:

- 8 or 16 function keys with 2 yellow/green warning lights (OFF, ON, FLASHING).
- 650 switches with blank labelling for functions and switch setting.
- Key lock or code lock for assigning different access authorizations.
- 233 selectors with up to 256 switch settings with blank labelling for functions and switch setting.
- Digital BCD/BIN-nominal value input with ten key keyboard or ± key: 233 nominal value variables for 4 digit BCD or 5 Digit BIN or 116 nominal value variables for 8 digit BCD or 10 digit BIN.
- 127 menus with max. 255 nodes or menu items. At PCS 090 each node is written into a 2 line menu text (with max. 8 variables) and at PCS 095 into a 4 line menu text (with max. 16 variables).
- For menu and default texts there are 128, 2(4) line operating texts combined with 8 (16) variables.
- Notation and alteration of the bit configuration of a word in the PCS is possible at any time.
- Actual value analog indicator.
- Actual value digital indicator selection of up to 5 digits (0...65.535) or 10 digits (0...4.294.967.295).
- 128 message lines, 32 lines combined with 128 variables in 3 message priorities, with 2 indicator and 4 deletion modes.
- Automatic change of the nominal and actual values of the BCD/BIN in decimal and back with algebraic sign, limits and scale.
- Analog nominal value input
- Digital ASCII nominal value input with ± key: 28 nominal value variables with 16 or 112 nominal value variables with 4 characters.
- 128 soft key bars
- 255 soft key actions
- For each of the Default, Menu, Note and Trouble priorities one **help text** is available.

Functions and tools of the PCS plus

The PCS plus series offers the following additional functions:

- 127 recipe texts with up to 32 lines and up to 128 variables. 8 kbytes (PCS 090plus) and 32 kbytes (PCS 095plus) of recipe data memory.
  Upload, download and printing of recipes.
- A **help text** is available for the recipe priority.
- Software clock with date, day of the week and time. Correctly indicates all leap years and is fully year-2000 compatible.
- Additional 896 message texts (1024 in total) with up to 32 lines and up to 128 variables.
- Daily history with 50 memory locations for displaying the last messages that are no longer active (the created message texts are shown).
- As an option, doubleword binary variables can be scaled.

The variables of the PCS

Machines produce different parts. Therefore quick and selective alterations of finished sizes and functions (variables) are especially important for increased flexibility.
The PCS features a convenient method of processing the variables. 650 external varia-bles (freely definable) and 6 internal variables are supervised from the PCS.
The value of the external variables are stoped in the words 30...255. The PCS differentiates between actual values and nominal values:
ACTUAL: The value in the word is the actual value. The PCS can only display the value.
NOMINAL: The standing value in the word is the nominal value. The value can be displayed and changed by the PCS.
NOMINAL VALUE-P: The private value in the word is a nominal value. The PCS can display the value. It can be changed only if this is allowed by the word 14 bit 7 = log 1 (key switch or DIL-switch 1...4 on the rear side of the PCS). When the bit 7 of word 14 = log 0, the display of the actual value follows.

Internal variables PCS topline

NAME	CONTENTS	FORMAT	LENGTH	ACT/NOM
ZP	NUMBER OF INFORMATIONS	BIN	3	ACT
ZQ	NUMBER OF WARNINGS	BIN	3	ACT
ZR	NUMBER OF FAULTS	BIN	3	ACT
ZT	MENU NUMBER	BIN	2	ACT
ZV	SCROLL TIME	BIN	2	NOM
ZX	INTERFACE FAULTS	BIN	2	ACT
ZA	PRN_TIMEOUT	BIN	3	NOM
ZB	PRN_RS232/TTY	STRING	5	NOM
ZC	PRN_HANDSHAKE	STRING	3	NOM
ZD	PRINT DIRECTION	STRING	4	NOM
ZE	PRN_BAUDRATE	STRING	5	NOM
ZF	PRN_DATA BIT	STRING	1	NOM
ZG	PRN_STOP BIT	STRING	1	NOM
ZH	PRN_PARITY	STRING	4	NOM
Z084	SOFTKEYLINE_1	SSTRING	40	ACT
Z085	SOFTKEYLINE_2	SSTRING	40	ACT

Additional internal variables PCS plus

NAME	CONTENTS	FORMAT	LENGTH	ACT/NOM
Z15	CLOCK_SECONDS	BIN	2	NOM
Z16	CLOCK_MINUTES	BIN	2	NOM
Z17	CLOCK_HOURS	BIN	2	NOM
Z18	DATE_DAY	BIN	2	NOM
Z19	DATE_MONTH	BIN	2	NOM
Z20	DATE_YEAR	BIN	2	NOM
Z21	WEEKDAY_NOM	STRING	2	NOM
Z22	WEEKDAY_ACT	STRING	2	ACT
Z23	CLOCK	CLOCK	8	ACT
Z24	DATE	DATE	8	ACT
Z25	RECEIPENR_ACT	BIN	4	ACT
Z26	RECEIPENR_NOM	BIN	4	NOM

External variables

FORMAT,	LENGTH	
BIT variable	max. length	40 Characters
STRING variable	max. length	40 Characters
CSTRING variable	max. length	40 Characters
WORD variable KM, KH, KY:	length: 17, 4, 7 Characters	
ASCII variable	max. length	16 Characters
BCD-1 variable	max. length	4 Digits
BCD0-1 variable *)	max. length	4 Digits
BCD-2 variable	max. length	8 Digits
BCD0-2 variable *)	max. length	8 Digits
BIN-1, BIN-A variable	max. length	16 Bit/11 Digits
BIN0-1, BIN0-A variable *)	max. length	16 Bit/11 Digits
BIN-2, BIN-B variable	max. length	32 Bit/11 Digits
BIN0-2, BIN0-B variable *)	max. length	32 Bit/11 Digits
VBIN-1, VBIN-A variable	max. length	16 Bit/11 Digits + sign
VBIN0-1, VBIN0-A variable *)	max. length	16 Bit/11 Digits + sign
VBIN-2,V BIN-B variable	max. length	32 Bit/11 Digits + sign
VBIN0-2, VBIN0-B variable *)	max. length	32 Bit/11 Digits + sign
Timer variable	max. length	40 Characters

*) BIN0...- and VBIN0...variable are only programmable with PCSPRO

The variable formats of the PCS

The BIT variable

When two possibilities can be selected at an input, the descision is taken by the bit variable. This is in the form of an ON/OFF switch.
Every switch position represents an inscription (text) which appears in the display. Each bit variable occupies a bit. A data word can also take on up to 16 differing bit variables or switches.

Example: A wood shavings vacuum absorption cleaner shall be switched on or off in bit 2 data word 33.
The +/- switch selects the inscription or the switching position. The bit bears the value of the inscription. The first inscription carries the value log 0, the second bears the value log 1.

STRING variable

When two or more possibilities can be selected at an input, the decision is made by the STRING variable. It corresponds to a selector switch.
With STRING variables, every switch position is classified with an inscribed text, which appears in the display. Every STRING value carries a data word with up to 256 switch positions. The switch position is deposited in low bytes of the data word.

Example: The frame material shall be selected in data word 40.
The inscription or switching position is selected with the +/- key. Acceptance follows with the ENTER key.

CSTRING variable

The CSTRING variable corresponds to STRING variable. Acceptance follows directly after using the +/- key without ENTER.

The variable formats of the PCS

BCD variable: BCD-1, BCD-2, BCD0-1, BCD0-2

The nominal value of the BCD variable corresponds to that of a BCD thumbwheel switch and the actual value to that of a BCD digital display. The 4 digit (decimal positions) variable BCD-1 is allocated to a word, the 8 digit variable BCD 2 to two consecutive following words 32 bits (W n, W n+1). BCD variables are displayed without pre-zeros. For example a BCD 2 actual value is: 4 2567.

The 4 digit variable BCD0-1 is allocated to a word, the 8 digit variable BCD0 to two consecutive following words 32 bits (W n, W n+1). BCD0 variables are displayed with pre-zeros. For example the actual value of a BCD0 is: 0004 2567

Every BCD value is limited to a min/max value.

Example:
The batch size per window type is written in word 30 as a 4 digit nominal value without min/max limits.

The nominal value input "8500" takes place with the ten key keyboard of the PCS and is transfered to the word with the ENTER BCD coded key:

Word 30 = 1000 0101 0000 0000

8 5 0 0

From the Bios versions	PCS 095	V508A	(1 Data set)
	PCS 095.1	V408A	(4 Data set)
	PCS 095.2	V428A	(Int. character key)
	PCS 090	V208D	
	PCS 009	V2041	

and the Version 5.2 of the PCSPRO-Software, as well as all devices from the PCS plus series, the BCD variable can be entered cover. The covered input is also for BCD variables with up to 4 and also up to 8 digits possible. While editing the following display appears:

after input of one number: *(with “pre zero”: - - - *)
after inputof three numbers: * * * (with “pre zero”: - * * *).

When the variable is not edited, are fundamental lines (“- - - -”) in the display. Apart from the covered input this variant behave just as the normal BCD variable, this means also, that the insertes value displays in the communication data module and can be read from the PLC.

The variable formats of the PCS

BINARY variables: BIN-1, BIN-2, BIN-A, BIN-B, VBIN-1, VBIN-2, VBIN-A, VBIN-B, BIN0-1, BIN0-2, BIN0-A, BIN0-B, VBIN0-1, VBIN0-2, VBIN0-A, VBIN0-B

The nominal value of the BIN variable corresponds to that of a BIN thumbwheel switch and the actual value to that of a BIN digital display. The scaled 16 bit variables (BIN-1 to VBIN-A) are allocated to a word, the 32 bit variables (BIN-2 to VBIN-B) to two consecutive following words (W n, W n+1).

The variables (V)BIN(0)-1,2 only differ from those of the (V)BIN(0)-A, B in the way the characters are loaded (V)BIN0-1,2 and (V)BIN-1,2 are with and without pre-zeros repectively VBIN(0)-1,2A,B take the operational sign into consideration. Every (V)BIN variable is limited by a min/max value. In addition the (V)BIN-1,A variables can be scaled.

Example:
The temperature of the engine brake can be set between 0°C and 70°C. The scaled 16 bit nominal value is written into the word W 45 with a min/max limit.

Example:
The window height is adjustable between 750 mm and 1500 mm. The 32 bit nominal value is written into the word 41+42 with a min/max limit. The higher value part remains in W 41, the lower value part in W 42.

WORD variable

The WORD variable is specially suitable for service. Die Darstellung kann sowohl bitweise (KM), hexadezimal (KH) oder byteweise dezimal (KY) erfolgen. An alteration of the bit pattern with the PCS is possible if the WORD variable is defined as a nominal value.

Example:
The word 33 is to be displayed and altered in the PCS display:
Alteration of the nominal value WORD variable takes place in a menu.

Display line 1 BIT PATTERN OF WORD 33

Display line 2 00000000 00000101

The value of the WORD variable can be changed with the "0" or "1" key. The "+" key switches the pointer one place to the right and with the "–" key, one place to the left.

Display line 1 BIT PATTERN OF WORD 33

Display line 2 11110000 11000000

The ENTER key puts the new value into the word.

TIMER variable

The TIMER variable allows an input of a 3 digit numeric input (BCD) and a timebase value with 4 selection (displayed as text).

Example:
Word 100 should be displayed in Timerformat.

The content of word 100 is KH1235.

If the timebase is defined as ".0", ".1", ".2" and ".3" in the display "235.1" is visible.

The value is defined with the key "0"..."9". The selection between base and value is done with the (.) key. The timebase is selectable with + or - key or direct input with "0" bis "3" key.

The variable formats of the PCS

ASCII variable

If an alphabetical nominal value is required (article number, name etc.) the ASCII variable provides it in a simple manner.

Example: Enter the 12 digit version » 41-BN-890-SB «:

As every 2 ASCII characters occupy a word, 6 words are to be reserved for a 12 digit version number. In the following example the words 56...61 are used to this purpose.
The loading of the nominal value ASCII variable takes place in a menu.

Display line 1 LOADING OF VERSION:

Display line 2 ■■■■■■■■■■■■

By calling the menu the value 0 stands in the DW 56 ... DW 61. For this value the PCS-ASCII chart sets up the signs "n" (all dots illuminate). By using any key these signs will be replaced by a question mark (?).

Display line 1 LOADING OF VERSION:

Display line 2 ????????????

Every "?" can be changed with a "+" key to any letter desired and with the "-" key to any character required. The "point" key moves the indicator one place to the right.

Display line 1 LOADING OF VERSION:

Display line 2 41-BN-890-SB

When all characters have been completely and correctly loaded, pressing the ENTER key for example, puts the values into the words 56 ... 61. The words then have the following values:

Word No.	Contents ($)	ASCII Characters
W56	34 31	4 1
W57	2D 42	- B
W58	4E 2D	N -
W59	38 39	8 9
W60	30 2D	0 -
W61	53 42	S B

The keyboard outline of the ASCII variables

+ key	pages to the letters (characters with the next largest ASCII code)
- key	pages to the characters (characters with the next smallest ASCII code)
Point key	moves the cursor to the right
ENTER key	records the ASCII characters into the data words
CLR key	displays old value

Nominal Value Input - Simple and Straight Forward with Menu Technique

The number and format of nominal values are as varied as the operation itself. Regardless of the type and number of nominal values required, the procedure for recording them used by "the man at the machine" must be simple and straight forward.

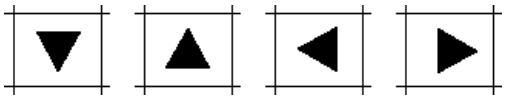
The menu technique offers considerable flexibility in recording and altering nominal values. It guides the operator and eliminates almost any possibility of false entering.

The PCS has at its disposal:

- 127 menus with a maximum of 255 menu or node points

Every node can be written with a 2 (PCS 090) or 4 (PCS 009, PCS 095, PCS 095.1) line operator text. This text can contain a maximum of 8 (PCS 009, PCS 090) or 16 (PCS 095, PCS 095.1) variables (nominal values/actual values).

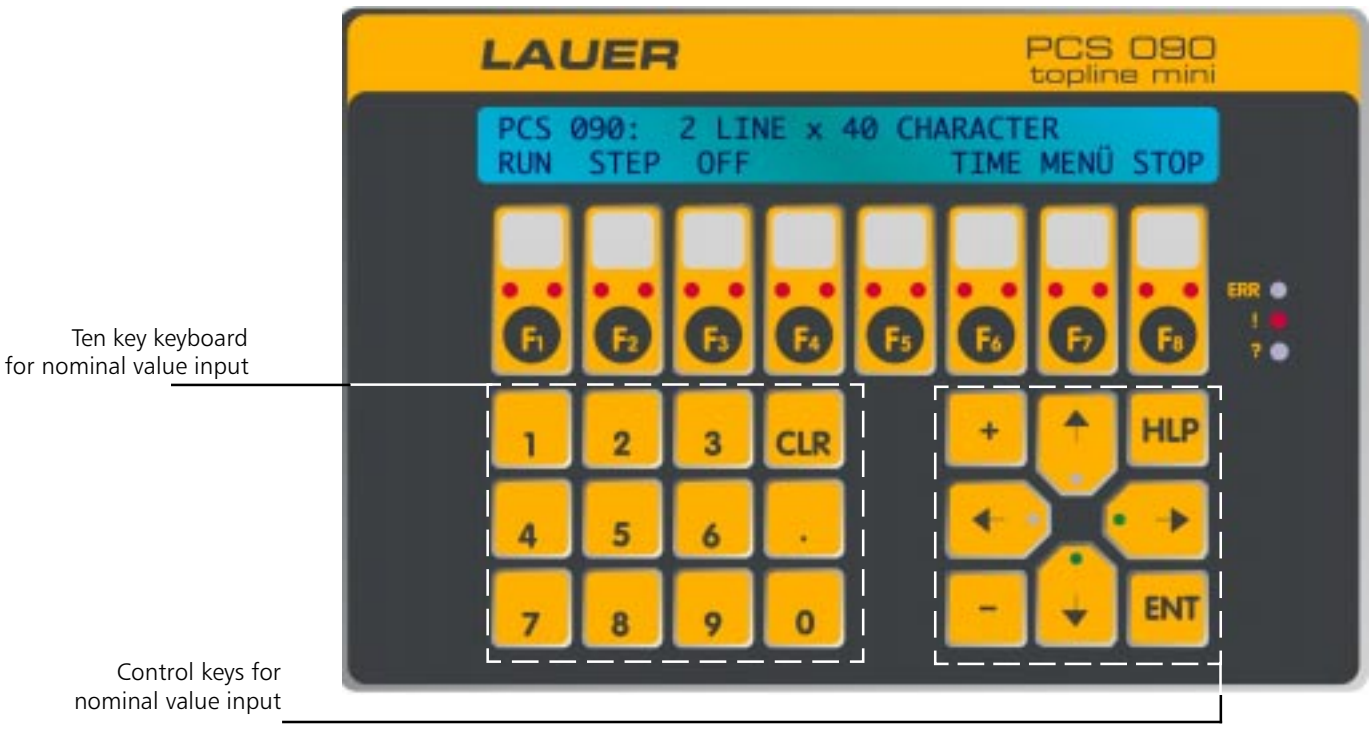
The PLC calls a menu with the word W 14 (bit 0...6). The PCS always shows the text of the start node. Depending on the arrangement of the menu, the other nodes are reached by actuating the ARROW key. The LED in the arrow key shows the operator the direction in which further variables (nominal values) are to be edited., i.e., the relevent LED lights. If on the other hand an LED flashes, it shows the operator that this node will be left on activating. Termination of a menu is achieved by setting bit 0...6 back in word 14.



The PCS has a simple editor for entering functions and nominal values. This editor permits 3 different inputs of figures:

- Nominal value input with the numeric key pad
- Incrementing/Decrementing the nominal value with the +/- key
- Addition and subtraction of various values of the displayed nominal value (only with BCD and BIN variables)

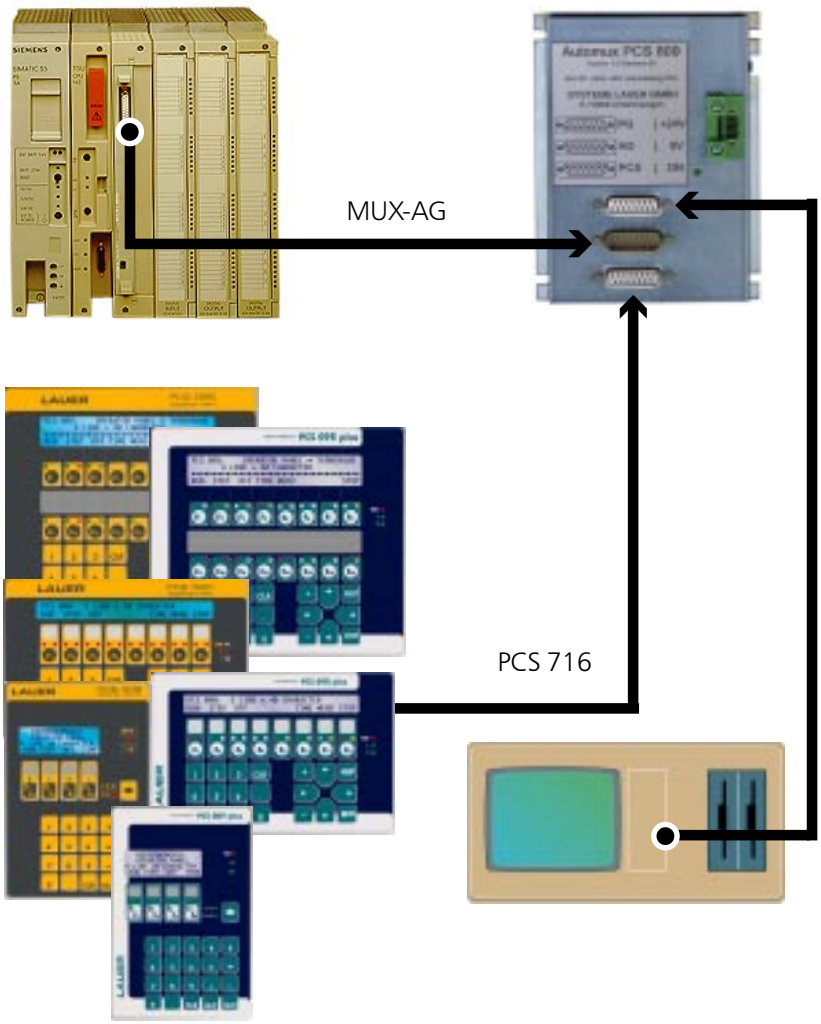
The CLR key sets nominal value back to its old value.



Automux PCS 809 for the Siemens PLC Range

The PG interface is occupied if the communication between the PCS and the Siemens S5 runs via the L1 standard or L1 direct protocol.

As the smaller PLC systems only have a PG interface, this leads to problems during running as a simultaneous application of PG and PCS is not possible.



The Automux PCS 809 re-moves this problem. The PCS 809 broadens the PLC-PG-interface so that the PG and the PCS can serve the PLC together. The switch over to MUX follows automatically.

The PCS 809 is intended to be used as a commis-sioning tool. After the start-up procedure the PCS is connected to the PLC via the PG interface. We recommend the Automux PCS 809 for the Siemens PLC

S5-90U

S5-95U

S5-100U

S5-115U (CPU with one interface)

PCS 809 is valid for the PCS Operator Panel

PCS 009

PCS 090

PCS 095/095.1/095.2

PCS 009.s

PCS 090.s

PCS 095.s

PCS 900

PCS 920

PCS 950

PCS 950c

PCS 9000/9100

PCS 110

PCS 210

We supply the PCS 809 with power supply cable and adaptor cable MUX / PLC-AG.

The character table of the PCS 009, PCS 090, PCS 095, PCS 095.1

The characters can be presented on the LCD display. 8 characters are individually definable.

00	10	20	0 30	@ 40	P 50	\ 60	p 70
		! 21	1 31	A 41	Q 51	a 61	q 71
		" 22	2 32	B 42	R 52	b 62	r 72
		# 23	3 33	C 43	S 53	c 63	s 73
		$ 24	4 34	D 44	T 54	d 64	t 74
		% 25	5 35	E 45	U 55	e 65	u 75
		& 26	6 36	F 46	V 56	f 66	v 76
freely defined characters		´ 27	7 37	G 47	W 57	g 67	w 77
08		(28	8 38	H 48	X 58	h 68	x 78
09		) 29	9 39	I 49	Y 59	i 69	y 79
0A		* 2A	: 3A	J 4A	Z 5A	j 6A	z 7A
0B		+ 2B	; 3B	K 4B	[5B	k 6B	{ 7B
0C		, 2C	< 3C	L 4C	¥ 5C	l 6C	| 7C
0D		— 2D	= 3D	M 4D	] 5D	m 6D	} 7D
0E		. 2E	> 3E	N 4E	^ 5E	n 6E	-> 7E
0F	1F	/ 2F	? 3F	O 4F	— 5F	o 6F	<- 7F

The character table der PCS 095.2 and PCS plus

This international character set can be presented on the LCD display. 8 characters are individually definable.

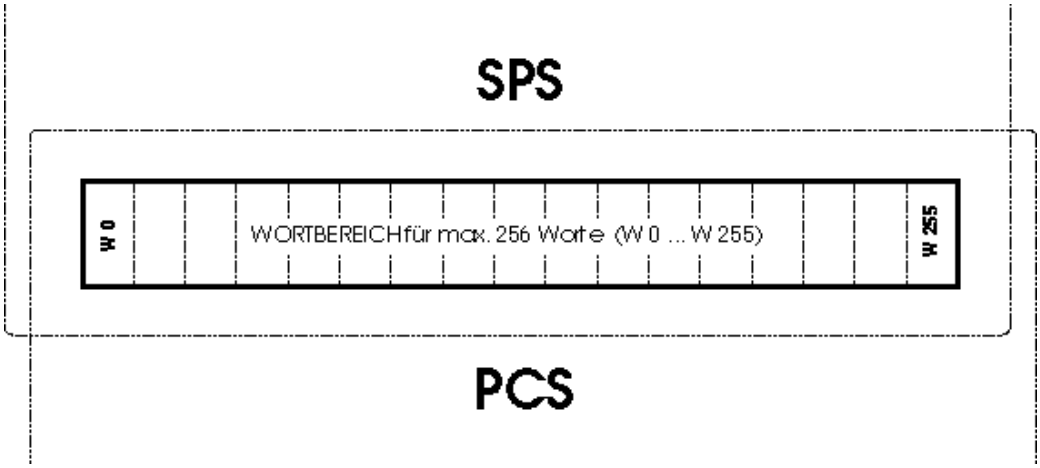
00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
free definable characters	▶		0	@	P	`	p	Б	α	▮▮	°	À	Ð	à	ð
	◀	!	1	A	Q	a	q	Д	♪	¡	±	Á	Ñ	á	ñ
	‘‘	"	2	B	R	b	r	Ж	Γ	¢	²	Â	Ò	â	ò
	’’	#	3	C	S	c	s	З	π	£	³	Ã	Ó	ã	ó
	▲	$	4	D	T	d	t	И	Σ	¤	₧	Ä	Ô	ä	ô
	▼	%	5	E	U	e	u	Й	σ	¥	µ	Å	Õ	å	õ
	●	&	6	F	V	f	v	Л	Ѧ	¦	¶	Æ	Ö	æ	ö
	↵	’	7	G	W	g	w	П	τ	§	·	Ç	×	ç	÷
(1)	↑	(	8	H	X	h	x	У	Ѫ	ƒ	ω	È	Ø	è	ø
(2)	↓	)	9	I	Y	i	y	Ц	Θ	⌐	¹	É	Ù	é	ù
(3)	→	*	:	J	Z	j	z	Ч	Ω	ª	º	Ê	Ú	ê	ú
(4)	←	+	;	K	[	k	{	Ш	δ	«	»	Ë	Û	ë	û
(5)	∠	,	<	L	\	l	|	Щ	∞	¼	½	Ì	Ü	ì	ü
(6)	∠	−	=	M	]	m	}	Ъ	∈	Я	½	Í	Ý	í	ý
(7)	▲	.	>	N	^	n	~	Ы	ε	⌂	¾	Î	Þ	î	þ
(8)	▼	/	?	O	_	o	⌂	Э	∩	‘	¿	Ï	ß	ï	ÿ

The simple communication principle of the PCS

Communication between any PLC and the PCS occurs as follows:

The PCS writes in predetermined word areas of the PLC, functions or nominal values, which the PLC then reads and interprets.

The PLC writes in predetermined word areas functions or actual values, which are automatically read and interpreted by the PCS. Independently of the PLC there are maximum 256 words of 16 bit, that is to say 4096 inputs / outputs for the PCS/PLC communication available.



... and rapid set-up of a particular operational requirement

1 First define the specification and decide on the required PCS (PCS micro, PCS mini, PCS midi or PCS maxi)

2 Allocate the word and bit number to variables (actual- and nominal values).

3 Create the texts for operational guidance and help functions as well as for displays of machine conditions.

4 Determine the message texts and apply these words to them, subdivide the message texts into 3 priority groups

- Information
- Warnings
- Faults

and take into consideration the differing cancel modes, display and message modes. Display and message modes can be altered by the PLC at any time.

5 Define the menus and the menu operating texts.

6 Transfer the data file (variables, texts, menus) which was made in the PC or PG under MSDOS/DRDOS or compatible DOS-system, with the software PCSPRO into the PCS.

7 Implement and parameterize the PLC specific operating software (PCS 91.nn, see overall view of information) in the users' programme.

8 Connect the PCS via the adapter cable with the PLC. Test together the operation and control of the PCS and PLC and adjust if necessary.

1 General references

1.1 General procedures

Please follow the description below to setup a complete system:

- Specify the functions of the system.
- Create a data record with the required parameters (variables, texts, menus) and download it into the PCS 009, PCS 090, PCS 095, PCS 095.1 using your specific driver. Refer to the PCSPRO manual and to this part of the manual for more information.
- Write a programmable controller program (information is contained in the driver appendix PCS 91.xxx) and download it into the system.
- Connect the PCS with the programmable controller. Test the communications and solve any faults.

1 General references

1.2 Equipment and accessories required

To write a user program and transfer this program into the PCS together with a driver. The following (Systeme Lauer) products are required:

1. The PCS itself
2. The programming cable PCS 733 for programming the PCS using an IBM compatible PC or programmer.
3. This manual (PCS 091).
4. The PCS*PRO* programming manual with diskette.
5. Driver manual (PCS 91.xxx, depending on the driver required).
6. For "beginners" we recommend the "PCS-SKILLS" booklet with an example program for the PCS.

The following are also required:

7. An IBM compatible PC or programmer with MSDOS > 3.3 or DRDOS operating system and at least one serial interface (COM).

… also the power supplies for all components.

2 Operation and display elements

2.1 Keys

They are divided into function keys, numerical keypad and control keys. All keys are made available as made available as key bits in the PLC. As long as a key is activated, a log 1 appears in the corresponding bit of the word range. The "pressing" of a key sets off a short acoustic signal, the so called keyboard click. Some keys also reproduce repeating acoustic signals on account of their "REPEAT" function.
The function keys F1 to F8 for the PCS 009 and PCS 090 and F1 to F16 for the PCS 095 and PCS 095.1 are only transmitted to the programmable controller. They have no internal functions.
The numerical keypad and the control keys also have PCS internal functions each depending on the displayed priority and are therefore to be interpreted in the PLC with caution.

Priority 0 = DEFAULT TEXT: In this instance the HLP key has internal functions.

Priority 2 = MENU: In this case the numeric keypad 0...9 as well as the control keys +,-,.,Arrow, CLR, ENTER and HLP, internal functions.

Priorities 4 to 8 = MESSAGE PRIORITIES: depending on the programming of the PCS (cancel mode number of message text lines, message help texts), the ARROW keys and the CLR and HLP key each have an internal function.

Priority 12 = HELP: On this occasion HLP, as well as ARROW-UPWARDS and ARROW-DOWN each have internal functions when more than one display is registered.
On activating non-permissible keys, exept for priority 0 = default text (only HLP key), the acoustic fault message rings out. Should the priority be limited by blocking the priorities 4...8 in the command word A (W13) to priority 0 = default, the numerical key pad as well as the control keys (exception: HLP) can be occupied with special machine functions. It is to be observed that the priority 12 = HELP is not lockable.
If the acoustic fault message should prove annoying, it can be switched off with bit 4 in the command word A (W13) = logic 1. At the same time the "REPEAT" click will be suppressed.

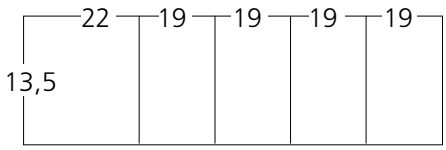
Tip!
The PCS plus series has no acoustic fault message.

2 Operation and display elements

2.2 Incription field

An individually design foil for labeling the F-keys can be inserted into the inscription field. For the PCS 009 the foil to be inserted should have the following dimensions:

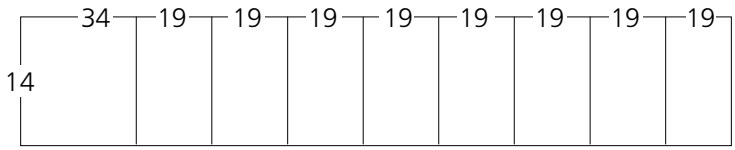
Length: 98 +0 -0,4 mm (left margin = 22 mm)
Width: 13,5 +0 -0,4 mm



Thickness of the cover foil: max. 0.1 mm. 0.9 mm are covered at the top and bottom margin. The visible window for each function key measures 15 mm (horizontal) x 12 mm (vertical).

An individually design foil for labeling the F-keys can be inserted into the inscription field. For the PCS 090 the foil to be inserted should have the following dimensions:

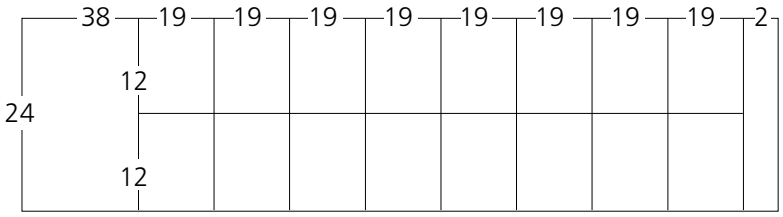
Length: 186 +0 -0,4 mm (left margin = 34 mm)
Width: 14 +0 -0,4 mm



Thickness of the cover foil: max. 0.1 mm. 0.9 mm are covered at the top and bottom margin. The visible window for each function key measures 15 mm (horizontal) x 12 mm (vertical).

For the PCS 095, PCS 095.1 the foil to be inserted should have the following dimensions:

Length: 192 +0 - 0.4 mm (left margin = 38 mm, right margin = 2 mm)
Width: 24 +0 -0.4 mm



Thickness of the cover foil: max. 0.1 mm. 1.75 mm are covered at the top and bottom margin. The visible window for each function key measures 15 mm (horizontal) x 11.6 mm (vertical).

Tip!
For the printing of the DIN A4 labeling sheet no use of a ink jet printer.

2 Operation and display elements

2.3 DIL switch (not PCS plus)

On the rear side there are 10 (12 at PCS 095) DIL switches.

DIL 1 to 4	=	PLC bits. These switches are in word 4, bit 4 to 7 are freely available DIL 1 = W4.4 DIL 2 = W4.5 DIL 3 = W4.6 DIL 4 = W4.7
DIL 5, DIL 6	=	Configurations parameter (driver) e.g. Baud rate, interface selection OFF OFF Parameter 1 (mainly driver parameter AC) ON ON Parameter 2 (mainly driver parameter AD) OFF ON Parameter 3 (mainly driver parameter AF) ON ON Parameter 4 (mainly driver parameter AF) For details refer to driver manual PCS 91.xxx
DIL 7	=	Configurations baud rate PCS 009, PCS 090, PCS 095, PCS 095.1 ON = 115.0 kBaud OFF = 38.5 kBaud
DIL 8	=	Operation Mode ON = stop, service programme expected OFF = rund, normal operation  **Hinweis!** Dieser Schalter muß im Betrieb auf OFF stehen, sonst sind Fehlfunktionen in der PCS und SPS möglich !!
DIL 9	=	write protection EEPROM ON = EEPROM re-writable OFF = EEPROM write protected
DIL 10	=	Contrast display adjustable with the HLP- and +/- key ON = alteration possible OFF = not possible
DIL 11	=	Datensatz *)
DIL 12	=	Datensatz *)

*) nur relevant bei PCS 095.1 und PCS095.2

Tip!
The DIL switch 9 should be switched to off after OFF after programming, otherwise the data content can not be guaranteed under all circumstances. In normal circumstances (including on/off switching at any time) there is no chance whatever of data loss.

The contrast normally only has to be adjusted once, it should be put in the OFF position after the setting of the DIL switch 10.

On the rear side of the PCS plus series are no DIL switches! They are replaced through a menu (see chapter "BIOS Setup").

2 Operation and display elements

2.4 LED displays

Every light display can be in 4 different states: OFF, ON, FLASHING and RAPID FLASHING. The FLASHING state is made up of 75% bright phase and 25% dark phase, the condition rapid FLASHING consists of 75% dark phase and 25% bright phase. The green and yellow LEDs at the function keys are available for the PLC to change. They are controlled by the LED status W10 und W11. The LEDs additionally available via the function keys F9...F18 for the PCS 095, PCS 095.1 are controlled by the extra LED status, words W24 and W25.

The 2 green and 1 yellow LEDs to the right of the control keys show the state of running of the PCS.

INPUT REQUIRED	MENU, INFORMATION WARNING, FAULT	COMMUNICATION FAULT
?	!	ERR
green	green	yellow

■ (?) INPUT REQUIRED

ILLUMINATED: The PCS is waiting for key activation (quit, i.e., delete from message, input of nominal values, closing of a menu)

FLASHING: If a message with cancel mode 4 is shown in the display, this LED flashes as long as the corresponding message bit is log 1 (the message can not be deleted). If the message bit is 0, then it is continually illuminated and the message can be cancelled with CLR. Should the HLP key be pressed and a help text is programmed to the currently activated priorities, this LED flashes alternately with the (!)-LED.

■ (!) MENU, INFORMATION, WARNING, FAULT

ILLUMINATED: An INFORMATION, a WARNING and a FAULT are shown in the display.

FLASHING: A MENU, a WARNING, an INFORMATION or a FAULT is switched on, however is not shown owing to an activated order of priorities in the command word A (W13; Bit 8...11) (at the moment). Should a help key be pressed down and a help text is programmed to the currently activated priorites, this LED (!) flashes alternately with the (?)-LED.

■ (ERR) COMMUNICATION FAULT

ILLUMINATED: The communication has not been started since the switch on.

FLASHING: The communication to the PLC has been broken.

When normal communication is taking place this LED of OFF. Should the communication be interrupt (after it had just been functioning) the acoustic alarm is activated for a short time and the LED begins to flash.

Warning!
Check the action/reaction of the programmable controller!
The action/reaction of the programmable controller has to be checked after a restart of the programmable controller following a communications loss.

2 Operation and display elements

- **CURSOR KEY LEDs IN MENUS**

  In this mode the (!)-LED is off or flashing. The arrow keys LED are enabled via bit 5 in command word A (W13). [Arrow key]-LED

  ILLUMINATED: Further nominal values which can be edited can be reached with this arrow.

  FLASHING: Activation of this arrow key enables this menu node to be left.

- **CURSOR KEYS LEDs IN MESSAGES**

  The (!)-LED is on, the arrow keys LEDs are enabled via the bit 14 in command word A (W13). Illuminated

  ARROW-UPWARDS: The main lines of this message can be activated.

  ARROW-BELOW: The follow-on pages of this message can be displayed.

  ARROW-LEFT: The manual scrolling is enabled and can be switched over to previous messages.

  ARROW-RIGHT: The manual scrolling is enabled and can be switched over to later messages.

- **CURSOR KEYS LEDs IN HELP TEXTS**

  In this mode the (!)-LED flashes alternately with the (?)-LED. The arrow keys LEDs are enabled via bit 15 in the command word A (W13). Illuminated

  ARROW-UPWARDS: The main lines of this help text can be activated.

  ARROW-BELOW: The follow-on pages of this help text can be displayed.

- **CURSOR KEYS LEDs IN RECEIPE TEXTS (ONLY PCS plus)**

  In this Mode is the (!)-LED off or flashing. [Arrow key]-LED

  ILLUMINATED: With this [Arrow]-key are additional edit nominal values within reach.

  FLASHING: The operating of the arrow keys (only ↑ and ↓) make possible that additional lines of the receipe texts can be displayed.

- **CURSOR KEYS LEDs IN HISTORY TEXTS (ONLY PCS plus)**

  In this Mode is the !-LED and the ?-LED always off. The automatic influence of the arrow key-LEDs can be enabled via Bit 7 in W12 (in the PCS 009plus are no arrow key-LEDs available).

  LED-[ARROW-UP], ILLUMINATED: The upmost lines (main lines) of this message texts can not be displayed.

  LED-[ARROW-DOWN], FLASHING: The follow-on lines (aditional lines) of this message texts can be displayed.

  LED-[ARROW-RIGHT], FLASHING: The history memory includes older inputs, they can be displayed through operate the key.

  LED-[ARROW-LEFT], FLASHING: The history memory includes younger inputs, they can be displayed through operate the key.

2 Operation and display elements

2.5 Display and contrast adjustment

When the PCS is in operation there are backlit lines (PCS 009: 4 lines x 20 characters, PCS 090: 2 lines x 40 characters, and PCS 095, PCS 095.1: 4 lines x 40 characters) . The character set is limited to the latin character set, including a few special cha racters. National special characters (eg. ä, ö, ü, ß) must be created via the character programme. For this purpose there are 8 characters to choose from. A character table can be found in the forward of this manual.
Flashing of individual characters (nominal value input) is administered by the PCS itself. Operating texts can flashed when used as default text through bit 15 log 1 in command word B (W14). With message texts this can follow for every priority via bit 8...10 in the command word A (W13). This switch over is also possible form the PLC at any time.

The contrast of the display characters can be altered on mass. The key HLP together with the key + increases the contrast of the characters, the keys HLP and - reduce the contrast until the script has almost completely disappeared. The setting is retentive, i.e., the very last ajustment remains stored even after switching off the PCS. To avoid an error of adjustment to the contrast, the adjustment can be disabled with the DIL switch = OFF (not PCS plus)

2.6 Acoustic signal

3 acoustic signals are available.

- a short keyboard click on pressing a key.
- when a key with a "REPEAT" function is "pressed", a "REPEAT" sound is heard.
- a 0.5 second duration acoustic fault message after having pressed a false key.

The volume of the acoustic signal can be adjusted on the rear side of the PCS by means of a potentiometer.
Should the acoustic ringing of a fault message be annoying, then it can be turned off with the word 13 bit 4 = logic 1. At the same time the "REPEAT" sound is suppressed.

Tip!
The PCS plus series have no acoustic signal.

3 Connections

3.1 Operating voltage

The connections for the operating voltage are fixed as screw terminals for wires up to 2 mm² diameter. For more about power consumption and limits of operating voltage read the chapter "Technical Data".

Warning!
The protective conductor and 0V of the supply voltage are separated in the device. The protective conductor is also connected to pin 1 of the serial interfaces (except for the noise filter). The enclosure must be grounded to avoid noise in the best way. Additionally, 0V must be neutralized near the power supply (according to VDE regulations).

3.2 Serial interfaces

The PCS 009, PCS 090, PCS 095, PCS 095.1 feature a combination interface. Only one interface can be used at a time. On the 25 pol D-type there is either an RS 232 (V24) or alternatively a TTY (line current interface), active or passive, available. On the 15 pol D-plug an RS 422 or alternatively an RS 485 interface is available. With regard to this please take note of the driver manuals PCS 91.xxx.
With a PLC coupling through the RS 422/RS 485, the programming cable PCS 733 can be plugged in at the same time. During the configuration of the PCS the interface RS 422/RS 485 is switched to high resistivity.

The PCS plus series have a 9pin RS 232 interface for projecting and printing. It can be used also for simulation operation.

Tip!
Simulation and printing is not possible simultaneous. During the simulation print commands will be ignored.
With the devices from the PCS plus series (with serial connection) it can be simulate with the 25pin interface and printed with the 9pin interface simultaneous.

3.3 RS 232/TTY interface

3.3.1 Configuration/programming

With the help of the RS 232 interface you can establish the configuration/programming of the PCS 009, PCS 090, PCS 095, PCS 095.1 from a PC/PG (also refer to PCSPRO) with the programming cable PCS 733 (configurations cable). The start up to the configuration, i.e., programming is observed at the DSR input. The PCS is thereby ready for programm transfer. Please note that in order to programm, the EEPROM must be enabled with the DIL switch 9 = ON. **This is invalid for the PCS plus, the programming is always possible!**

Attention!
The level at DSR (pin 6) is determined by the PC output DTR (25-pole: pin 20; 9-pole: pin 4). Since the level of this pin is not defined after booting the PC/programmer or after exiting a program, it is possible that the PCS is in confi-guration mode (only if the programming cable PCS 733 is plugged in). In this case, the PCS program is stopped. Any communication with the programmable controller will be aborted. In this case, you must disconnect the PCS 733 cable. The PCSPRO software sets the correct level at this pin.

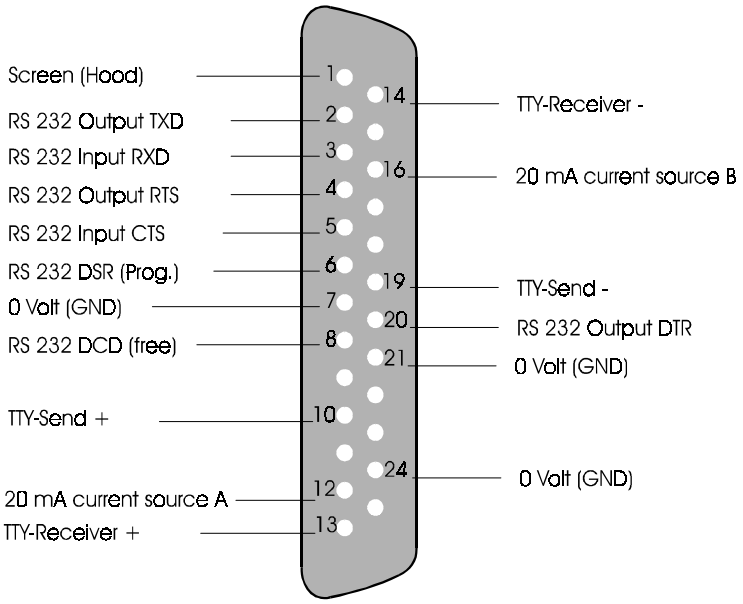
3 Connectors

3.3.2 Communication

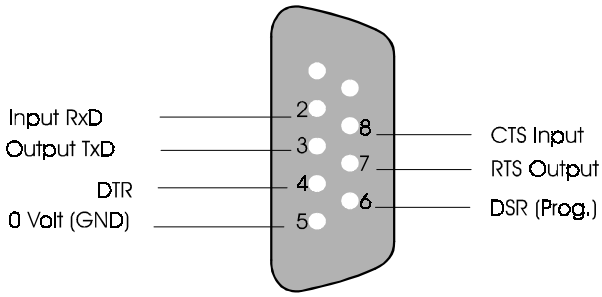
Depending on your driver and the PLC being used, you need to utilise a special communication cable. Further-more DIL switches 5 and 6 must be set according to the programmed driver parameter. For information regarding this please refer to the respective driver manual PCS 91.xxx.

2 seperate line current sources (A+B) are at the disposal of the TTY.

(Overhead view of the plug)



RS232/TTY interface for projecting
and communication
(PCS 009/090/095.x/PCS plus.s)



RS232 interface for projecting
and printer
(all PCS plus devices)

Warning!
If external current loop sources are used, the maximum e.m.f. may not exceed 15 V. Furthermore, real current sources with a maximum of 22 mA are required. Otherwise malfunctions may occur in the PCS and in the programmable controller!

If the programming cable PCS 733 is used with 9 and 25pin connectors:

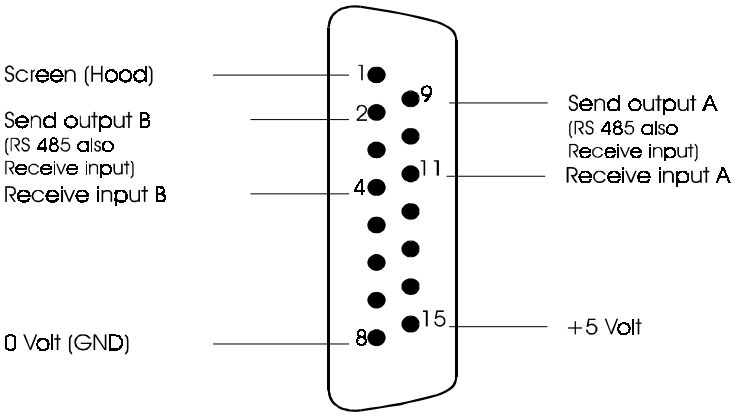
- **Never** connect both connectors simultaneous!

3 Connectors

3.4 RS 422/485 interface

You will need a special communication cable depending on the driver and the PLC that you use. In addition the DIL switches 5 and 6 must be set according to the programmed driver parameters PCS 91.xxx.

This interface is intended for the communication only.
The RS 422 communication utitises the pins 2 and 9 for transmission and pins 4 and 11 for reception. On the other hand RS 485 applies pins 2 and 9 to transmit and receive. For further details refer to the "PCS 91.xxx.Driver Manual".



Warning!
Check the action/reaction of the programmable controller!
The action/reaction of the programmable controller has to be checked after a restart of the programmable controller following a communications loss.

3 Connectors

4 Variables

Variables can be applied to every text. From this position the PCS reserves room for the variables. The display form and the length are not needed in the variable description. Maximum 4 variables can be used per text line (with the application of the ASCII variable, only one variable per line is permissible). When writing text, the additional variable lengths in each line have to be taken into consideration. Use the programming software "PCSPRO", as this automatically takes into consideration the maximum variable lengths when defining the texts.
A difference is made between INTERNAL and EXTERNAL variables. The source values of the EXTERNAL variables lie in the PLC. A variable definition must be written for these variables. The description of the external variables is filed in the configuration of the PCS. With respect to the internal variables, this is already to hand.
In addition the variable types (V)BIN(0)-1,A permit scaling. That means a given range of values (source range) in the PLC will be displayed in another display range (target area) in the PCS (restrictions: the multiplicator must be positive!).
The number of the pre- and after decimal point positions with every BIN (binary), as well as limiting values; that is minimum and maximum value; are programmable as constants.

BCD(0)-1,2 allow the definition of a minimum and a maximum value, as well as a definable mantissa (digits).

Every variable can be defined as an ACTUAL-, NOMINAL- or NOMINAL-P value.

ACTUAL: The value in the word is an actual value. The PCS can only display the value.

NOMINAL: The value in the word is a nominal value. The value can be displayed and changed by the PCS.

NOMINAL VALUE-P: The value in the word is a private nominal value. The PCS can display the value. It can be changed only if this is allowed by word 14 Bit 7 = log 1 (key switch or DIL switch 1...4 on the rear side of the PCS). When bit 7 of word 14 = log 0, the value is displyed as an actual value.

PCS plus:
Variables defined as NOMINAL VALUE-P can only be changed in recipes if the NOMINAL VALUE-P bit (bit 15 in the control word of the recipe words) is set.

Overview of the external variable formats:

- BIT see chapter 4.1
- STRING see chapter 4.2
- CSTRING see chapter 4.3
- BCD see chapter 4.4
- BIN see chapter 4.5
- VBIN see chapter 4.5
- WORD see chapter 4.6
- ASCII see chapter 4.7
- TIMER see chapter 4.8

Overview of the internal variable formats :

- PCS 009 /090 / 095 see chapter 4.9
- PCS plus see chapter 4.9.1

4 Variables

4.1 Variables format BIT

It is assumed that you have created a bit variable on word 30 as nominal value with the assistance of the programming software PCSPRO. You have selected bit 15 as bit number. You have programmed the character string (inscriptions) for the logic bit condition 0 with "CLOSED" and for the logic bit condition 1 with "OPEN".

Summary:

Word number:	30
Class:	NOMINAL
Variable format:	bit
Bit position:	15
Inscription 0 (AP0):	CLOSED
Inscription 1 (AP1):	OPEN

The variable is incorporated into the operating text 0 as follows:

```
VALVE 0 IS IN •••••••••••• CONDITION
```

If the bit 30.15 = 0, there appears with the selected operating text 0 in the display:

```
VALVE 0 IS IN CLOSED CONDITION
```

If the bit is 30.15 = 1, there appears with the selected operating text 0 in the display:

```
VALVE 0 IS IN OPEN CONDITION
```

If this operating text 0 is utilised in the menu node, then the bit 30.15 can be set with the key + and set back with the key -. The alteration is carried out immediately after every activation of the keys. The remaining bits of the word 30 are not influenced by writing back.

4 Variables

4.2 Variables format STRING

It is assumed that you defined a STRING variable on word 31 as nominal-P value with the help of the programming software PCSPRO. The character strings (inscriptions) 0...2 are programmed with "SERVICE", "SETTING UP OPERATION" and "AUTOMATIC OPERATION".

Summary:

Word number:	31
Class:	NOMINAL-P
Variable format:	STRING
Inscription 0 (AP0):	SERVICE
Inscription 1 (AP1):	SETTING UP
Inscription 2 (AB2):	AUTOMATIC

The variable is inserted in the operating text 15 as follows:

```
TYPE OF OPERATION:•••••••••••••• CONTINUED: >
```

If the value 1 is present in the lower value byte of word 31, then with active operating text 15 there appears in the display.

```
TYPE OF OPERATION: SETTING UP  CONTINUED: >
```

If the variable is used in a menu, the value in the word 31 can be decremented with keys "-" until the value 0 and incremented with the key "+" to the value 2. However bear in mind that an altered value is written back into the word first after "ENT" or departure from the variable field. If the value is to be written at once into the PLC, refer to CSTRING.

Attention:

1. The bits in the higher valued byte of word 31 are ignored on reading; on writing them back into the PLC, they are set to 0. This is a means of assistance to establish alterations brought about by the PLC programs.
2. Should the old value not be altered, then it won't be written back (even including Bits 8...15).
3. A maximum of 256 inscriptions are allowed (including 0).
4. The limitations set themselves according to the number of programmed inscriptions; whose minimum value is 0.
5. At least 3 inscriptions must be defined, otherwise the variable is to be declared as a bit.
6. It is impossible to leave the input field with a value outside the limiting values as soon as editing has begun.
7. A restoration of the original value is possible at any time with the "CLR" key.

4 Variables

4.3 Variables format CSTRING

It is assumed that you defined a CSTRING variable on word 32 as nominal-P with the help of the programming software PCSPRO. The character strings (inscriptions) 0...11 are programmed with "JANUARY", "FEBRUARY", "MARCH", "APRIL", "MAY" until "DECEMBER".

Summary:

Word number:	32
Class:	NOMINAL
Variable format:	CSTRING
Inscription 0 (AP0):	JANUARY
Inscription 1 (AP1):	FEBRUARY
up to Inscription 11 (AB11):	DECEMBER

The variable is inserted in the operating text 20 as follows:

```
FILLING MONTHS: •••• CONTINUED: >
```

If the value 5 is present in the lower value byte of word 32, then with active operating text 20 there appears in the display.

```
FILLING MONTHS: JUNE CONTINUED: >
```

If the variable is used in a menu, the value in the word 32 can be decremented with key "-" until the value 0 and incremented with the key "+" until 11 (=$000B). A modified value is written into the PLC at once. This is contrary to that with CSTRING.

Attention:

1. The bits in the higher valued byte of word 32 are ignored on reading; on writing them back into the PLC, they are set to 0. This is a means of assistance to establish alterations brought about by the PLC programs.
2. Should the old value not be altered, then it won't be written back (even including Bits 8...15).
3. A maximum of 256 inscriptions are allowed (including 0).
4. The limitations set themselves according to the number of programmed inscriptions; whose minimum value is 0.
5. At least 3 inscriptions must be defined, otherwise the variable is to be declared as a bit.
6. It is impossible to leave the input field with a value outside the limiting values as soon as editing has begun.
7. A restoration of the original value is not possible with the "CLR" key.

4 Variables

4.4 Variables format BCD

The BCD variable formats are divided into the following sub groups:

Variable type	16 bit	32 bit	Number of digits	Pre-zeros
1. BCD-1	x		1...4	
2. BCD0-1	x		1...4	x
3. BCD-2		x	1...8	
4. BCD0-2		x	1...8	x

It is assumed that you have defined a BCD variable (BCD-2) on word 33 as nominal-P value with the assistance of the programming software PCSPRO. You will to display 8 digit positions, the typed in minimum value should be 90 and the maximum value 50000000.

Summary:

Word number:	33
Class:	NOMINAL-P
Variable format:	BCD-2
Inscription 0 (AP0):	8
Inscription 1 (AP1):	90
up to Inscription 11 (AP11):	50000000

The variable is inserted into the operating text 100 as follows:

```
FINISHED NUMBER OF PIECES: •••••• CONT.: >
```

If the value $0045 (69) is in word 33 and the value $5673 (22131) is in word 34, then there appears in the selected operating text 100 in the display:

```
FINISHED NUMBER OF PIECES: 455673 CONTINUED: >
```

The 2 pre-zeros are not shown as this is the variable format BCD-...! If you wish the pre-zeroes to be displayed, put in the variable format BCD0-... instead of BCD-...

Attention:

1. Unnecessary higher value bits will be ignored and written back to 0.
2. Scalling and the superimposing of decimal points is not possible.
3. Intermediate values will not be recognised. The writeback first occurs after "ENT" or on leaving the variable field.
4. Offsets are also possible: "1", "0", "+", would give the intermediate result of 455683 in the above example as a result. As this case is about an intermediate result, no writeback will be made (although the cursor now refrains from blinking)!
5. It is impossible to leave the input field with a value outside the limiting value after editing has begun.
6. You can also increment and decrement with the operational sign keys (with auto repeat).
7. It is possible to bring back the previous values at any time with "CLR".

4 Variables

From the Bios versions	PCS 095	V508A	(1 Data set)
	PCS 095.1	V408A	(4 Data set)
	PCS 095.2	V428A	(Int. character key)
	PCS 090	V208D	
	PCS 009	V2041	

and the Version 5.2 of the PCSPRO-Software, as well as all devices from the PCS plus series, the BCD variable can be entered cover. The covered input is also for BCD variables with up to 4 and also up to 8 digits possible. While editing the following display appears:

after input of one number: *(with “pre zero”: - - - *)

after inputof three numbers: * * * (with “pre zero”: - * * *).

When the variable is not edited, are fundamental lines (“- - - -”) in the display. Apart from the covered input this variant behave just as the normal BCD variable, this means also, that the insertes value displays in the communication data module and can be read from the PLC.

4 Variables

4.5 Variables format BIN

The 16 bit value of a word or 32 bit value of a double word in the PLC are displayed in the fixed point format as a non pre-character figure. The variable requires maximum 11 digit places (with decimal points). The inclusion of the decimal point is made possible with the selection of the pre- and after point position. At the same time the position for the decimal point in the display is also to be condisdered. With 16 bit variables it is also possible to have scaling, that is a conversion of the range of values PLC -> PCS and in the reverse PCS -> PLC. The display range in the PLC with the 16 bit variables is between $0 and $FFFF, and with 32 bit variables between $0 and $FFFFFFFF. The range of values presentable in the PCS is between 0 and maximum 4 294 967 295.
The following variable formats are possible:

BIN-1: This variable occupies a word in the PLC. The number of pre-decimal point is definable between 1 and maximum 10. The number of the after decimal point positions is between 0 (without decimal point) and maximum 9. As soon as the after decimal point positions are declared, the variable requires one further character position in order to superimpose the decimal point. If the minimum value of the PLC is different from the minimum value of the in the PCS, i.e., the maximum value of the PLC from that of the PCS, then it is dealing with a scaling BIN variable. With this type of variable, the input of the pre-decimal point position is seperate from the after decimal point positions, should an after decimal point position have been given. Activating the (.) key puts in the after decimal point positions. This kind of figure input is also known as pocket calculator input.

BIN0-1: As in BIN-1, though here pre-zeroes instead of empty spaces are displayed.

BIN-A: As in BIN-1, however the value is not entered according to the pocket calculator input, but by means of an interjection over the decimal point (from right to left).

BIN0-A: As in BIN-1, however the value is not entered according to the pocket calculator input, but by means of an interjection over the decimal point (from right to left). Also here pre-zeroes instead of empty spaces are displayed.

BIN-2: This variable occupies a double word in the PLC. The number of pre-decimal point is definable between 1 and maximum 10. The number of the after decimal point positions is between 0 (without decimal point) and maximum 9. As soon as the after decimal point positions are stated, the variable requires one further character position in order to superimpose the decimal point. With this type of variable, the input of the pre-decimal point position is separate from the after decimal point positions, should an after decimal point position have been given. Activating the (.) key puts in the after decimal point positions. This kind of figure input is also known as pocket calculator input.

BIN0-2: As in BIN-2, though here pre-zeroes instead of empty spaces are displayed.

BIN-B: As in BIN-2, however the value is not entered according to the pocket calculator input, but by means of an interjection over the decimal point (from right to left).

BIN0-B: As in BIN-2 however the value is not entered according to the pocket calculator input, but by means of an interjection over the decimal point (from right to left). Also here pre-zeroes instead of empty spaces are displayed.

VBIN: The 16 bit value of a word or 32 bit value of a double word in the PLC are displayed in the fixed point format as a non pre-character figure. The variable requires maximum 12 digit places (essentially with operational sign and alternatively with decimal points). The superimposition of the decimal point is made possible with the selection of the pre- and after decimal point position. At the same time the position for the decimal point and the operational sign in the display is also to be considered. With 16 bit variables it is also possible to have scaling, that is a conversion of the range of values PLC -> PCS and in the reverse PCS -> PLC. The display range in the PLC with the 16 bit variables is between $8000 and $7FFF, and with 32 bit variables between $80000000 and $7FFFFFFF. The range of values presentable in the PCS is between -2 147 483 648 and maximum +2 147 483 647. The operational sign can be altered with the help of "+" or "-" key. The following variable formats are possible:

VBIN-1: The variables format VBIN displays the bit value of a word or double word in solid point formats as a operational signed number. The variants of the VBIN variables corresponds to the BIN varables.

4 Variables

The BIN variables format are divided up into the following sub-divisions as follows:

Variable type	16 Bit	32 Bit	Pocket calculator entry	Scaling	Operational sign	Pre-zeros
1. BIN-1	x		x	x		
2. BIN-A	x			x		
3. BIN-2		x	x	selectable at PCS plus		
4. BIN-B		x		selectable at PCS plus		
5. VBIN-1	x		x	x	x	
6. VBIN-A	x			x	x	
7. VBIN-2		x	x	selectable at PCS plus	x	
8. VBIN-B		x		selectable at PCS plus	x	
9. BIN0-1	x		x	x		x
10. BIN0-A	x			x		x
11. BIN0-2		x	x	selectable at PCS plus		x
12. BIN0-B		x		selectable at PCS plus		x
13. VBIN0-1	x		x	x	x	x
14. VBIN0-A	x			x	x	x
15. VBIN0-2		x	x	selectable at PCS plus	x	x
16. VBIN0-B		x		selectable at PCS plus	x	x

Tip!
Variables 9...16 (V)BIN0-... are only definable with the programming environs PCS*PRO*!

4 Variables

Example:
It is assumed that with the assistance of the programming software PCSPRO, you have defined a BIN variable (BIN-) on word 34 as nominal value. You want to present and key in two pre-decimal point and one after decimal point. In addition you want to incorporate scaling. Values of between 0 and 100 (0 and 10,0) may be typed into the PCS. This range of values should be sent to the PLC however as 0...4095 ($0...$0FFF). Pre-positioned zeros should be suppressed.

Summary:

Word number:	34
Class:	NOMINAL VALUE
Variable format:	BIN-1
Pre-decimal point positions:	2
After decimal point positions:	1
Minimum value PCS:	0
Maximum value PCS:	100
Minimum value PLC:	0
Maximum value PLC:	4095

The variable is to be inserted in the operating text 120 as follows:

```
POTENTIAL: ••• VOLT CONTINUED: >
```

If the value $0800 (2048) is in word 34, then there appears in the display with operating text 120 the following:

```
POTENTIAL: 5.0 VOLT CONTINUED: >
```

Operation as nominal variable in a menu:

- The value can be altered with the numeric keys.
  (V)BIN(0)-1(2): Separation of pre-decimal point and after decimal point, change occurs with key (.).
  (V)BIN(0)-A(B): Simple pushing through from right to left springing over the decimal point.
- Offset input possible (not with VBIN variables!): e.g., ".", "2", "+", : new display (example) 5.2!
- Keys "+"/"-":
  BIN(0)-1,2,A,B: Adding / subtracting is with 1 (also with ".").
  VBIN (0)-1,2,A,B: Change of operational signs at any time.

Tips!

- Only altered values are written back within the limiting values.
- If the original value is outside the limiting values, then inverse fields will be displayed.
- If a value outside the limiting values has been keyed in (this is only possible with direct numeric input) then by ENTER of departure from the field, a check will be carried out. If there is an error and the given value was smaller than the minimum value, then the minimum value will be displayed. Furthermore the acoustic signal rings out and nothing is written in the PLC.
- It is possible to leave the inverse field. For example, if the first variable in a menu text is outside the limiting value, then it is not possible to page further. First of all the value has to be corrected (a valid value is keyed in when BIN is "+", "-" or "CLR" and with VBIN only "CLR" or per character input).
- The declared range of values (PLC and PCS) may only be negative with VBIN(0) variables. In this case the minus sign is merely to be set before the corresponding value or values.

4 Variables

4.6 Variables format WORD

The 16 bit value of a word in the PLC is displayed in the bit format. The keys [+] and [-] enable a cursor to be positioned on the individual bits. An individual bit be cancelled with the [0]-key or set with [1]-key. This data format requires a definite 17 character place in a line. An empty space has been set between the HIGH- and the LOW-byte as an convenient division.

The WORD variable of the PCS is used to represent the content of a 16-bit word in different formats:

KM - bit-by-bit representation of a word, e.g. '10001001 10101011' (see word variable)
KH - hexadecimal representation of a word, e.g. '89AB' (for entry see ASCII variable)
KY - byte-by-byte decimal representation, e.g. '137 171' (for entry see binary variable)

Attention!
The variable formats KM, KH, and KY are available starting with the following hardware versions:
PCS 009 version V2000 and up
PCS 090 version V205B and up
PCS 095/095.1 version V4067, 4 data records
PCS 095/095.1 version V5066, 1 data record
PCS 095.2 from version V428A, International character set
PCS plus series all versions

Example:
It is to be assumed that you have defined a word variable on word 35 as a nominal value with the help of the programming software PCSPRO.

Summary:

Word number:	35
Class:	NOMINAL VALUE
Variable format:	WORD

1. Format when using bit-by-bit representation (corresponds to KM)
The word on the specified address is represented in binary format using 0 and 1 (e.g. a PRESET value has been assigned to word 135): The insertion of the variable into the operating text 99 is represented below:

```
W 35 BINARY: ••••••••••••••••• CONTINUED: >
```

If word 135 contains the value $5A5A the following is displayed with operating text 99 selected:

```
W 35 BINARY: 01011010 01011010 CONTINUED: >
```

Using the [+] and [-] keys, the cursor can be moved bit-by-bit if the variable is used in a menu. The bit at the cursor position can be set to logic. 0 and 1 by using the [0] and [1]-keys.

4 Variables

2. Format when using the dual decimal representation (corresponds to KY)
The word on the specified address is represented using decimal numbers with separation of the high and low byte of the word:

```
W 35 BINARY: ••••••• CONTINUED: >
```

```
W 35 BINARY: 123 123 CONTINUED: >
```

0..9: calculator entry of high/low byte; Point: switching between digit high/low byte; +/-: INC/DEC of high/low byte

3. Format when using hexadecimal representation (corresponds to KH)
The word on the specified address is represented word-by-word using the numbers 0...F.

```
W 35 BINARY: •••• CONTINUED: >
```

```
W 35 BINARY: 5A5A CONTINUED: >
```

Point: change to the next digit (right direction); 0...9: assigning a number to each digit; +/-: accessing the numbers A..F (pseudo tetrad).
Generally, a modified value is only stored in word 135, if the ENT key is pressed or if you exit the variable field.

Attention!

*• If the previous value is not changed, no data are stored.
- Restoring the previous value is possible at any time using the CLR key.
- The WORD variable format permanently requires 17 characters in the display (the 8 most significant bits are separated by a SPACE from the 8 least significant bits)!

* This point is only valid, if the operating page options correspond to the default setting!

4 Variables

4.7 Variables format ASCII

Up to 16 characters (8 words) in the PLC can be displayed or altered as ASCII characters. The + and - keys enable the ASCII characters to be presented with the next higher or lower ASCII code. The (.) switches the cursor one position to the right. After the last character has been entered, activation of the (.) key, the cursor again appears on the 1st character.

Example:
It is assumed that you have defined an ASCII variable on word 36 as nominal value with the help of the programming software PCSPRO. You wish to be able to key in and display a 16 digit serial number.

Summary:

Word number:	36
Class:	NOMINAL VALUE
Variable format:	ASCII
Number of characters:	16 (8 words)

The variable is inserted in the operating text 90 as follows:

```
SERIAL NUMBER: •••••••••••••••• CONTINUED: >
```

If there exists in the words W36=$4557, W37=$4120, W38=$344E, W39=$4542, W40=$2D38, W41=$3131, W42=$3530 und W43=$3533 (corresponds to the String "EWA-4NEB 8115033), then with the selected operating text 90, the following appears in the display:

```
SERIAL NUMBER: EWA-4NEB 8115033 CONTINUED: >
```

4 Variables

Should the variable be used in a menu, then the cursor (flashing position) can be moved one place to the step by step to the right with the help of the "." key. If the cursor is resting at the variable end (end of the character string), then activation of the "." key sends it once again to the beginning of the variables. Every sign, including the special signs can be selected with the "+" and "-" keys. An altered value is first written in the delivery area first after ENTER or departure from the variables field as from word 36 (W36...W44) Hex coded (except in the case where the value has not been altered).
If the words W36 to W43 are outside the displayable characters, that is to say in the areas $00...$07, $09...$1F or > $7F, there appears in the string display:

```
SERIAL NUMBER: ■■■■■■■■■■■■■■■■ CONTINUED: >
```

After activation of the control keys "+", "-", or "CLR", the "■" characters replaced with "?", so that the variables prediction now consists of 16 characters with $3F "?".

```
SERIAL NUMBER: ???????????????? CONTINUED: >
```

Now the variable can be edited. Afterwards the newly edited variable value can be written in the PLC with ENTER or departure from the variables field.

Attention!

- If the previous value is not modified, no data are stored.
- Restoring the previous value is always possible by pressing [CLR].
- Only 1 ASCII variable may be used for each display line and no other variables may be shown on that line.
- Only even character lengths are admissible!

4 Variables

4.8 Timer

The variable format TIMER is used to specify a 3-digit time value and to select the time base from 4 possible values.

The TIMER variable reads/writes the content from/into a 16-bit word in the following format:

'00dd cccc bbbb aaaa'

aaaa = BCD-coded number D1 (0..9) of the time value

bbbb = BCD-coded number D2 (0..9) of the time value

cccc = BCD-coded number D3 (0..9) of the time value

dd = Time base value (0..3)

Word content '2 1 0 0' - time value 100 corresponds to 100 seconds

|

Time base 2 (corresponds to * 1s)

The texts used to represent the selected time base can be created as desired. To modify a TIMER preset value, the time value and (if required) the time base must be modified. To switch between these two entries, use the (.) key of the PCS.

The time value can be directly modified using the numeric keys. If the time base modification is activated, it can be selected with the (±) key.

Timer variable in accordance with the Siemens format with 3 BCD digits and 4 Project.AP with a maximum of 37 characters.

Example with an AP comprising 4 characters:

```
TIMER: ••••••• CONTINUED:>
```

```
TIMER: 123ABCD CONTINUED:>
```

Word format:

Bits 12+13= These bits indicate the corresponding AP.
Bit 11...0 = 3-digit BCD number

Attention!
The variable formats KM, KH, and KY are available starting with the following hardware versions:
PCS 009 version V2000 and up
PCS 090 version V205B and up
PCS 095/095.1 version V4067, 4 data records
PCS 095 from version V5066, 1 data records
PCS 095.2 from version V428A, International character set

4 Variables

4.9 Internal variable formats

PCS 009 / 090 / 095 / 095.1 / 095.2:

Apart from the variables defined by the user, there are 6 predefined internal variables. At present, only variables above ZP are being used. These variables can be displayed in the PCS display.

Description of the internal variables PCS009 / 090 / 095 / 095.1 / 095.2:

NAME	CONTENTS	FORMAT	LENGTH	ACTUAL/NOMINAL
ZP	NUMBER OF INFORMATIONS	BIN	3	ACTUAL
ZQ	NUMBER OF WARNINGS	BIN	3	ACTUAL
ZR	NUMBER OF FAULTS	BIN	3	ACTUAL
ZT	MENU NUMBER	BIN	3	ACTUAL
ZV	SCROLL TIME	BIN	2	NOMINAL
ZX	INTERFACE FAULTS	BIN	2	ACTUAL
Z084	SOFTKEY TEXT LINE_1	STRING	20/40**)	ACTUAL
Z085	SOFTKEY TEXT LINE_2	STRING	20/40**)	ACTUAL

Additional internal variables of PCS 095 / 095.1 / 095.2:

ZA	PRN_TIMEOUT	BIN	3	NOMINAL
ZB	PRN_RS232/TTY	STRING	5	NOMINAL
ZC	PRN_HANDSHAKE	STRING	3	NOMINAL
ZD	PRINT DIRECTION	STRING	4	NOMINAL
ZE	PRN_BAUD RATE	STRING	5	NOMINAL
ZF	PRN_DATA BITS	STRING	1	NOMINAL
ZG	PRN_STOP BITS	STRING	1	NOMINAL
ZH	PRN_PARITY	STRING	4	NOMINAL

Brief explanation of the existing internal variables:

ZP: The number of currently set notes is displayed as a 3-digit actual value.

ZQ: The number of currently set warnings is displayed as a 3-digit actual value.

ZR: The number of currently set faults is displayed as a 3-digit actual value.

ZT: The current menu number is displayed as a 3-digit actual value.

ZV: The scroll time in the message memory can be displayed in seconds or edited. This alteration is only valid until the next RESET is performed and is not retained in memory.

ZX: The maximum number of faulty (repeated) packages since the RESET is displayed. This number refers to 100 packages each and indicates the safety of data transmission which in turn depends on the cable length, the cable type and the influence of electric and magnetic interferences.An error rate of up to 1% errors is uncritical. This information applies to all drivers that support the internal ZX variable.

Z084: Variable format SOFTKEY TEXT LINE_1 STRING 20/40 ACTUAL*) **)

Z085: Variable format SOFTKEY TEXT LINE_2 STRING 20/40 ACTUAL **)

For an explanation of the additional internal variables, please refer to section “Printer parameters”.

The SOFTKEY TEXT LINE variable allows a comment to be issued for the presently set softkey text number (DW26 HB). It is comparable to a STRING variable with a constant expression length of 40 characters (PCS 090/PCS 095) or 20 characters (PCS 009). The user can define the individual expressions in the PCSPRO. A total of up to 128 softkey text expressions is available. There are two SOFTKEY TEXT LINES, allowing both the uppe r and the lower softkey line to be assigned a comment of its own. The variables are allowed in all priorities. They cannot be edited as their expressions are constantly allocated to the PLC SOFTKEY_TEXT_NUMBER high byte.

*) PCS 090: only variable format SOFTKEY TEXT LINE_1.

**) PCS 009 and PCS 095: both variable formats are valid. Length for PCS 009: 20 characters; for PCS 090/095: 40 characters.

4 Variables

4.9.1 Internal variables of PCS 009plus, 090plus, 095plus

The devices of the PCS plus series have 26 internal variables. The differences are shown in the table.

Name	Contents	Format	Length	Act./Nom.	Addressable
[ZP]	NOTES	BIN	3	Act.	no
[ZQ]	WARNINGS	BIN	3	Act.	no
[ZR]	FAULTS	BIN	3	Act.	no
[ZT]	MENU_NUMBER	BIN	3	Act.	no
[ZV]	SCROLL_NOMINAL	BIN	2	Nom.	no
[ZX]	ERR_INTERFACE	BIN	2	Act.	no
[ZA]	PRN_TIMEOUT	BIN	3	Nom.	no
[ZB]	PRN_RS232/TTY	STRING	5	Nom.	no
[ZC]	PRN_HANDSHAKE	STRING	3	Nom.	no
[ZD]	PRINT_DIRECTION	STRING	4	Nom.	no
[ZE]	PRN_BAUD RATE	STRING	5	Nom.	no
[ZF]	PRN_DATA BITS	STRING	1	Nom.	no
[ZG]	PRN_STOP BITS	STRING	1	Nom.	no
[ZH]	PRN_PARITY	STRING	4	Nom.	no
[Z15]*	CLOCK_SECONDS	BIN	2	Nom.	yes
[Z16]*	CLOCK_MINUTES	BIN	2	Nom.	yes
[Z17]*	CLOCK_HOURS	BIN	2	Nom.	yes
[Z18]*	DATE_DAY	BIN	2	Nom.	yes
[Z19]*	DATE_MONTH	BIN	2	Nom.	yes
[Z20]*	DATE_YEAR	BIN	2	Nom.	yes
[Z21]*	WEEKDAY_NOMINAL	STRING	2	Nom.	yes
[Z22]*	WEEKDAY_ACTUAL	STRING	2	Act.	yes
[Z23]*	TIME	TIME	8	Act.	yes
[Z24]*	DATE	DATE	8	Act.	yes
[Z25]**	RECIPE_NO_ACTUAL	BIN	4	Act.	yes
[Z26]**	RECIPE_NO_NOMINAL	BIN	4	Nom.	yes
[Z084]	SOFTKEY_LINE_1	STRING	40	Act.	no
[Z085]	SOFTKEY_LINE_2	STRING	40	Act.	no

Length = Number of characters in the display

* Description of time and date: see section 8.
** Description of recipies: see section 10.

All other variables have been described in the previous section “Internal variable formats” and in section “Printer parameters”.

4 Variables

4.10 Treatment of variables

Every variable is automatically read by the PCS; that is to say the specified word number. The PLC specific word number (DW, MW, DM, Counter...) or indication, can be found in the help section of the driver manual PCS 91.xxx. This also applies for nominal values. Here the read value is displayed as preset value (refer to the chapter "Variables in menus").

The following rules apply for the refressing of variables (ACTUAL values or non active nominal-P-values):

- Continual refressing of variables occurs in every priority class. The rate of refress depends on various factors: the number of variables in the display, the type of driver, the transmission speed (baud rate), the number of tasks that can be achieved in a transfer paket, as well as the answer time of the PLC which is independant of the PLC cycle time. The best case shows a refress time of roughly 8 per second.
- There is no difference between internal and external variables. As long as the variable values have not been transfered, spaces are shown in the display. If the read value is outside the filed limiting values in the PCS, then the inverse fields will be displayed in the variables field (every one with dots).
- Nominal-P-variables are treated exactly like ACTUAL values as long as the bit 7 in word 14 is logic 1.

Special treatment is required for PCS 009, PCS 095, PCS 095.1, PCS 095plus as follows:

- If there are more than 8 double words from an PLC to read in a display page (4 lines), then the reading is divided into two different PLC cycles. First the variables which are in the first line pair are read, then finally those in the second pair of lines.

  The following rules apply for the editing and writing of variables (NOMINAL and NOMINAL-P):

- Nominal-P-variables are first read before activation and then frozen. As a result an alteration of the value by the PLC is not recognisable after freezing. As soon as a key is pressed to editor the nominal values, a flashing cursor appears and the remaining variable is presented in a static form. This doesn't apply with offset input nor with the variable bit or CSTRING, as these are written at once.
- As far as nominal value (NOMINAL or NOMINAL-P) is to be altered, it will be written by activating the ENTER key or by leaving the variables field (permitted arrow key). There is an exception for the menu end. In this case the last presented value is written on any account.
- If an active nominal-P-value is in the display an is set in word 14 bit 7 to zero, then this variable can be written at once. Finally the first to be edited nominal value of this display side will be looked for and presented flashing (not yet edited).
- After a nominal-P-value has been written by the PCS, it will be read twice again (differing PLC cycles). Finally it will be compared with the previous edited value. If there is a difference in the values, the acoustic warning signal rings and the current value of the PLC is momentarily displayed flashing. Thereby a dynamic examination of the limiting values by the PLC is possible. First after activating the proposed value as suggested by the PLC, with ENTER or a permissible "arrow key" can you quit the variable field (or even a menu). With scaled binary variables where the PLC area is larger that the PCS area, care must be taken that the correct value, "level" is presented by the PLC. Here is an example: the range of values of the PCS goes from 0...1000, the range of values of the PLC from 0...65535. The value 10 in the PCS display corresponds to the value 655 in the PLC. The value 11 in the PCS display corresponds to the value 721 in the PLC. If the PLC is written with the value 670, the menu could never be completed as the PCS value of (655) always differs form the 670.

4 Variables

5 Texts

5.1 Text groups

There are 3 groups of freely defined texts:

1. 128 OPERATING TEXTS: 2 (PCS 090, 090plus) i.e., 4 (PCS 009, 009plus, 095, 095.1, 095plus) line texts, which can be used as DEFAULT TEXTS and MENU TEXTS.
2. PCS topline: 128 MESSAGE TEXTS
   PCS plus: 1024 MESSAGE TEXTS
   Text pages which can be up to 32 lines (max.) in length. These texts are allocated to the message bits and can be displayed as INFORMATION, WARNINGS, FAULTS and as RECEIPES (only PCS plus).
3. PCS topline: 5 HELP TEXTS
   PCS plus: 6 HELP TEXTS
   The HELP TEXT is maximum a 32 line text page, which can be brought anytime into the ON-LINE operation with the HLP key. Individual text pages can be produced according to priority class (default texts, menus, information, warnings and faults).
4. 127 RECIPE TEXTS: Text pages which can be up to 32 lines in length. The values of the external variables in this texts getting read from a special receipe memory and can only fetched by an upload from the PLC.

Additional lines can be found with the "DOWN ARROW" in those texts which have more than 2 (PCS 090, 090plus) i.e., 4 (PCS 009, 009plus, 095, 095.1, 095plus) lines can be switched further. With the "UP ARROW" the first display; known as main lines can be found. If a text consists of only one line, the following lines in the display are empty. If the bit 14 and 15 in word 13 are logic 0, the relevant arrow key LED lights up in order to show whether the main lines or extra lines can be activated.

Alterable texts can be achieved using variables within the main texts. The conversion of numerical and logical values into text form is done by the PCS. The PCS therefore requires a variable definition during programming and also space allocation in the text. This definition contains also the format and the length of the variable. These lengths are important in the formulation of the texts. If the texts are defined with the help of the programming software PCSPRO, then the text length is checked automatically.

Apart from monitoring the variables value in the PLC, no extra PLC programme is necessary. The variables are refreshened cyclically in every priority, whereby every value in the display comes from a fixed data exchange cycle. An exception is for the PCS 009, PCS 095, PCS 095.1, where more than eight double words (i.e., 16 words) are read. This reads those variables out of the upper two and lower two display lines in separate PLC cycles.

As the variable can also be presented in text form, the recognition of the variables format BIT, STRING, CSTRING, ASCII, WORD and TIMER important for projecting distribution of text.

Every menu is a collection of between 1 to 255 menu points (nodes). The start up and termination of a menu is controlled by the PLC. Switching between nodes is under operator control only.

5 Texts

5.2 Administration of priorities

Several of the priorities in the PCS 009, PCS 090, PCS 095, PCS 095.1 can be active. It is always the highest active released priority that will be displayed. If a priority is deleted or barred, then the next lower active released priority will be displayed.

The behaviour of the PCS is shown by the PCS status, which is put at disposal in the PLC transfer area in the words 6...9, as well as in the command word A (W13):

- Word 6 (bit 0...5) displays every active priority, even when they are barred and therefore not on display.
- Word 7 (bit 8...11) shows the priority currently on display. This is the highest active released priority.
- In the command word A (W13; bit 8...11) several priorities (menu, information, warning and fault) can be barred at any time. This can be used, for example, to prevent a menu from being interrupted by a information, warning or fault as long as it is active.

Here is an example that will clarify the matter:

Assume that:

- Fault priority is barred (that means bit 11 of word 13 logic 0), every other one active (bit 8...10 of word 13 logic 1): W13, bit 8...11: 0111.
- The following priorities are active: Fault, information, menu: word 6 bit 0...5: 0x1011.

Valid therefore is:

- The highest presentable display, i.e., active priority is information (word 7, bit 11...8: 0100).

If the information is deleted, then the menu is the highest valued active released priority:

- Word 7, bit 8...11: 0010; word 6, bit 0...5: 0x1001.

  If the operator presses the HLP key, and assuming that a help text has been programmed into the priority menu, then the help text will be displayed on account of its higher (not barred) priority. If the operator releases the HLP key, the menu will again be displayed.

  As soon as the PLC again releases the fault priority (bit 11 of word 13 is logic 1), the fault message will be displayed.

  If the fault message is then deleted, the menu will again appear.

  When the operator terminates the menu after having controlled the PLC, the preselected default text will be displayed.
- Recipes (only PCS plus) have the same priority as the menus. To distinguish bit 7 of the recipe operating word is used (see also chapter 10).

  Bit 7 = 1: when RECIPENO_ACT a available recipe texts mark, the recipe texts will be displayed.
  Bit 7 = 0: Menu will be displayed.

5 Texts

The priorities 0 to 8 allow themselves to be limited by the PLC (from the highest to the lowest).

Here are the individual priority classes:

Lowest	0	=	DEFAULT TEXT and HISTORY DISPLAY activated through bit 0 in word 27 displayed when there is no higher priority switched on.	(operating texts 0...127) (the last 50 messages can be displayed as a history text)
: *)	2	=	MENU activated and concluded through the PLC (word 14) and RECEIPE TEXTS activated through bit 7 in the receipe operating word in conjunction with a valid RECEIPENO_ACT	(operating texts 0...127) (receipe texts 1 ...127)
: *)	4	=	INFORMATION activated through 0 > 1 transfers at least one message bit to which a text with INFORMATION priority has been allocated to. Deactivated according to the cancel mode of the corresponding INFORMATION message texts.	(message texts 0...127)
: *)	6	=	WARNING activated through 0 > 1 transfers at least one message bit to which a text with WARNING priority has been allocated to. Deactivated according to the cancel mode of the corresponding WARNING message texts.	(message texts 0...127)
: *)	8	=	FAULTS activated through 0 > 1 transfers at least one message bit to which a text with FAULTS priority has been allocated to. Deactivated according to the cancel mode of the corresponding FAULTS message texts.	(message texts 0...127)
:	12	=	HELP (Help texts on (R) default-, (M) enu-, (H) information-, (W) arnings- and (S) faults priority) activated by pressing <HLP> deactivated by releasing <HLP> Prerequisite: HELP-text is allocated to the corresponding priority.	
: **)			ERROR PRIORITY activated through interfaces or start test error usually deactivated through PLC RESET command.	(firm text)
highest			PLC stop/run - transmission or new start	

*) These priorities are not activated, if they are barred through the PLC.

**) This error case will be caused mainly by driver in the error word W3 of the PLC. The executions of the error word are specifically to do with the driver and are therefore to be found in the manual PCS 91.xxx.

5 Texts

5.3 Default text priority

The operating texts 0...127 belong to this priority class. They can all be applied as default texts. The operating texts can and will be used in menus. The PLC alone decides which of these default texts (bit 8...14 in word 14) are to be displayed and whether or not the default text should be flashing (bit 15 in word 14). The character and control keys do not have any function here. However if they are pressed, then the acoustic error will be suppressed in order that the control keys can be applied for control purposes. An exception here is the HLP key, which brings the defined help text in the default priority onto the display. Every variable can use NOMINAL values, NOMINAL-P-values and ACTUAL values. None the less nominal values can not be changed. Every variable is cyclically refreshed.

The DEFAULT TEXT Nr. 0 possesses a special position: it immediately appears after switching on the PCS even when no communication has been started with the PLC. Should a variable be in the idle text 0, then this variable will be replaced by an empty space until the variable out of the PLC can be read. This is an good way to recognize whether the communication has been started.

If an default text is selected that is not declared, then the previous displayed default text will remain active.

In the devices of the PCS plus series the daily history texts lay also on priority 0 (see chapter "Daily history")

5.4 Daily history priority (PCS plus only)

Note!
Only applicable for devices of the PCS plus series!
The daily history display of the devices of the PCS plus series does not feature a priority of itsown. Instead, the default texts and the history texts share priority 0. They are distinguished by bit 0 of data word W27. The default text is only replaced by a history text if this bit is set and history entries are available. Status bit 4 in W6 is set when a history text is displayed at priority 0. Also refer to section “Daily history”.

5.5 Menu priority

127 menus are available for this priority class (2). The menus are labelled with numbers from 1...127. A menu consists of one or more nodes (1...255), whereby an operating text (0...127) is allocated to every node.

A menu is called with the command word B (W14), bit 0...6.

Requirements for starting up the menu priority is that a menu is programmed and that no higher priority prevents the start up of the menu.

The actual node number is displayed in the word 6, bit 8...15 as status.

Within a menu additional nodes can be reached with the arrow keys, whereby the structure is freely programmable. The first declared node is the initial node or start node. This initial node is activated by the call of the menu.

It will be determined through bit 7 in word 14, whether nominal-P-variables can be modified or not. If bit 7 logic 0, then only nominal values can be modified. If bit 7 is logic 1, then nominal value variable and nominal-P-variable can be modified. This bit can be changed by the PLC at any time, e.g., node dependent.

In the devices of the PCS plus series the receipe texts lay also on priority 2 (see chapter "Receipe priorities").

5 Texts

5.6 Recipe priority (PCS plus only)

Note!
Only applicable for devices of the PCS plus series!
The recipe texts of the devices of the PCS plus series do not feature a priority of their own. Instead, the recipes and the menus share priority 2. They are distinguished by bit 7 of the recipe control word. The menu is only replaced by a recipe text if this bit is set and REZEPTNR_IST contains the number of an existing recipe text (unequal to 0).
Status bit 14 of the recipe control word indicates whether or not the display contains a recipe.

5.7 Message priorities

In these priority classes (4, 6 and 8) texts are called by the setting of a bit in the message area word 15 up to maximum word 22. A message text with maximum 32 lines is allocated to each of the 128 bits. An individual MESSAGE PRIORITY can be determined for each of the 128 texts (fixed through programming). Here they are individually.

- INFORMATION PRIORITY (Priority 4)
- WARNING PRIORITY (Priority 6)
- FAULT PRIORITY (Priority 8)

These priority classes differenciate themselves only on the priority level and not in there function. For every priority class there is an individual storage behaviour (word 12 bit 0...5) and an individual display behaviour (word 12 bit 8...10) which is controlled by the PLC (and therefore can be changed over at any time). Refer to the following section for further information on this matter.

Should a message bit be set, to which no message text has been declared, then there will be no reaction.

5.8 Help priority

This priority level is the highest priority level. Under normal conditions, the user always has access to it. It is active as long as the [HLP] key is pressed. Releasing the key switches this priority off again. The PLC cannot lock this priority level which is therefore always accessible to the user if a HLP text has been defined for the priority currently shown on the display. The text required in this case is an independent text of no more than 32 lines. We recommend to integrate all variables that might be important for troubleshooting (also internal variables!) in this text .

Each of the priorities 0..8 (default, menu, note, warning, recipe and fault priority) features help text pages of itsown.

When the [HLP] key is pressed, [ARROW DOWN] is used to scroll to the next line and the [HLP] key is then released, the line numbers will be saved (not available after the next power-on). Pressing the [HLP] key again causes the text page defined before to be displayed. [ARROW UP] (with the [HLP] key pressed) allows you to switch back to the main lines.

The arrow key LEDs indicate whether successive lines or main lines can be reached (if bit 15 of word 13 is logically set to 0).

The help text for the default priority is only available when communication is in progress. In other cases (only after a RESET or power off/power on), constant texts are displayed for diagnostic purposes. Refer to section “Diagnostic text”.

5 Texts

5.9 Error priority

The highest priority level described here is activated through various errors. The respective texts can not be modified. These texts exist as English abbreviations. A listing of possible messages you can find in chapter 12.

Warning!
After a communication loss, all actions which should have been performed by the programmable controller during the communication interruption are transmitted by the PCS to the programmable controller. The correct action/reaction of the programmable controller and the PCS have to be checked after a restart!

6 Menus

There are a total of 127 menus available. The menus are numbered from 1 to 127. A menu consists of one or more nodes (1...255), an operating text (0...127) is allocated to every node.

The actual node number is displayed in word 6, bit 8...15.
Further nodes can be reached within the menus via the arrow keys. Here the structure is freely programmable. The first specified node is the initial node, i.e., start node. This initial node is displayed by calling the menu through the appointed operating text.
By means of the status of bit 7 from the command word B (W14), the operator can determine at any time whether the nominal-P-variables are alterable or not. If bit 7 = 0, then only a pure nominal value can be altered. If the bit D7 = 1, then the nominal and nominal-P-variables can be altered.
If the cursor is positioned on a nominal-P-value and at the same time bit 7 in word 14 is logic 0, then this nominal value can be changed. When a nominal value is entered withing the appropriate limiting values and transfered to the PLC and read again by the PCS, the editor field is then free. The editing position is initially set on the first nominal value of the display page that is eligibe to be edited. If there are no nominal values, then all variables will be treated as actual values.

- **Starting up the menus**
  The PLC programme writes a menu number (1 to 127) on the lower valued byte of the command word B (W14), bit 0...6.

  Bit 7 of the command word B (W14) determines whether a nominal-P-value can be altered or not. If bit 7 is logic 0, then this will still be written and finally depart from the variables position, if it is the case that the currently edited nominal value concerns a nominal-P-value.

- **Termination of the menus**
  Termination of the menus takes place with the PLC, the menu number of the command word B (W14) bits 0...6 are set to logic 0.

  The menu can however only bed exited when an altered nominal value has been read twice out of the data area of the PLC and that it is checked with the previously written value. The PLC therefore can recognize and reject (dynamic limiting value examination) locking or minimum and maximum overlapping. Should the nominal value not be taken over by the PLC and therefore immediately written over, then the input field remains active (flashing) with the current PLC variable values. The menu can only be terminated when the comparison of the written nominal value with the read nominal value are checked with one another. In order to show the operator that this nominal value input is not possible an INFORMATION text could be displayed for example. It has to be acknowledged with the CLR key. This acknowledgement doesn't influence the nominal value in any manner (it functions similar to an interruption).

  There is an exception for variables, which are presented with inverse fields. In this case, the menu can still be left as long as no editing follows.

  The actual menu end can be recognized with the negative edge of bit 0 in word 6 (PCS-status).

6 Menus

6.1 Build-up of the menus

Each one of the maximum 127 possible menus (1...127) can possess a particular structure. If complex structures are to be used, then it is recommended to procede in the following manner (separate for each menu):

- First the structure is put down on paper, where the node connections are joined with several coloured lines (a different colour for every arrow key).
- Finally an operating text number is allocated to every node. Similar operating texts can be readily used in several menus (furthermore this saves storage space!).
- In conclusion every node is given a particular number (1...255).
- Branches are decided for every node, where every parameter is taken from the sketches. The initial node, also called start up node, must appear first (only when applying software PCSPRO. The sequence of the remaining nodes is random (provided they belong to a menu).

Programming of the menu nodes is written in the manual PCSPRO. The compiler programme checks the plausibility of the menu definition during the translation. If the programming software PCSPRO is used, the syntax control will be already carried out during the editing of the menus. Care is to be taken that menus do not fail. In detail this means that every menu node must be accessible via a path from the start node. There are no further restrictions, i.e., within every node, a given target node within the same menus can be allocated to every arrow key.
When formulating the operating text, it is important to think out a satisfactory operating procedure. It is certainly feasible to consider node points without variables, which only serve the operating procedure. Clarity should be achieved with the application of (programmable) special characters ARROW UPWARDS, ARROW BELOW, as well as ARROW TO THE RIGHT and ARROW TO THE LEFT (refer to character set) (e.g. character $0E = Arrow upwards, $0F = Arrow downwards, <, >).
As long as the arrow key LEDs in the menus (for the PCS 090, PCS 095, PCS 095.1) are free; that is bit 5 of command word A (W13) is logic 0, the operator is additionally guided with optical displays through the menu. If an arrow key lights up statically, it means that another additional variable can be selected within the same menu node. If an LED flashes, activation of this key will cause departure from the currently displayed menu node.

6 Menus

6.2 Variables in the menu

On calling one of the new menus or menu nodes, the first nominal value; after it has been read out of the PLC; will first appear flashing. Should this predetermined value be outside the defined limiting values, then an inverse field instead of a nominal value be displayed. A single activation of the editor key CLR (also + or -) gives a permissible value. This is the maximum or minimum value depending on high or low PLC value. With the ASCII variables "?" is presented as a default value.

Should the sign be altered except for offset input, then the input position is marked by a flashing cursor.
For refreshing variables, the following rules apply: The flashing variable will be picked up once. Every other one on the same display page with nominal and actual values will be continually refreshed. Should the variable be left after an alteration with a flashing cursor, then as early as possible in an PLC cycle and later, the value be read again and compared with the edited value. The input field can be left when the written nominal value is in agreement with the later re-read nominal value. In this way nominal values; dependant on the situation; can be applied within a menu node.

Attention!
As long as the cursor is flashing, the presentation of an intermediate result is taking place. That means that the value in the display is not in agreement with the value in controlling operation!
Numerical values can also be altered in the addition and subtraction mode (also known as offset inputs): <numeric character>, <numeric character>, ...<plus>, possible with BCD(0) and BIN(0)-1,2,A,B. Afterwards the editor is again in the basic condition (variable flashing). It deals likewise here with an intermediate result which cannot yet be written back!

The following rules apply in writing nominal-P-values.

- Basically only altered values are written back (even after ENTER!). If a value is not written, then an acoustic alarmsignal rings. An exception applies in terminating a menu: here the last activated nominal value will at least be written.
- BIT- and CSTRING variables will be written into the transfer area of the PLC with every alteration.
- Should the variables refer to smaller sizes than in the word (as with BCD(0)-1: 1...max. 3 digit, BCD(0)-2: 1...max. 7 digit, STRING and CSTRING), the leading bits will be processed according to the following logic: leading bits are ignored when reading in the predetermined values (i.e., if they are set, then they do not lead to the presentation of inverse fields). On writing back they are set back to zero. This can be evaluated in the PLC for example, in order to be able to react to nominal value inputs.
- The word 8 stands at disposal as status for every variable. The latest edited word number is registered here in higher valued byte. The number of bytes which were last written stand in the lower valued byte. This word can for example be zeroed by the PLC and in conclusion monitored on ><0, in order to wait for an input of the PCS operator.
- With bit variables, except for the edited ones, they all remain free for alteration. The respective altered bit is additionally registered in word 9 with logic 1. In this manner it can be found out which bit within the registered bits in word 8 has changed. The new state of the bits can be registered through and together with the bit mask as registered in word 9 as well as the amended word number which is registered in word 8.

6 Menus

6.3 Arrow keys in menus

The arrow keys are permitted in a node to direct to further nodes as at the same time to further variables. If a non valid arrow key is pressed, an acoustic warning signals rings an error. A valid arrow key with LED is displayed, so long as bit 5 of word 13 is logic 0. Should an LED illuminate statically, then an additional variable can be selected from the same page. If on the other hand an LED flashes, then you can leave this node. These LED functions are only for the PCS 090, PCS 095, PCS 095.1.
If several nominal value variables are applied in a text, then these can be reached via the arrow keys. If there are several nodes in the activated menu, the arrow keys have a double significance (variables-, node exchange). If this is not required then only one nominal value variable per node or only one node per menu may be declared.

"ARROW-LEFT" "-RIGHT": If several nominal value variables are used in the text, then every line of a display page will be considered as lying side by side and the next variable will be looked for. In the case the arrow key LEDs are released and further nominal value variables to be edited are present, then the relevant LED lights up statically. If the actual variable had just been the last or the first, then the next node is looked for. If this is available, then position will be takten on the 1st variable top left. When the arrow key LEDs are active and a sequence node is available in the direction of the arrow, then this LED flashes. If there is no node in the direction of the arrow, an acoustic error signals rings.

"CURSOR UP" "-DOWN": If variables are distributed on several display lines, then the first variable in that line will be selected (left) which is in the direction of the arrow. If the arrow key LEDs active, then the corresponding LED will light up. If there is no nominal value variable in this line, then the next node in the direction of the arrow will be looked for. In so far as the arrow key LEDs are free, the relevant LED will flash in this case. If there is no node there, then pressing this key will sound an acoustic warning.

"CURSOR UP" in the last line and "CURSOR DOWN" in the first line always look for the next node.

Termination of a menu can be recognized in word 6, bit 0. If the bit is logic 0, the menu is no longer active. The exact point in time of the termination can be found through the negative edge triggering.

The functions of the arrow LEDs have been extended in the following hardware versions:
- PCS 009 from V2030 onwards,
- PCS 090 from V206C onwards,
- PCS 095.1 from V4079 onwards, 4 data records,
- PCS 095 from V5079 onwards, 1 data record,
- PCS plus

DW12,7 “internal LEDs/controlled by PLC”(status LEDs in menu, help, and message priority)
DW12,6 “static menu LED ”

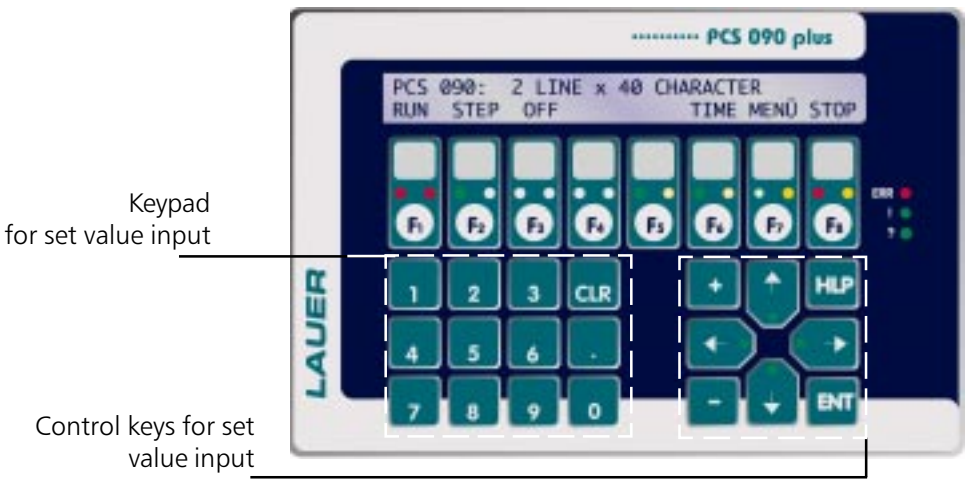
Bit 12,7=0	Bit 12,6=0	Arrow LEDs entirely controlled internally.
Bit 12,7=0	Bit 12,6=1	Arrow LEDs entirely controlled internally, menu LEDs for node change permanently lit (instead of flashing).
Bit 12,7=1	Bit 12,6=x	Arrow LEDs controlled externally via lowbyte DW26, the internal LED functions are always completely separated. Bits 15, 14 and 5 in DW13 are of no effect.

6 Menus

6.4 Permissible keys in menus

Operation of the integrated editors		
Variable Type	Key	Function
BIT	PLUS MINUS * ARROWS	A bit that was logic 0 sets to logic 1 (at once written in the PLC). Deletes a bit that was logic 1 to logic 0 (at once written in the PLC). Leaves this variable if allowed. The next variable or node in arrow direction is looked for.
STRING	* PLUS * MINUS CLR ENTER * ARROWS	Increments the value of a variable, so long as value is still within limiting values. Decrements the value of a variable, as long as value is still within limiting values. Restore the old value in the display; (the last value read by the PLC). Writes the selected value in the PLC as long as it has been amended and not yet written. Write the selected value, if it has been modified and not yet sent and then look for the next variables, i.e., the next menu nodes in direction of arrow.
CSTRING	* PLUS * MINUS CLR * ARROWS	Increments the value of a variable, so long as the value is still within the limiting value (in contrast to STRING at once stored in the PLC). Decrements the value of a variable, so long as the value is still within the limiting value (in contrast to STRING at once stored in the PLC). Restore the old value into the display; (the last read value of the PLC). Leave these variables if allowed to. The next variable or node in arrow direction looked for.

* = Auto repeat



6 Menus

Variable Type	Key	Function
BCD-1 BCD-2 BCD0-1 BCD0-2	* PLUS/MINUS	Adds/subtracts n within the limiting values (Offset input), whereby * n = 1 if no numeral input follows, i.e., * n = given value, if numerical input follows.
	CLR	Restores old value in the display; (last read value by PLC)
	ENTER	Writes the selected value in the PLC, if it has been changed and not yet written.
	* ARROWS	Write the selected value, if it has been changed and not yet written and seeks the next variable, i.e., the next node in the arrow direction.
	* NUMBERS	Permit direct input.
BIN-A BIN-B BIN0-A BIN0-B	* PLUS/MINUS	Adds/subtracts n within the limiting values (Offset input), whereby * n = 1 if no numeral input has occured, i.e., * n = value input, when numerical input has just been entered.
	CLR	Restores the old value in the display; (last value read by PLC).
	ENTER	Writes the selected value in the PLC, if it has been changed and not yet written.
	* ARROWS	Write the selected value, if it has been changed and not yet written and seeks the next variable, i.e., the next menu node in arrow direction.
	* NUMBERS	Enables direct input. Numbers moved from right to left (even beyond a decimal point).
BIN-1 BIN-2 BIN0-1 BIN0-2	* PLUS/MINUS	Adds/subtracts n within the limiting values (Offset input), whereby * n = 1 if no numerical input follows, i.e., * n = given value, if numerical input follows.
	CLR	Restores the old value in the display; (last value read by PLC).
	ENTER	Writes the selected value in the PLC, if it has been changed and not yet written.
	* ARROWS	Write the selected value, if it has been changed and not yet written and seeks the next variable, i.e., the next menu node in arrow direction.
	* NUMBERS	Enables direct input. Numbers are entered according to the pocket calculator principle.
	(*) POINT	Changes to after decimal point position, if after decimal point positions are defined.

* = Auto repeat; (*) = Auto repeat, though without significant meaning

6 Menus

Variable Type	Key	Function
VBIN-A VBIN-B VBIN0-A VBIN0-B	* PLUS * MINUS CLR ENTER * ARROWS * NUMBERS	Gives the operational sign "+". Gives the operational sign "-". Restores old value in the display; (last read value by PLC). Writes the selected value in the PLC, if it has been changed and not yet written. Write the selected value, if it has been changed and not yet written and seeks the next variable, i.e., the next node in the arrow direction. Permit direct input. Numbers moved from right to left (even beyond a decimal point).
VBIN-1 VBIN-2 VBIN0-1 VBIN0-2	* PLUS * MINUS CLR ENTER * ARROWS * NUMBERS (*) POINT	Gives the operational sign "+". Gives the operational sign "-". Restores the old value in the display; (last value read by PLC). Writes the selected value in the PLC, if it has been changed and not yet written. Write the selected value, if it has been changed and not yet written and seeks the next variable, i.e., the next node in arrow direction. Enables direct input. Numbers entered according to the pocket calculator principle. Changes to after decimal point positions, if after decimal point positions are defined.
WORD	* PLUS * MINUS CLR ENTER * ARROWS * NUMBERS	Moves the cursor one bit position to the right in direction of lowest value bit LSB. Moves the cursor one bit position to the left in the direction of the highest bit MSB. Restores the old value in the display; (last value read by PLC). Writes the selected value in the PLC, if it has been changed and not yet written. Write the selected value, if it has been changed and not yet written and seeks the next variable, i.e., the next menu node in arrow direction. Only the keys <0> and <1> are significant: <0> Sets a bit to 0 and moves the cursor, if possible one position tho the right. If the cursor finds itself at end of the variables, then it will be positioned on the highest bit (MSB). <1> Sets a bit to 1 and moves the cursor, if possible one position to the right. If the cursor finds itself at end of the variables, then it will be positioned on the highest bit (MSB).

* = Auto repeat; (*) = Auto repeat, though without significance

6 Menus

Variable Type	Key	Function
ASCII	* PLUS	Presents the character with the next higher displayable character code. If the end of the character table has been reached, the first presentable character is returned.
	* MINUS	Present the character with the next smaller displayable character code. If the begining of the character table has been reached, the last character out of the character table is returned.
	CLR	Restores the old value in the display; (last value read by PLC).
	ENTER	Writes the selected value in the PLC, if it has been changed and not yet written.
	* CURSOR	Write the selected value, if it has been changed and not yet written and seeks the next variable, i.e., the next menu node in arrow direction.
	* POINT	Moves the cursor one place to the right. If the variable end has been reached, then the cursor will again be set on the first position of the variables.
WORD-KH	* PLUS	Increments the digit by 1 the cursor is positioned on.
	* MINUS	Decrements the digit by 1 the cursor is positioned on.
	CLR	Restores the previous displayed value.
	ENTER	Writes the selected value into the PCS, if it has been modified, but not sent yet.
	* ARROWS	Write the selected value, if it has been modified, but not sent yet and search for the next variable in the direction of the arrow.
	* NUMBERS	Used to directly enter numbers (0..9) on the corresponding digit.
	* POINT	Moves the cursor from left to right. If the rightmost cursor position is reached, the cursor is repositioned on the left digit.
WORD-KY	* PLUS	Increments the digit by 1 the cursor is positioned on.
	* MINUS	Decrements the digit by 1 the cursor is positioned on.
	CLR	Restores the previous displayed value.
	ENTER	Writes the selected value into the PCS, if it has been modified, but not sent yet.
	* ARROWS	Write the selected value, if it has been modified, but not sent yet and search for the next variable in the direction of the arrow.
	* NUMBERS	Used for direct entry: Numbers are shifted from right to left (calculator entry).
	* POINT	Switches between high byte and low byte of the data word (decimal format).

* = Auto repeat

7 Message texts

7.1 Message priorities

In these priority classes (4, 6 and 8) texts are called by the setting of a bit in the message area word 15 up to maximum word 22. A message text with maximum 32 lines is allocated to each of the 128 bits. An individual MESSAGE PRIORITY can be determined for each of the 128 texts (fixed through programming). Here they are individually.

- INFORMATION PRIORITY (Priority 4)
- WARNING PRIORITY (Priority 6)
- FAULT PRIORITY (Priority 8)

These priority classes differenciate themselves only on the priority level and not in there function. For every priority class there is an individual storage behaviour (word 12 bit 0...5) and an individual display behaviour (word 12 bit 8...10) which is controlled by the PLC (and therefore can be changed over at any time). Refer to the following section for further information on this matter.

Should a message bit be set, to which no message text has been declared, then there will be no reaction.

7.1.1 Storage behaviour - message block 0

- FIRST VALUE MESSAGE WITHOUT THE POSSIBILITY OF MANUAL SELECTION:

  The oldest message text remains in the display until it is deleted.

- FIRST VALUE MESSAGE WITH THE POSSIBILITY OF MANUAL SELECTION:

  The first bit that has a positive edge (0 > 1 transmission) brings its text in the display. If additional bits are set, then these texts can be reached with the key "ARROW-RIGHT". Reverse is achieved with "ARROW-LEFT". The text inputs can at any time and randomly (depending on their cancel modes) be deleted from the memory. If the bit 14 in word 13 is logic 0, then the manual selectibility, in so far as more than one message is active, will also be displayed with the arrow key LEDs (left and right).

- LAST VALUE MESSAGE WITHOUT THE POSSIBILITY OF MANUAL SELECTION:

  Every 0 > 1 transmission brings its text immediately into the display, the older inputs remain in the storage. In case the most recent message text is deleted, the next most recent message text will appear in the display.

- CYCLICAL DISPLAY WITHOUT THE POSSIBILITY OF MANUAL SELECTION:

  This kind of storage is in accordance with the first value message. If however several texts are switched on, then the inputs cycle with a programmable scroll time. If further switching is made to the help texts, then the scroll time will be started from new (stopping time = 0,5 s). In principle all cancel possibilities are also possible here. Nevertheless as there is no prohibitive time for keys within a priority, only cancel possibility 1 (no manual deletion) should be chosen (in order to avoid operation errors).

For example:

The cyclic display is activated. At the moment there are more than two messages of the same priority active. Every message is programmed with deletion characteristics 2 (therefore can be deleted manually). The operator ascertains that the currently displayed message can be quitted and he/she presses the CLR key. At the same time, for example, the cyclical display switches to the next message, the false message is now quitted!

The written storage behaviour is at any time individually adjustable with the bits 0...5 in word 12 for every priority (information, warning and fault). In this way it is also possible for example to amend the storage behaviour by means of a priority change. Changing the storage behaviour only influences the display characteristics and not the input behaviour. In order to avoid incorrect operation, a blocking time of 0.5 seconds for the controlling keys is built in after a priority changeover.

Basically an attempt is being made to also register the chronological appearance of the flags into the correct chronological sequence. The following limitations are however also imposed. The reading off of the bits has a relatively low priority in comparison with the other tasks of the PCS.

Should several bits be set in a cycle, the lower text numbers have a higher priority.

7 Message texts

7.1.2 Storage behavior of message blocks 1-7 (PCS plus devices only)

Message blocks 1-7 can be individually released in DW 27. Each 0 -> 1 edge in a released message block activates the appropriate message. The edge has no effect if no message was programmed. The sequence in which the messages occur are not stored. This only applies to message blocks 1-7, i.e. for messages 128 - 1023. Instead of the temporal sequence, the messages is always displayed and stored according to the text numbers where the lowest number corresponds to the first value message of message block 0 and the highest number to the last value message of message block 0. The cyclic display and the display with selection option occur accordingly.
The lower text numbers have a higher priority when several bits are set in one cycle. When messages from message block 0 and messages from message blocks 1-7 are available, the messages from message block 0 are displayed first (in the correct temporal sequence). The first 128 messages have a higher priority with regard to the first value and the last value message than the following 896 messages. The number of the currently displayed message is output in DW 28.

Note!
We recommend to release only those message blocks that are required. This helps to relieve the communication between the PCS and the PLC from unnecessary loads.
Computation time can be saved for message blocks 1-7 by avoiding to mix the different message priorities.

Example:
65 notes, 34 warnings and 6 faults are required in message block 1.
Optimum structure:
M128 - M133: Faults
M134 - M167: Warnings
M168 - M232: Notes

7 Message texts

7.2 Cancel modes

The cancel mode is individually programmable for every message bit. It is determined by programming with the programming software PCSPRO. There are 4 kinds of deletion:

Cancel mode 1, or deletion through the PLC:

The text remains switched on as long as the relevant bit is = 1. If the PLC resets the bit, then the message text will be cancelled. The bit is merely read by the PCS. The operation required LED (?) is switched off.

Cancel mode 2, or manual deletion by resetting the message bit:

The text is switched on with an 0 > 1 transfer and can be quitted with <CLR>. Thereby the message bit is cancelled in the PLC and as a result of the deleted message bit, the text is switched off. Reversing the message bit, on the part of the PLC, has the same effect as pressing the <CLR> key.

The message bit in the PLC programme may only be set once in order to obtain this deletion behaviour (no current assignment "!"), since the message would again be displayed after the <CLR>.

After activating the <CLR>, the operation requirements LED (?) immediately goes out.

Cancel mode 3, or manual deletion without reversing the message bit:

The text is switched on with an 0 > 1 transfer. Switching off of the text is possible at any time with the <CLR> key independent of the status of the message bit. The message bit itself (in the PLC) must be reversed with the PLC programme.

After activating the <CLR>, the operation requirements of the LED (?) goes out immediately.

Cancel mode 4, or manual deletion, if the message bit is 0:

The text is switched on with every 0 > 1 transfer. The text can be switched off with the <CLR>, when the PLC sets the message bit to 0. The state of the message bit is displayed through the operational requirements-LED (?).

Flashing:	The bit is still log 1, deletions not possible.
Continual light:	The bit is log 0, the message may be deleted.Löschverhalten

7.3 Display behaviour

An individual display mode can be controlled at any time by the PLC for any of the priorities 4, 6 and 8, also INFORMATION (bit 8 of word 12), WARNING (bit 9 of word 12) and FAULT (bit 10 of word 12). Through evaluating word 7 (displayed text number), for example, can be defined dependent of message texts.

There are two display characteristics:

The bit is logic 0: the message text is static
The bit is logic 1: the message text flashes

7.4 Variables in message texts

Basically every variable within INFORMATION and WARNING priority are treated as actual values. They are continually refreshed. Editing of the variables is not possible.

7 Message texts

7.5 Diagnostic text

After successful initialization (no "internal error" of the PCS 009, PCS 090, PCS 095, PCS 095.1), a diagnostic test can be called without the communication running to the PLC (LED-"ERR" displays a continual light).
This happens by pressing the HLP key. It is possible to page forward after pressing the ARROW DOWN key onto the additional lines. Application of the ARROW UP key again presents the main lines. Releasing the HLP key, the display is suspendend and will be again be actuated by pressing the key. This procedure is however not retentive.
The following diagnostic information, which you should have to hand if possible for telephone enquiries can be read as follows:

- Equipment identification and version number of the EPROMS
- Information on the data record DAT: name of data record, number of least version EPROM, date and time of the creation of the data record and software name, with which the texts are made (PPCS or PCSPROX.X).
- Information on the driver DRV: Project driver name with date and time, number version EPROM, with which the driver runs, driver version and every available driver variation with actual settings.

  Especially the driver variables "AC...AF", mainly occupied with baud rates and interface types, inform on the possible interface settings. The currently position of the DIL switch 5, 6 is marked at the beginning of the line with the arrow ">".
- Information on the functions (should these be available) FKT: Project function name with date and time, original function time with date and time, the least number of the version EPROM, with which the function runs, function versions and every available function variables with actual settings.
- Information on the bus modules (only PCS plus), version bus module: version number of the bus module with date and time.

8 Date/time (PCS plus only)

This section only applies to devices of the PCS plus series!

The devices of the PCS plus series feature an integrated software clock.
Leap years are calculated correctly. The year 00 is considered to be a leap year, resulting in a correct display of the year 2000.

Time and date can only be calculated if a basic address for the transfer range has been defined in PCSPRO (see section "Transfer range between PCS and PLC"). To save computation time, no DW number should be entered if neither the date nor the time are required.

The following data are provided:
- Date (day, month, year)
- Day of the week
- Time (hour, minute, second)

Note!
The date and the time are cleared when the device is switched off!

The clock's software controller may cause minor time inaccuracies!

The date format can be selected as follows in the PCSPRO *Project – Times* menu:
- EU dd.mm.yy
- US mm/dd/yy
- MIL yy-mm-dd

The display (ACTUAL values) of day of the week, time and date uses the following internal variables:

Z22	WEEKDAY_ACTUAL
Z23	TIME
Z24	DATE

To set the date and the time:

[Z15]	CLOCK_SECONDS
[Z16]	CLOCK_MINUTES
[Z17]	CLOCK_HOURS
[Z18]	DATE_DAY
[Z19]	DATE_MONTH
[Z20]	DATE_YEAR
[Z21]	WEEKDAY_NOMINAL

These nominal values can be used to change the date and the time in the PCS.
When variables are used in operator texts, the current values are adopted upon opening of a text. These values can then be edited and are only adopted after a node or menu change.

8 Date and time (PCS plus only)

Transfer range between PCS and PLC

The entire date and time information is stored in 4 contiguous data words. The basic address of the first data word (DW m) can be set in PCSPRO in the *Project – Times* menu.

Transfer range assignment

	High byte								Low byte							
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
DWm	**Reserved**								**Year**							
DW m+1	**Month**								**Day**							
DW m+2	**Day of the week**								**Hour**							
DW m+3	**Minute**								**Second**							

Transferring the data from the PCS to the PLC

The date and the time can be transferred to the PLC and constantly updated.
Access occurs using the transfer range by help of the defined DW addresses.

Condition: DW13 / bit 6 = 1 Release for DW12
DW12 / bit 13 = 1 Updates the date/time

Note!
Only data words that have changed will be transferred.

Transferring the data from the PLC to the PCS

It is also possible to transfer the date and the time from the PLC to the PCS. This is useful when the PLC is equipped with a hardware clock. PLC and PCS can thus be easily synchronized.
Access occurs using the transfer range by help of the defined DW addresses.

Condition: DW13 / bit 6 = 1 Release for DW12
DW12 / bit 12 = 1 Read command

Note!
The PCS automatically clears the bit when all 4 data words have been transferred.
Please ensure beforehand that bit 13 in DW 12 is cleared as otherwise the wrong data are sent to the PCS.

9 Softkey bar

Up to128 softkey bars can be defined in the PCS. For each of the function keys of each softkey bar, a softkey action can be assigned for pressing and releasing the key. Each of the softkey actions can comprise up to 8 definable write commands. A comment text can be assigned each of the defined softkey bars by means of the softkey text line variable. This text can then be displayed during communication of the device. The high byte of data word 26 of the PLC contains the softkey bar to be requested.
The PCS 009/009plus also features 8 softkey actions of which, however, only 4 can be selected at a time (either F1...F4 or F5...F8). The softkey actions are used to change the default page (by writing to the high byte of DW14) or to control function key LEDs via the PCS.

9.1 Softkey actions

Softkey functions 1..255 are called external softkey actions. Up to 8 different wite operations may be defined for each of these actions which are used to change the contents of data words in the PLC. Thus, a softkey action could be used to call up a menu. The following commands are available:

- **The WRITE command**

  This command transfers constant values to a word in the PLC. Thus, a speed could be set to the value of 870 each time a key is pressed.

- **The OR command**

  This command serves for replacing specific bits in a data word in the PLC without affecting other bits.

- **The AND command**

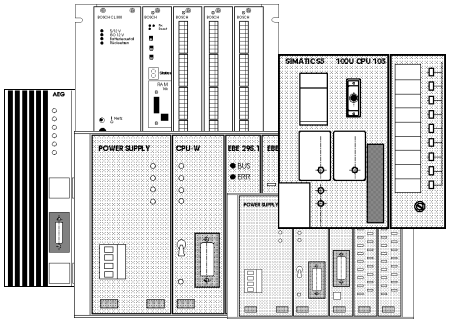
  This command serves for resetting specific bits in a data word without affecting other bits.

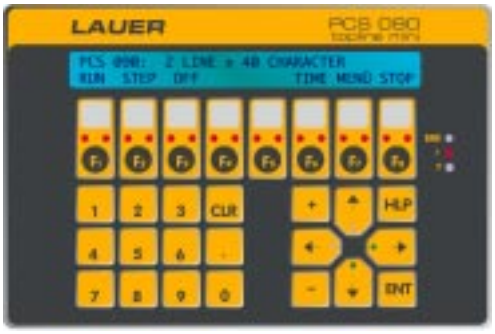
9 Softkey bar

9.2 Example of a softkey bar and softkey actions

Press a single button!

To make your PLC program even smaller and faster!
An operating concept without an additional PLC program!





Word	10	= 00000000 10000000
Word	13	= 00001111 11001000
Word	14	= 00000000 00000000
Word	26	= 00000000 00000000
Word	100	= + 54
Word	101	= 01100000 00100001

Word	10	= 10000000 00000000
Word	13	= 00000001 11001000
Word	14	= 00000000 10000001
Word	26	= 00000001 00000000
Word	100	= + 870
Word	101	= 01100000 00100000

9 Softkey bar

Faster results with softkeys!

This tool allows you to call up and operate all the PCS functions without an additional PLC program. A function key can be assigned up to 128 different tasks, and it is of no importance whether this task is to trigger a machine operation, a PCS function change or both.

Example:

An F1 key is to make the green LED light up and to switch off the yellow LED. A menu (hand) is to be called up and the softkey bar is to be changed to allow the menu to be left later with the F1 key (using a new action). The priorities are to be locked, the decimal machine parameters (e.g. in word 100) are to be set to a specific value (870 rpm) and the bit for Auto (e.g. in word 101 bit 0) is to be reset.

All of this can be stored in one key without programming a single PLC command.
The PCSPRO programming interface features a convenient editor for softkey actions that allows our example to be simply programmed by completing a table.

PCSPRO Menu Softkey action 1

	NONE	WRITE	AND	OR	DW	BIN	DEC	HEX	VALUE
1)	( )	( )	(•)	( )	10	(•)	( )	( )	11111111 01111111
2)	( )	( )	( )	(•)	10	(•)	( )	( )	10000000 00000000
3)	( )	( )	(•)	( )	13	(•)	( )	( )	00000001 11111111
4)	( )	(•)	( )	( )	14	(•)	( )	( )	00000000 10000001
5)	( )	( )	(•)	( )	26	(•)	( )	( )	00000000 11111111
6)	( )	( )	( )	(•)	26	(•)	( )	( )	00000001 00000000
7)	( )	(•)	( )	( )	100	( )	(•)	( )	870
8)	( )	( )	(•)	( )	101	(•)	( )	( )	11111111 11111110

1) AND word 10 with value 11111111 01111111 = switches off the yellow LED for F1
2) OR word 10 with value 10000000 00000000 = switches on the green LED for F1
3) AND word 13 with value 00000001 11111111 = resets the priorities on the menu level
4) Write to word 14 the value 00000000 10000001 = calls up menu 1 with release of the NOMINAL-P bit
5) AND word 26 with value 00000000 11111111 = sets the softkey bar to zero but does not affect the cursor LEDs
6) Now OR word 26 with value 00000001 00000000 = calls up softkey bar 1
7) Write 870 to word 100 = sets the speed in word 100 to 870
8) AND 101 with value 11111111 11111110 = resets bit 0 in word 101 for Auto operation

Once the action table for action 1 is completed, it can be simply inserted in softkey bar 0 using the softkey bar editor.
To ensure that the operator always has an exact overview, the internal variable “SOFTKEY_TEXT_LINE_1” is integrated in every text. When the softkey bar is changed, “SOFTKEY_TEXT_LINE_1” is automatically updated and immediately displays the new key function.

9 Softkey bar

10 Recipes (PCS plus only)

This section only applies to devices of the PCS plus series!

10.1 Introduction

The PCS 009plus, 090plus and 095plus devices contain a recipe management unit with:

- 127 recipe texts
- up to 32 lines each
- up to 4 variables per line

The recipes are permanently stored in a separate EEPROM memory.

Display of recipes:

- External variables are always read from the recipe memory (not from the PLC).
- Internal variables are always displayed with their current values.
  The data can always be changed in the PCS.

Restrictions

- The line cannot hold another variable if an ASCII variable is used.
- Allocation of recipe variables: use each data word only once per recipe.
  (no multiple usage of data words)
- Allocation of bit variables: use each data bitonly once per recipe.
  (no multiple usage of data bits)

Data transmission possibilities:

- From the PCS to the PLC (download)
- From the PLC to the PCS (upload)

10.2 Operation

Recipe texts are exclusively selected by means of the data words in the transfer range. This provides two possibilities for selection:

- Write to the transfer range from the PLC
- Write to the transfer range from the PCS, e.g. using a softkey action assigned to a function key

The arrow keys are used for scrolling the lines.

- Arrow down key: scroll down in steps of 2 (PCS 090plus) or 4 (PCS 009plus, 095plus) lines
- Arrow up key: to the top line

10 Recipes (PCS plus only)

10.3 Selecting recipes

Two internal variables are available for defining and displaying recipes:

Name	Contents	Format	Length	Act/Nom
Z25:	RECIPE_NO_ACTUAL	BIN	4	Act
Z26:	RECIPE_NO_NOMINAL	BIN	4	Nom

The variables are copied to the communication data chip. The address of the first variable (DW m) is given in the Rezepttexte window of the programming software. Starting with this address, a block of 3 contiguous data words will be reserved.

Transfer range

	High byte								Low byte							
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
DWm	**RECIPE_NO_ACTUAL**															
DW m+1	**RECIPE_NO_NOMINAL**															
DW m+2	NOM.-R BIT	**Status display**	**Reserved**						Display	Abort		Recipe command				

The control word is structured as follows:

Bit 0-5	Recipe command (see below).
Bit 6	Abort bit: 1 = terminates all actions triggered by the recipe command. Is reset by the PCS after the abort.
Bit 7	1 = displays the recipe with the RECIPE_NO_ACTUAL number. 0 = displays a menu.
Bit 8-13	Reserved.
Bit 14	1 = recipe in the display. 0 = no recipe in the display (the menu is displayed if no higher priority is active).
Bit 15	NOMINAL-R bit: NOMINAL-P variables in recipe texts can only be edited as long as this bit is set.

The following values in the recipe command trigger the actions:

Value	Action
0	No action.
1	Upload (load recipe data from the PLC to recipe RECIPE_NO_ACTUAL) PLC---> PCS
2	Download (load recipe data of recipe RECIPE_NO_ACTUAL to the PLC) PCS ---> PLC
3	Print recipe RECIPE_NO_ACTUAL. PCS ---> Printer
4-63	Internal, reserved.

The PCS clears the recipe command (bit 0 - 5) when the action has been completed.

Note!
The values above are **decimal values** that must be entered, and **not bits that must be set!**

10 Recipes (PCS plus only)

Actions can be performed independently of the recipe display. When an action is triggered during editing of a recipe text, the PCS does the following:

- When downloading or printing, only values that have already been saved are used.
- When uploading, the editor is locked and then the value loaded from the PLC is displayed in the editor.

  Uploading therefore has a higher priority than the editor!

Selecting a recipe

1. Write the desired recipe number to DW m+1 (RECIPE_NO_NOMINAL).
2. The PCS checks the recipe number.
3. Valid recipe number: The PCS selects the recipe
   Invalid recipe number: The recipe selected last remains active
4. RECIPE_NO_ACTUAL contains the current recipe number.
5. Write the recipe control word.
   Recipe command = 1: Upload
   = 2: Download
   = 3: Print
6. The PCS clears the recipe command when the action has been performed.

10.4 Programming

1. Create recipe texts (1...127).
   - Up to 32 lines
   - Constant texts that cannot be changed
   - Insert external and internal variables

   Select the *Edit– Recipe texts* menu in PCSPRO (see section 17.10).

2. Define defaults for external variables.
   - Click the Form button in PCSPRO
   - Enter the values according to the format of the variable (see section 17.10)

3. Create the help texts for the recipes.
   - Up to 32 lines
   - Constant texts that cannot be changed
   - Insert external and internal variables

   Select the *Edit– Operating text* menu in PCSPRO (see section 17.6).

10 Recipes (PCS plus only)

11 Daily history (PCS plus only)

This section only applies to devices of the PCS plus series!

11.1 Introduction

It is useful to view the last fault texts that may have been issued during an operation fault to analyze the error.
The daily history (abbreviated to history) allows 50 messages that have disappeared or were acknowledged to be redisplayed. A new entry in the history memory clears the oldest memory entry (FIFO). Messages are stored when they are cleared (e.g. when they are acknowledged, when the message has the clear attribute 4).

11.2 Important details

The daily history implemented here has been specially adapted to the characteristics of the PCS plus series and in parts differs from the history display of other PCS series.
There are no specific texts for the daily history; rather, the already defined message texts are used. For the history display, the full length of the message texts is available, i.e. up to 32 lines.
The variables in the history texts always carry their current value which can differ from the value at the time the message was issued or cleared.
The daily history memory is cleared when the device is switched off or reset (e.g. when switching to another data record).
The history display does not have a priority level of its own. The history texts are displayed together with default texts on priority level 0.

11.3 Operation

Control of the daily history display occurs with three bits in the transfer range. Another bit is required for the status display.

DW 27, bit 0: History display bit

A history text is displayed instead of the default text on priority level 1 if the user sets this bit to 1 **and** daily history entries are available. The PCS keeps status bit 4 in DW 6 set to 1 as long as a history text is being displayed. Whenever the daily history display described here is started, the most recent of the history texts appears. The history display bit is ignored if the history memory is empty.

DW 27, bit 1: Lock history bit

New messages will not be written to the daily history memory as long as the user keeps this bit set to 1. This bit can be set when the daily history function is not required or when you want to prevent current messages from being overwritten by new messages while you are analyzing a fault.

DW 27, bit 2: Clear history bit

The entire daily history memory is cleared when the user sets this bit to 1. The PCS then clears this bit again.

11 Daily history (PCS plus only)

The following functions can be used if a history text is displayed:

[Arrow UP]: The upper text lines (main lines) are displayed.

[Arrow DOWN]: The lower lines (additional lines) of this text are displayed.

[Arrow RIGHT]: The next older history text is displayed.

[Arrow LEFT]: The next more recent history text is displayed.

If bit 7 of W12 is set to 0, thus releasing the internal LED controller (see also section “LEDs”), the LEDs indicate whether or not pressing a key has an effect (not for PCS 009plus) by lighting up and flashing.

The CLR key can be used in addition to the arrow keys.

[CLR]: Whenever the key is pressed, the display alternately jumps from to the oldest or to the most recent daily history entry.

The dark LED of the Arrow LEFT key indicates that the display holds the most recent history text. Likewise, the dark LED of the Arrow RIGHT key indicates that the display holds the oldest history text.

While being displayed (without a key being pressed), a history text can be replaced by new entries in the history memory. The history text number can be retrieved from DW 28 bit 0 to bit 9 (message text number) as the respective message texts are used for the history texts.

The user can distinguish between history and message text by referring to the ! LED that is always dark in case of a history text and always lit in case of a message text.

12 BIOS setup and off-line menus (only PCS plus)

12.1 Overview

To configure the PCS devices of the Plus series, the BIOS setup menu is used. It replaces the DIL switch present in the PCS 009, PCS 090 and PCS 095.x devices. All devices of the PCS plus series feature the same BIOS setup menu.
The PCS 095.1, PCS 095.2 and PCS plus devices allow several data records to be programmed that can be selected as desired in the off-line menu (see section 12.6).

12.2 Calling up the BIOS setup menu

The BIOS setup menu can be activated as follows:

- By powering on
  1. Switch the device off
  2. Press the CLR key and hold it down
  3. Switch the device on while holding the CLR key down until the text “BIOS SETUP MENU” appears.
- In case of a BIOS error message (exception: hardware fault).
  - Press the CLR key

12.3 Leaving the BIOS setup menu

You can only leave the BIOS setup menu in the last menu page.

```
  SAVE CHANGES ?
[X] NO    [ ] YES
```

To save changes:
1. Use the [+] key to mark the 'Yes' field
2. Press the Enter key

Note!
Leaving the BIOS setup menu always causes the device to be reset whether or not changes were made.

12.4 Operation

To select the menu pages

Use the [Arrow UP] and [Arrow DOWN] keys to select the desired menu page.
Changes made to other menu pages are retained when you change the menu page.

To change parameters

Use the [+] and [-] keys to change parameters on a menu page.

To change the display contrast

To change the display contrast, first press the [HLP] key (and keep it down). Then use the [+] and [-] keys to increase or decrease the display contrast.

12 BIOS setup and off-line menus (PCS plus only)

12.5 Description of the menu pages

The following text appears after entering the BIOS setup menu:

```
==== BIOS SETUP ====
====    MENU    ====
```

Press the [arrow DOWN] key to enter the first menu page.

To set the baud rate for data transmission

Data transmission rate for programming the PCS: 'SLOW' (38.4 kBd)
'FAST' (115 kBd)

```
SELECT BAUD RATE
[X] SLOW  [ ] FAST
```

To select the active data record

OLD = Data record active until now
NEW = Data record to be activated

To select: use the [+] and [-] keys

```
SELECT DATA RECORD
OLD: 0   NEW: 0
```

To set software DIL switches 1 through 4

Configuration according to the function of PCS 009 / 090 / 095 (see section "DIL switch").

```
DIL NO. 1 (CUSTOM)
[X] OFF   [ ] ON
through
DIL NO. 4 (CUSTOM)
[X] OFF   [ ] ON
```

To select the driver parameter record

Select the active driver parameter record. Configuration according to PCS 009 / 090 / 095 (see section "DIL switch").

```
DIL NO. 5 (DRIVER)
[X] OFF   [ ] ON

and

DIL NO. 6 (DRIVER)
[X] OFF   [ ] ON
```

12 BIOS setup and off-line menus (PCS plus only)

12.6 Off-line menu

The PCS 095.1 and PCS 095.2 operating panels feature all functions of the PCS 095 and 4 additional data records (banks) that can be selected as desired. For the PCSplus, the number of available data records depends on the device variant and the device configuration:

- PCS 009plus 1 or 2 data records
- PCS 090plus 1 or 2 data records
- PCS 095plus 3 or 6 data records

Selection occurs with an off-line menu.
You reach this menu with the [HELP] and [CLR] keys. The PCS displays the current data record (old bank).

[+] / [-] key: Select a new data record (new bank).
[ENT] key: Reset and restart with the selected data record.
[•] key: Quit the off-line menu without changes.

To lock the off-line menu:
- Set bit 15 of DW12 to 1 while communication is in progress.

Note!
PCS 095.1 and PCS 095.2 do not memorize the selected data record after power-off.
When one of these PCS devices has been switched off and on or reset by a hardware RESET (at the rear of the PCS 095.1), the PCS will select the data record set with DIL switches 11 and 12.
The PCS plus devices memorize the current data record selection in the configuration EEPROM.

12 BIOS setup and off-line menus (PCS plus only)

13 System error messages

13.1 Firmware messages

The following errors can only appear when switching on (self tests):

====== INTERNAL ERROR ======
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

There appears for XXXX in the second line:

- **INVALID CHECK SUM IN DATA MEMORY:**
  An invalid data record is included in the flash EEPROM as the check sum is not correct.
- **NO PLC DRIVER FOUND:**
  The driver which is necessary for the communication with the PLC is not present.
- **UNUSABLE DIRECTORY:**
  The logical data structure in the EEPROM is not correct.
- **INITIALIZATION FAILED:**
  On running through the initialization programme of a driver or function, an error occurs for one or other reason. Have you loaded the correct driver?
- **FIRMWARE ARE NOT COMPATIBLE:**
  A data record, function or driver is loaded which is not compatible with the EPROM version. For example, some PLC drivers require a specific EPROM version.
- **DRIVER IS NOT SUPPORTED:**
  A data record, function or driver is loaded which cannot run with this hardware. Check out the hardware in use.
- **RECIPE IS NOT AVAILABLE (only for PCS plus):**
  The recipe data (file project_name.REC) were not transferred to the PCS.
  Please select *"Transfer recipe data"* in the *"Transfer"* window of the PCSPRO.
- **FIRMWARE AND RECIPE ARE NOT COMPATIBLE (only for PCS plus!):**
  The sequence and/or the number of variables in the recipe text and in the recipe data memory differ. The components cannot cooperate. Adapt the recipe data or the recipe text accordingly.
- **HARDWARE ERROR: RECIPE MEMORY DEFECT (only for PCS plus!):**
  Writing to the recipe memory is not possible. The device can only be operated with projects without recipe. Please contact the Systeme Lauer service department.

Basically the data record should once again be thoroughly checked out after one of these failures has appeared. After transmission, for safety reasons, the DIL switch 9 should certainly be switched to "off".

If this error occurs again, then it is the result of a hardware fault.

13 System error messages

13.2 BIOS messages

Only applies to PCS plus!

Hardware failure

```
==== BIOS ERROR ====
  HARDWARE FAILURE
```

A serious fault has occurred during initialization of the device.

Invalid configuration

```
==== BIOS ERROR ====
   CONFIG INVALID
```

The contents of the configuration EEPROM is invalid. This error message can occur when data transmission to the PCS was incomplete. In most cases, this error can be corrected by transferring the data record/recipe/firmware again.

Invalid firmware

```
==== BIOS ERROR ====
  FIRMWARE INVALID
```

The firmware in the device is invalid. This error message can occur when the checksum of the loaded firmware is invalid or when no firmware was loaded into the device. The error can be corrected by loading the firmware.

Invalid firmware version

```
==== BIOS ERROR ====
  FIRMWARE VERSION
```

The loaded firmware and the BIOS version of the PCS are incompatible. This error message can occur when an old firmware version is loaded into the device. Perform a firmware update when this error occurs.

Invalid driver

```
==== BIOS ERROR ====
   DRIVER INVALID
```

The driver in the device is invalid. This error message can occur when the checksum of the loaded driver is invalid or if no driver was loaded at all. The error can be corrected by loading the driver.

Invalid data record

```
==== BIOS ERROR ====
DATA RECORD INVALID
```

The data record in the device is invalid. This error message can occur when the checksum of the loaded data record is invalid, when the data record was not completely loaded or when the device does not contain any data record. The error can be corrected by loading the data record.

13 System error messages

EEPROM write error

```
==== BIOS ERROR ====
 EEPROM WRITE ERROR
```

Writing to the firmware/data record EEPROM or the recipe EEPROM is no longer possible. Please contact the Systeme Lauer service department.

13.3 Communication error

In addition to the permanently defined firmware and BIOS messages, loadable drivers and function programs can also issue error messages. All error messages use a common first line:

```
===== COMMUNICATION ERROR =====
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

This is a communication driver message indicating an interruption of the communication link to the PLC or heavy interferences. The second line is reserved for messages generated by the special drivers. See the appropriate PCS 91.xxx driver manual.

The message "**Restart PCS or press reset button**" is generated by the communication driver. For reasons of compatibility, it can also appear in the PCS plus devices. In such a case, the PCS must be briefly deenergized (the PCS plus has no reset button).

Warning!
PCS actions that fall due while communication is interrupted will be transferred to the PLC when the PCS has been started again. Make sure that the actions/reactions of the PCS and the PLC are correct after a restart!

13 System error messages

14 Activation of the PCS micro, mini and the PCS plus

Activation of the PCS 009, PCS 090, PCS 095, PCS 095.1 is done over a transmission area which has a maximum number of 256 words and lies in the PLC.

In this manner the operator controls every function of the PCS. With "writing" and "reading" he/she controls this data.

Activities which lead to the communication between the PLC and the PCS are organized by the accompanying PLC software, which is in the respective manual PCS 91.xxx. Data security and communication records are taken care of by the communication's processor (e.g., PCS 810.1), i.e., the operating system of the PLC and the PCS.

As the transfer area (e.g., its position, size and functionality) is dependent on the parameterized driver, the corresponding **"Driver manual" PCS 91.xxx**) should be used as well.

Basically two principles of the data exchange are available:

First principle: An „expander" enabling all functions of the PCS is required for the PLC. Only the size of the transfer area varies depending on the driver. At any time It is possible (except for interrupt programs) to access data of the transfer area. It is the task of the expander to process the coded data packages of the PCS. Only the currently required data and task are transmitted via the interface.

Second principle: „Direct drive" (e.g. „AS511.DRV"). It has the advantage that it reads and writes data from/into fixed data areas in the PLC. This principle is used for systems having no commands for indirect addressing or which require a relatively large amount of PLC cycle time for processing the expander. Below, you will find a brief description of the data exchange.

The PCS writes data into a data area of constant length in the receiving area of the PLC. At a later point in time the PCS reads data from a data area of constant length in the sending area of the PLC. Please note that the sending and receiving area are located in different data areas.

Words written by the PCS are stored In the receiving area of the PLC. Examples for the written data are key words, PCS status information, and external variables (set values).

Words read by the PCS are located in the sending area of the PLC. Examples for the read data are LED status, command words, message area, and external variables (set and actual values!).

Special attention must be paid to the reading and writing of data from/into the sending/receiving areas (especially for set values). Since the PCS reads and compares the set value twice after writing, the application program must transfer the written data from the receiving area of the PLC into the sending area. This can be only be done at a certain time slot since only then all data of the receiving area are (consistently) valid. For this purpose, a special block (subroutine) is available in the handling software of the PLC which is timely executed between writing into the receiving area of the PLC and reading from the sending area of the PLC. Only during this time slot, data of the sending/receiving area should be accessed. Especially set values must be reflected during this time. If access to these words must be possible at any time, then the data must be copied into/from temporary flag(s).

With this method, the functionally and the number of variables is reduced in comparison to the first principle. Deletion behaviour 2 for messages and modifying of a bit in the transfer area cannot be realized. This applies only for using the unsynchronized operation.

The remaining chapter 3 describes the operation independent of the programmable controller. It is to be supposed that the full functionality is available. The transfer area is consecutively numbered from word 0 to word 255 - in short **W0 .. W255**.

Warning!
Take care to use the appropriate driver for the programmable controller. Otherwise, malfunctions can be caused in the PCS and in the programmable controller!

14 Activation of the PCS micro, mini and the PCS plus

14.1 Overview

1. System area: W0...3

   W0...2 used internally, barred from the user.
   W3 Error word for the communication display. Details in the respective "Driver Manual" PCS 91.xxx.

2. Fixed function area: W4...14

		Direction: PCS	PLC
KEYS:			
W4	Key bits F1...F8, DIL 1...4, HLP, ., 8, 9	———	>
W5	Key bits 0...7, ARROWS, +, -, CLR, ENT	———	>
PCS STATUS:		PCS	PLC
W6	Node number and active priority	———	>
W7	Displayed priority and text number	———	>
W8	Word number nominal value and nominal value length (byte number)	———	>
W9	Bit mask high and low (only for bit variables)	———	>
LED STATUS, DISPLAY AND STORAGE MODES:		PCS	PLC
W10	LED activation F1...F8 green and yellow	<	———
W11	LED flashing status F1...F8 green and yellow	<	———
W12	Display and message mode (storage behaviour)	<	———
COMMAND WORDS:		PCS	PLC
W13	Release of priorities and transmission	<	———
W14	Default text number and menu number	<	———

3. Message area: W15...22

	PCS	PLC
Cancel mode 1	<	———
Cancel mode 2	<	——— >
Cancel mode 3	<	———
Cancel mode 4	<	———

14 Activation of the PCS micro, mini and the PCS plus

4. Extension area: W 23...29

	PCS	PLC	
W23.. 29	currently used for variables in the PCS 009 and PCS 090		<———>

ADDITIONAL KEYS (ONLY PCS 095, PCS 095.1):		PCS	PLC
W23	key bits F9...F16 in high byte (only PCS 095, PCS 095.1)	———>	

ADDITIONAL LED STATUS (ONLY PCS 095, PCS 095.1):		PCS	PLC
W24	LED activation F9...F16 green and yellow (only PCS 095, PCS 095.1)	<———	
W25	LED flashing status F9...F16 green and yellow (only PCS 095, PCS 095.1)	<———	
W26...29	currently available for variables		<———>

PCS plus

W27	Message block release, daily history bits	<———
W28	Message exts number	———>
W29	Reserved	<———>

5. Area of variables: W30...255

PCS	PLC	
W30...255 free for variables		<———>

PCS plus

W30-W85	Message bit area
W86-W255	free for variables

14 Activation of the PCS micro, mini and the PCS plus

Key bits

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W4	F1	F2	F3	F4	F5	F6	F7	F8	DIL4	DIL3	DIL2	DIL1	HLP	.	9	8
W5	7	6	5	4	3	2	1	0	↓	↑	→	←	-	+	CLR	ENT

PCS status

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W6	128	64	32	16	8	4	2	1	X	X	Help active	History active	S	W	H	Menu active
	actual node number (only if menu active)												recognized			
W7	Printer ready	F5..F8 (only PCS009	Mess. print active	Hard copy end	8	4	2	1	M/B 0/1	64	32	16	8	4	2	1
					displayed priorities					displayed text number						
W8	128	64	32	16	8	4	2	1	X	X	X	16	8	4	2	1
	latest written nominal value word number											written nominal value (Byte)				
W9	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	Bit mask HIGH-Byte (only with BIT variables)								Bit mask LOW-Byte (only with BIT variables)							

LED status, Display and Storage modes

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W10	F1	F2	F3	F4	F5	F6	F7	F8	F1	F2	F3	F4	F5	F6	F7	F8
	LED activation green								LED activation yellow							
W11	F1	F2	F3	F4	F5	F6	F7	F8	F1	F2	F3	F4	F5	F6	F7	F8
	LED activation "flashing" green								LED activation "flashing" yellow							
W12	Offl. disab.	Switch/ shift (PCS009)	Date/ time write to PLC	Date/ time load in PCS	X	S	W	H	Arrow LED activation		Faults		Warnings		Information	
						Display modes					Message modes (storage behaviour)					

Commando words

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W13	Arrow LEDs Help	Arrow LEDs Mess.	Mess. print	Hard-copy	S	W	H	Menu	LED	W12-	Arrow LEDs Menu	Keys * rep. click	8	4	2	1
					Release of priorities				Transfer				number message words; transfer/read (only message block 0)			
W14	Stat/ Blink	64	32	16	8	4	2	1	NOM. -P	64	32	16	8	4	2	1
	Default text number (0... 127)								Menu number (0... 127)							

*** at PCS plus series without effect**

14 Activation of the PCS micro, mini and the PCS plus

Message words, Message block 0

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W15	M15	M14	M13	M12	M11	M10	M9	M8	M7	M6	M5	M4	M3	M2	M1	M0
up to																
W22	M127	M126	M125	M124	M123	M122	M121	M120	M119	M118	M117	M116	M115	M114	M113	M112

Extra key words (only PCS 095, 095.1, 095.2, 095plus)

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W23	F9	F10	F11	F12	F13	F14	F15	F16	X	X	X	X	X	X	X	X
	Key bits (only PCS 095)								at moment free, will be zeroed on writing							

Extra LED status and softkey bar number (only PCS 095, 095.1, 095.2, 095plus)

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W24	F9	F10	F11	F12	F13	F14	F15	F16	F9	F10	F11	F12	F13	F14	F15	F16
	LED activation green (only PCS 095)								LED activation yellow (only PCS 095)							
W25	F9	F10	F11	F12	F13	F14	F15	F16	F9	F10	F11	F12	F13	F14	F15	F16
	LED activation "flashing" green (only PCS 095)								LED activation "flashing" yellow (only PCS 095)							
W26	128	64	32	16	8	4	2	1	128 ↓	64 ↑	32 →	16 ←	8 ↓	4 ↑	2 →	1 ←
	Softkey bar number								Arrow LEDs static				Arrow LEDs flashing			
W27	MB7	MB6	MB5	MB4	MB3	MB2	MB1	X	X	X	X	X	X	History delete	History lock	History displ.
W28	X	X	X	X	X	X										
							Message text number									

} Only PCS plus

Variable area

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
ab W30	optional external variables BIT, (C)STRING, (V)BIN.., BCD.., WORD, ASCII								optional external variables BIT, (C)STRING, (V)BIN.., BCD.., WORD, ASCII							

PCSplus:

W30 bis W85 } Message block 1-7

ab W86 } Variable area

See chapter "Message area, Message block 1-7" (only PCSplus devices).

14 Activation of the PCS micro, mini and the PCS plus

14.2 System area

The words W0...2 are reserved for driver dependent functions.

14.3 Key bits

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W4	**F1**	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**	**F8**	**DIL4**	**DIL3**	**DIL2**	**DIL1**	**HLP**	**.**	**9**	**8**
W5	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	↓	↑	→	←	**-**	**+**	**CLR**	**ENT**

These key bits are log 1, so long as the respective key is pressed and the communication runs without fault. The control keys in the LOW byte of W5 should only be used with care, as they are also required for the editing of nominal values in several priorities, especially in the menu priority for editing.

Mint:
The ENT key should not be used for the termination of menus, as it is also used for the transfer of nominal values. A function key as menu end key is better suited for this purpose. Termination of a menu occurs simply by writing logic 0 on bit 0...6 of word W14. The final menu node can be checked through the PCS status W6 bit 0 (negative edge).

14 Activation of the PCS micro, mini and the PCS plus

14.4 PCS status

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W6	**128**	**64**	**32**	**16**	**8**	**4**	**2**	**1**	**X**	**X**	**Help active**	**History active**	**S**	**W**	**H**	**Menu active**
	actual node number (only if menu active)												**recognized**			

HIGH byte, bit

0...7:actual node number (binary)

The actual node number (1...255) is only active as long as a menu is active. Whether a menu is active or not can be read in the same word in bit 0.

LOW byte, bit

6...7: not used at present
5: log 1, as long as a Help text is displayed
4: not used at present
3: log 1, if at least one fault is active
2: log 1, if at least one warning is active
1: log 1, if at least one information is active
0: log 1, if one menu is active

If the HLP key is pressed by the operator, the programmed help text appropriate for the currently displayed priority is set for the bit 5, as long as the help key is pressed. If there is a message bit log 1 in the message area W15...22, and at the same time a message text is programmed, then the (H) information, (W) arning, or (S) fault respective to the programmed priority of the message, will be recognized. A prerequisite for this is however that the message word transfer is free, refer to LOW byte of command word A (W13)!
If a menu was started with the command word B (word 14; bit 0...6), that is filed in the data record, then the bit will be log 1. This bit can also be brought in as end criterion (negative edge) for a menu.
Several priorities can be active and therefore several bits can set. The presently displayed priority can be evaluated in the HIGH byte of word 7.

Example:

A message (fault) is active, however barred through the bit 11 in command word A (W13) (not displayed). At present menu 15 and the node number 28 is in the display. In addition the HLP key is not depressed. Content of word 6: 00011100 xx0x1001.

14 Activation of the PCS micro, mini and the PCS plus

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W7	**Printer ready**	**F5..F8 (PCS009)**	**Mess. print active**	**Hard-copy end**	**8**	**4**	**2**	**1**	**M/B 0/1**	**64**	**32**	**16**	**8**	**4**	**2**	**1**
					displayed priorites					**displayed text number**						

HIGH byte, bit

12 logic. 1 if printing has been finished. This bit is kept at „1“ until bit 12 DW 13 „Request bit“ is set to „0“ (PCS 095.1 with printer interface only).

13 logic. 1 if message printing is active.

14 active F-key level. 0 corresponds to F0 .. F4, 1 corresponds to F5 .. F8 (only PCS 009).

15 logic. 1 if printer is ready for operation. Only with RTS/CTS handshaking, the „Ready“ printer state is clearly defined. With XON/XOFF handshaking, „Busy“ will only be signaled after receiving XOFF. Without handshaking „Ready“ will always be signaled (only PCS 095.1 with printer interface)

8..11: priority currently used for display (binary, possible 0, 2, 4, 6, 8, 12)

The actual displayed priority is displayed as binary coded. This is the highest valued, free and active priority in command word A (W13). The following values are possible:

0 0000: Default priority
2 0010: Menu priority
4 0100: Information priority
6 0110: Warning priortiy
8 1000: Fault priority
12 1100: Help priority

LOW byte, bit

7: log 0 if a message text and log 1 if an operating text is in the display.

0..6: presently displayed text number (binary), only valid if the displayed priority is 0...8.

The currently displayed text number is shown here binary coded. It can be ascertained by checking of bit 7 whether a message text or an operating text is in the display. This bit is log 0 with message texts and log 1 with operating texts.

Example 1: Default text 3 is in the display -> word 7 (binary) = xxxx0000 10000011
Example 2: Operating text 34 (e.g. in the menu) -> word 7 (binary) = xxxx00010 101000010

14 Activation of the PCS micro, mini and the PCS plus

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W8	**128**	**64**	**32**	**16**	**8**	**4**	**2**	**1**	**X**	**X**	**X**	**16**	**8**	**4**	**2**	**1**
	latest written nominal word number											**written nominal value length (Byte)**				

HIGH byte, bit

0...7: latest written set value word number (binary)

The word number of the latest edited set value can be read in binary here. If an PLC programme is waiting on the input of a specific set value, W8 (or only the HIGH byte) can be zeroed before. As soon as the byte is <> 0 the set or nominal value can be evaluated in the PLC programme. If this doesn't correspond to the expected set value, then the W8 is to be zeroed again and waiting will continue.

LOW byte, bit

5...7: at present not in use
0...4: latest written set value length (binary, number of bytes)

If a set value is written by the PCS, the type of the variables on evaluation of the bits 0.4, the number of written bytes and those of the subsequent written bit masks can be evaluated.

Number of bytes:

0: BIT variable
2: 16 bit variable as (C)STRING; BCD(0)-1; (V)BIN(0)-1, A; WORD; ASCII
4: 32 bit variable as (C)STRING; BCD(0)-2; (V)BIN(0)-2, B; ASCII
[4: ASCII variable

If a bit variable (number of bytes = 0) is written, the amended bit number can be verified with the displayed bit mask in W9.

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W9	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
	Bit mask HIGH-Byte (only at BIT variables)								**Bit mask LOW-Byte (only at BIT variables)**							

The bit number from the bit mask of W9 can be ascertained. The corresponding bit that has changed is reported in the bit mask with a logic 1. All remaining bits appear with logic 0. The new condition of the respective bits can be decided upon in conjunction with the word number entered in W8 and the bit mask.

Example:
A bit variable which was programmed on word 40 (bit 11) as a set value is adjusted in a menu (previously logic 0, after pressing "+" key logic 1). Afterwards the following values are present in W8 and W9:

W8: 00101000 xxx00000
W9: 00001000 00000000

Through a logical link up of the words W9 and W40, you have the values 00001000 000000, that is to say <> 0. Whereupon the bit is set to logic 1.

14 Activation of the PCS micro, mini and the PCS plus

14.5 LED status, display and storage behaviour

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W10	**F1**	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**	**F8**	**F1**	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**	**F8**
	LED activation green								**LED activation yellow**							
W11	**F1**	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**	**F8**	**F1**	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**	**F8**
	LED activation "flashing" green								**LED activation "flashing" yellow**							

A green and a yellow LED (not for PCS 009)per function key F1...F8 is available. Every LED can take on 4 conditions, as each LED has 2 bits at its disposal:

- off
- on
- flashing (75% bright phase, 25% dark phase)
- inverse flashing (25% bright phase, 75% dark phase)

If an LED is flashing and another one is flashing inverse, then they light up alternately. A bright phase with an LED is a dark phase with another one and reversed.
The state of an LED is dependent on the 2 respective bits of word W10 and W11 (with the red LED via the function key "F6" these are e.g., bit 2 of W10 and W11).

Arrangement of the LED status:

W10, bit no. x	W11, bit no. x	Condition
0	0	off
0	1	inverse flashing
1	1	on
1	1	flashing

Example:

W10: 00001111 00001111
W11: 00000000 11111111

-> green LEDs over F1...F4: off
-> green LEDs over F5...F8: on
-> yellow LEDs over F1...F4: inverse flashing (not for PCS 009)
-> yellow LEDs over F5...F8: flashing (not for PCS 009)

14 Activation of the PCS micro, mini and the PCS plus

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W12	**Offl. disabl.**	Switch/ shift (PCS 009 009plus)	**Date/ time write to PLC**	**Date/ time load in PCS**	**X**	**S**	**W**	**H**			**Faults**		**Warnings**		**Information**	
						Display modes			**Arrow LED activation**		**Message modes (storage behaviour)**					
											H-Bit	L-Bit	H-Bit	L-Bit	H-Bit	L-Bit

HIGH byte, bit

15: logic. 1 if offline menu should be disabled
11..13: currently not used
14:*) Mode keys ▲ logical 0 corresponds to the switch function F1..F4/F5..F8,
▼ logical 1 corresponds to the shift function F1..F4/F5..F8
10: logic 1, if a displayed fault should be flashing
9: logic 1, if a displayed warning should be flashing
8: logic 1, if a displayed information should be flashing

DISPLAY MODES:

The display mode bits determine, whether a message text should be presented statically or flashing. A logic 1 means flashing presentation for the entire message text and a logic 0 represents a static presentation. These bits, separated for (H) information, (W) arning and (S) fault, can be altered at any time by the PLC.

LOW byte, bit

7**: logic. 1, arrow LEDs were not adressable through the display priorities but directly from the user through DW26 (low byte). This bit has a higher priority as the influence of the LEDs through the display modes.
6**: logic. 1, arrow LEDs in menus were presented at node changing static not flashing
4...5: storage behaviour for faults
2...3: storage behaviour for warnings
0...1: storage behaviour for information

STORAGE BEHAVIOUR:

HL bit:
- 00: First message without selection possibility
- 01: First message with selection possibility
- 10: Last message without selection possibility
- 11: Cyclic display (without selection possibility)

Continued switching to other messages by hand (with arrow right & left) is only possible in mode 01 (first message selection possibility). If paging is to continue in another mode, then mode 01 should be set first of all. At this moment the text currently visible in the display can be either paged with the "Arrow-left" to the oldest, i.e., "Arrow-right" to the latest message.

If the bit 14 logic 0 is in the command word A (W13), then the arrow key LEDs show in addition the paging possibility within the message text page and from the oldest to the youngest message (manual selection possibility).

The various cancel possibilities and the paging to the help lines are written in section "MESSAGE PRIORITIES".

*) only for PCS 009 and PCS 009plus
** Not at PCS 009/009plus!

14 Activation of the PCS micro, mini and the PCS plus

14.6 Command word

Release

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W13	**Arrow LEDs Help**	**Arrow LEDs Mess.**	**Mess. print**	**Hard-copy**	**S**	**W**	**H**	**Menu**	**LED**	**W12-**	**Arrow LEDs Menu**	**Keys * rep. click**	**8**	**4**	**2**	**1**
					Release of priorities				**Transfer**				**number message words; transfer/read (only message block 0)**			

HIGH byte, bit

15: logic 1, if arrow LEDs in the help priorities not to be active
14: logic 1, if arrow LEDs in the message priority (H, W, S) not to be active
13: logic. 1 if the message word area should be checked for 0 -> 1 transitions and to earmark messages for printing. Logic. 0 deletes all earmarked messages.
12: logic. 1 initiates the hardcopy function for the current display contents (only PCS 095.1 with printer interface).
11: logic 1, if the fault priority may be interrupted by a lower one (W, H, M, R)
10: logic 1, if the warning priority may be interrupted by a lower one (H, M, R)
9: logic 1, if the information priority may be interrupted by a lower one (M, R)
8: logic 1, if the menu priority may be interrupted by a lower one (R)

LOW byte, bit

7: logic 1, if the LEDs (W10...11, with PCS 095, PCS 095.1 also W24...25) must be read
6: logic 1, if the display and storage behaviour W12 is considered
5: logic 1, if the arrow LEDs should not be active in the menu priority
4: logic 1, if the acoustic signal (repeat click and error signal) should not be active
0..3: gives binary (0...8) the number of the message words, which have to be transfered (read)
1: logical 1 if at least 1 info is active
0: logical 1 if a menu is active

Interlocked Arrow Key LEDs: (only PCS 090, PCS 095, PCS 095.1)
The arrow key LEDs in the bits 15, 14 and 5 can be activated according to help, message (H, W, S) and menu priority. If the respective bit is on logic 0, the corresponding LEDs light up via the permitted "Arrow keys". More detailed information can be found in chapter "LIGHT DISPLAYS" and "ARROW KEYS IN MENUS". Here is a summary:

LED Arrow...	Menu priority	Message priority	Help priority
lit above	variable accessible	select main lines	select main lines
flashes above	menu node accessible	–	–
right lit up	variable accessible	latest report	–
right flashes	menu node accessible	–	–
lit below	variable accessible	select next lines	select next lines
flashes below	menu node accessible		–
left lit up	variable accessible	next older message	–
left flashes	menu node accessible		–

14 Activation of the PCS micro, mini and the PCS plus

Release Priorities:
The priorities in the bits 8...11 (menu, information, warning, error) can be blocked individually. Please note that the priorities 8 (HELP) and 12 (communication errors) are not blockable. If on entering the set value into a menu, the priorities information, warning and fault are blocked, then only default texts and menus are allowed in the display (High byte = xxxx0001), the menus cannot interrupt the messages (H, W, S). Nevertheless they are activated in the background (LED "!" then flashes).

Release Data Transfer:
If certain words of the function area, such as LEDs, messages, displays and storage behaviour, are not required or do not have to be continually refreshed, then it is recommended that the transfer between PCS and PLC in the LOW byte should be kept to a minimum. The blocking of the transfer of data saves time in the PLC cycle and accelerates the transfer for other services such as data!
For example a logic 0 in bit 7 blocks the reading (transfer) of all the LED STATUS WORDS (W10...11 and with the PCS 095, PCS 095.1 also W24...25).
A logic 0 in bit 6 blocks the reading (transfer) of the display and storage behaviour. The number of message words in the bit 0...3, which should be read (transfered) can be set binary coded. Here, a value range between 0 and 8 is sensible.

Example: You require only 35 messages (35/16 = 2, 18...), therefore it is enough to be able to read 3 word messages. This can through writing xxxxxxxx xxxx0011 in W13. Please note that this setting can at any time (dynamic) be altered by the PLC.

Warning!
Blocking of the transfer can lead to problems, if it is carried out at the wrong moment. For example after blocking transfer (assuming deletion behaviour 4), of a set message, it cannot be deleted for the time being, even though the message in the PLC is on logic 0. Therefore only use the blocking facilities of the transfer when you are sure that this will not lead to any undesired consequences.

14 Activation of the PCS micro, mini and the PCS plus

Default ext and menu

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W14	**Stat/ flash.**	**64**	**32**	**16**	**8**	**4**	**2**	**1**	**NOM. -P**	**64**	**32**	**16**	**8**	**4**	**2**	**1**
		Default text number (0... 127)								**Menu number (0... 127)**						

HIGH byte, bit

15: logic 1, if a displayed default text should be flashing
8...14: binary coded the default text number (0...127)

Default Text Number:
This is the operator text number, when the default text priority is activated that will be displayed. By writing the value xxxxxxx xxxx0000 into W13 the default text priority is displayed. Only a filed help text or a communications error can interrupt the default text. The default text number which is identical with the operator text number, can be altered at any time by the PLC. The variables (set value) contained in the text are not adjustable (cannot be edited).
If bit 15 is logic 1, then the entire default text can be flashed. If the bit 15 is logic 0, then the default text appears static.
Example: Default text 23 is to be displayed. Therefore the value 1001011 x0000000 is to be written on the word W14.

LOW byte, bit

7: logic 1, if the NOM-P-variables in the menu priorities may be edited
0...6: the activated menu number as binary coded (1...127, as 0 = end of menu)

Menu number:
In writing a value on bit 0...5, you can activate a menu and end one. The requirement is that no higher priority (H, W, S, HLP or communications error) is active. By writing a binary coded value > 0, i.e., 1...127 on bit 0...6, a menu can be started. The first text to arrive in the display is the defined operating text for the initial node or start node. If there are already one or more nominal variables in a menu node, they will be activated first of all. They then appear flashing. Now set values can be entered and the menu, depending on the definitions which you have set in it, be branched out with the "Arrow keys". A valuable help to you at any time are the arrow key LEDs provided bit 5 of this word, logic 0.
If you want to end a menu, then simply zero the bits 0...6. In the case that a set value was just activated; indicated by flashing or with a cursor; this can still be written in the PLC within the permitted limiting values! The NOM-P-variables in the actual displayed menu nodes can be altered at any time with bit 7 = logic 1. This enables the formation of keyswitch dependent menus or variables. NOM-P-variables are then treated as ACTUAL values. A very special case arises when a NOM-P-variable is being edited and the PLC during this time sets the bit 7 on logic 0. This then develops in such a way that this variable is then written in the PLC. If the present edited value or intermediate result happens to be outside the limiting values, whether minimum or maximum, then the PCS waits until a reliable value is entered. In conclusion the first NOM variable is searched for by the beginning of the text and presented in a flashing manner. If there is no NOM variable in this menu node, then all variables will be presented as ACTUAL values.
Released and vacant arrow key LEDs in menus, are able to show at any time and in dependent of the bit 7, the actual valid arrow keys.
Example: Menus 15 can be started at any time by writing xxxxxxx x0001111 on W14.

14 Activation of the PCS micro, mini and the PCS plus

14.7 Message area, Message block 0

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W15	**M15**	**M14**	**M13**	**M12**	**M11**	**M10**	**M9**	**M8**	**M7**	**M6**	**M5**	**M4**	**M3**	**M2**	**M1**	**M0**
W16	**M31**	**M30**	**M29**	**M28**	**M27**	**M26**	**M25**	**M24**	**M23**	**M22**	**M21**	**M20**	**M19**	**M18**	**M17**	**M16**
W17	**M47**	**M46**	**M45**	**M44**	**M43**	**M42**	**M41**	**M40**	**M39**	**M38**	**M37**	**M36**	**M35**	**M34**	**M33**	**M32**
W18	**M63**	**M62**	**M61**	**M60**	**M59**	**M58**	**M57**	**M56**	**M55**	**M54**	**M53**	**M52**	**M51**	**M50**	**M49**	**M48**
W19	**M79**	**M78**	**M77**	**M76**	**M75**	**M74**	**M73**	**M72**	**M71**	**M70**	**M69**	**M68**	**M67**	**M66**	**M65**	**M64**
W20	**M95**	**M94**	**M93**	**M92**	**M91**	**M90**	**M89**	**M88**	**M87**	**M86**	**M85**	**M84**	**M83**	**M82**	**M81**	**M80**
W21	**M111**	**M110**	**M109**	**M108**	**M107**	**M106**	**M105**	**M104**	**M103**	**M102**	**M101**	**M100**	**M99**	**M98**	**M97**	**M96**
W22	**M127**	**M126**	**M125**	**M124**	**M123**	**M122**	**M121**	**M120**	**M119**	**M118**	**M117**	**M116**	**M115**	**M114**	**M113**	**M112**

Every message text (0...127, with a max. of 32 characters each) can be allocated to a bit. In addition a specific priority (4 = information, 6 = warning, 8 = fault) and a specific cancel mode (1...4) is assigned to each text. If a message bit is set, to which no message text has been programmed, then it will be ignored.

The continuation of the message area for the PCS plus series is described in chapter "Message area, Message block 1-7 (only for PCS plus devices)".

14 Activation of the PCS micro, mini and the PCS plus

14.8 Extension area

At the moment only extension area W23...W29 is occupied used by the PCS 095, PCS 095.1 (W23...W25). It is reserved for later additions and is therefore used for variables with caution. If however variables are used, then incompatibility with the PLC programme is to be expected.

As the PCS 095, PCS 095.1 already uses this area (extra keys W23 and additional LEDs W24 and W25), the PCS 009 or PCS 090 cannot be exchanged against a PCS 095, PCS 095.1, without amending the PLC programme.

Extra function key words (only PCS 095, 095.1, 095.2, 095plus)

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W23	**F9**	**F10**	**F11**	**F12**	**F13**	**F14**	**F15**	**F16**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
	Key bits (only PCS 095)								**at moment free, will be zeroed on writing**							

These key bits are log 1, as long as the corresponding key is pressed and the communication runs without fault.

Extra LED status F9..F16 (only PCS 095, 095.1, 095.2, 095plus)

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W24	**F9**	**F10**	**F11**	**F12**	**F13**	**F14**	**F15**	**F16**	**F9**	**F10**	**F11**	**F12**	**F13**	**F14**	**F15**	**F16**
	LED activation green (only PCS 095)								**LED activation yellow (only PCS 095)**							
W25	**F9**	**F10**	**F11**	**F12**	**F13**	**F14**	**F15**	**F16**	**F9**	**F10**	**F11**	**F12**	**F13**	**F14**	**F15**	**F16**
	LED activation "flashing" green (only PCS 095)								**LED activation "flashing" yellow (only PCS 095)**							

For each functions' key "F8...F19", there is a green and a yellow LED available. As there are 2 bits available to every LED, every LED can take on 4 conditions:

- off
- on
- flashing (75% bright phase, 25% dark phase)
- inverse flashing (25% bright phase, 75% dark phase)

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If one LED is flashing and another is flashing inverse, then they light up on an exchange basis. A bright phase of one LED corresponds to a dark phase of the other one and reversed.
The state of an LED is set by 2 bits from word W24 and W25 (for the red LED via the function key F11, they are bit 5 of W24 and W25).

Arrangement of the LED states:

W24, bit no. x	W25, bit no. x	Condition
0	0	off
0	1	inverse flashing
1	1	on
1	1	flashing

Example:

W24: 00001111 00001111
W25: 00000000 11111111

-> green LEDs over F9...F12: off
-> green LEDs over F13...F16: on
-> yellow LEDs over F9...F12: inverse flashing
-> yellow LEDs over F13...F16: flashing

Externally controlled softkey bar number and arrow LEDs

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W26	**128**	**64**	**32**	**16**	**8**	**4**	**2**	**1**	**128** ↓	**64** ↑	**32** →	**16** ←	**8** ↓	**4** ↑	**2** →	**1** ←
	Softkey bar number								**Arrow LEDs static**				**Arrow LEDs flashing**			

The high byte of data word 26 is used to set the desired softkey bar. Values between 0 and 127 are possible. The low byte of DW26 is used to set the arrow LEDs to a permanently lit or flashing state.

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Message block release, message text number (only PCS plus devices)

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W27	**MB7**	**MB6**	**MB5**	**MB4**	**MB3**	**MB2**	**MB1**	**X**	**X**	**X**	**X**	**X**	**X**	**History delete**	**History lock**	**History displ.**
W28	**X**	**X**	**X**	**X**	**X**	**X**										
							Message text number									

W 27 Bit 3-8 Reserved
Bit 9-15 Releases message blocks 1 ... 7
W 28 Bit 0-9 Current message text number
Bit 10-15 Reserved

Word 27, low byte, bit
0: Setting this bit allows the history display to be activated.
1: The daily history memory does not accept any new entries as long as this bit is set.
2: Setting this bit clears the entire daily history memory.
The PCS then sets this bit back to 0.

For each of the message blocks 1..7, a bit has been provided in W27 that is used to release the transmission. Each message block bit releases the transmission of 8 words. We recommend to only release those message blocks that you need because the communication speed is greatly affected by this!

Message block 1 = W30..W37 M128..255
Message block 2 = W38..W45 M256..383
Message block 3 = W46..W53 M384..511
Message block 4 = W54..W61 M512..639
Message block 5 = W62..W69 M640..767
Message block 6 = W70..W77 M768..895
Message block 7 = W78..W85 M896..1023

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14.9 Message area, message block 1-7 (only for PCS plus)

W30-W37: Message block 1

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W30	M143	M142	M141	M140	M139	M138	M137	M136	M135	M134	M133	M132	M131	M130	M129	M128
up to																
W37	M255	M254	M253	M252	M251	M250	M249	M248	M247	M246	M245	M244	M243	M242	M241	M240

W38-W45: Message block 2

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W38	M271	M270	M269	M268	M267	M266	M265	M264	M263	M262	M261	M260	M259	M258	M257	M256
up to																
W45	M383	M382	M381	M380	M379	M378	M377	M376	M375	M374	M373	M372	M371	M370	M369	M368

W46-W53: Message block 3

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W46	M399	M398	M397	M396	M395	M394	M393	M392	M391	M390	M389	M388	M387	M386	M385	M384
up to																
W53	M511	M510	M509	M508	M507	M506	M505	M504	M503	M502	M501	M500	M499	M498	M497	M496

W54-W61: Message block 4

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W54	M527	M526	M525	M524	M523	M522	M521	M520	M519	M518	M517	M516	M515	M514	M513	M512
up to																
W61	M639	M638	M637	M636	M635	M634	M633	M632	M631	M630	M629	M628	M627	M626	M625	M624

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W62-W69: Message block 5

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W62	M655	M654	M653	M652	M651	M650	M649	M648	M647	M646	M645	M644	M643	M642	M641	M640
up to																
W69	M767	M766	M765	M764	M763	M762	M761	M760	M759	M758	M757	M756	M755	M754	M753	M752

W70-W77: Message block 6

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W70	M783	M782	M781	M780	M779	M778	M777	M776	M775	M774	M773	M772	M771	M770	M769	M768
up to																
W77	M895	M894	M893	M892	M891	M890	M889	M888	M887	M886	M885	M884	M883	M882	M881	M880

W78-W86: Message block 7

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W78	M911	M910	M909	M908	M907	M906	M905	M904	M903	M902	M901	M900	M899	M898	M897	M896
up to																
W85	M1023	M1022	M1021	M1020	M1019	M1018	M1017	M1016	M1015	M1014	M1013	M1012	M1011	M1010	M1009	M1008

Each bit is assigned a MESSAGE TEXT (128...1023, up to 32 lines each); each text can have a specific priority (S,W,H) and a specific clearance behavior (1-5).

- **Conversion of message text numbers to DW numbers (valid for message blocks 0-7)**

  DW number = digits before decimal point of (message text/16) (+ 7 if message text > 127) + 15

  Bit position = digits after decimal point of (message text/16) x 16

  Example: To find the bit position of message text 165

  165 / 16 = 10.3125

  i.e. we must add 7 because 165 >127:

  10 + 7 = 17

  17 + 15 = 32

  0.3125 x 16 = 5

  Message text number 165 corresponds to W32, bit 5.

14 Activation of the PCS micro, mini and the PCS plus

- **Assessment**

  A maximum of 1 message block is fetched during each PLC cycle. To reach the maximum possible assessment speed, only one message block may be released.

- **Transmission**

  The transmission length (from word 15 onwards) for message block 0 can be released on a word-by-word basis in bit 0..3 of W 13. The bits are weighted as follows:

  Number of transferred words: bit3 x 8 + bit2 x 4 + bit1 x 2 + bit0

  Equal to or greater than 8 means that all 8 words of message block 0 are transmitted.

  Example: W13 = xx.x3 (hex)

  The three values 15..17 are sent.

  For each of the message blocks 1..7, W27 provides one bit for releasing transmission. Changes to these bits during operation should only occur when all bits in the block are set to zero (as messages that have been set can no longer be cleared by the PLC). Normally, these bits are only set when the device is restarted and will not be changed.

Warning!
Locking of transmissions may have undesired effects when this is done in the wrong moment. Example: a set message can at first not be cleared after transmission is locked (if clearance behavior 4 is assumed) although the message bit in the PLC is logically set to 0! We recommend that you only use the transmission locking function only when you are sure that no undesired effects can occur!

Note!
- The messages used should be programmed contiguously, i.e. without gaps to increase the processing speed.
- Message blocks that are not required can be used for variables (except message block 0).

14 Activation of the PCS micro, mini and the PCS plus

14.10 Variables area

The variable range is between word W30 and maximum word W255. If this area is not sufficient, then the extension area can also be used (PCS 009, PCS 090: W23...W29 and PCS 095, PCS 095.1: W26...W29). This area is however intended for necessary modifications and therefore is to be used with care (PLC programming!).

If all messages are not required, then the words 15...22 can be used for the variables.

More detailed information about the various variable types can be found in the chapter "VARIABLES/TEXTS/MENUS".

Before the exchange of data, every variable set and actual value must be written in the corresponding words. After the data exchange only the set values must be read back from the respective words.

It is recommended to address variables of the same display page in packets! This also saves PLC cycle time.

The addressing order to the individual variables occurs by programming (PCSPRO) of PCS 090, PCS 095, PCS 095.1.

The variable formats STRING, CSTRING, BCD, BIN, WORD and ASCII use the words right aligned and ascending, e.g., BIN-2 on W30...W31 (W30 is HIGH word and W31 is LOW word). The format bit can be used on every individual bit (in order to use every 16 bit in a bit-by-bit manner, 16 bit variables have to be declared). One and the same word can be source and target for several variables even with different format. As a set value, it is recommended to only allot one variable format to a word. One or more actual value variables with differing formats can however at the same time be allocated to this word.

Leading and non used bits in the set values of the types STRING, CSTRING, BCD(0)-1 (length 1...3) and BCD(0)-2 (lengths 1...7) are ignored on reading and on writing back they are set at 0 in the PLC. The type bit only changes the currently addressed bit!

Set values should be occupied as far as possible corresponding to their permitted min-/max-values, before the new start, as they are required as a standard value on which to base the editing. If they are outside the min-/max area, then inverse displays will be presented in the display. As set values, they can first be relinquished after correction procedure.

With a 32 bit variable, the word with the lower number is the higher valued word, and the word with the higher number is the lower valued word.

Variables of the type BIT and CSTRING are written into the PLC immediately after their adjustment. All the others are written first after ENT or on leaving the variable range.

15 Printer (PCS 095, PCS 095.1, PCS 095.2 und PCS plus)

The PCS 095, PCS 095.1, PCS 095.2 and PCS plus series features a printer interface and supports a printer protocol. The printer parameters are selected using the setup software PCS*PRO* (version 2.1 and up).

15.1 Printer parameters

You define the printer parameters using the PCSPRO setup software. Some of these parameters are internal variables which are modifiable via a set value menu. An automatic initialization of the printer interface is performed if the PCS 095.1 encounters a change.

The following printer parameters (Zx) are internal variables:

ZA: printer timeout 1 .. 999 seconds. After this time, the programmable controller is informed about a non-operational printer. This is specially important for printers, e.g. the LCA 710 since this printer sets the RTS line to 0 during printing of a line. Specify a timeout time of 5 seconds for the LCA 750 printer.

ZB: Selection of the RS232/TTY interface.

ZC: handshake selection: NONE, XON/XOFF, RTS/CTS. With handshake set to NONE, the characters to be printed are sent without confirmation - the printer always signals „ready". With XON/XOFF, sending of the characters is only interrupted after receiving XOFF. With RTS/CTS handshaking, sending is only performed if the RTS line is set to 1 level.

ZD: printer output direction „UP" or „DOWN". Depending on the physical orientation of the printer you can select if the first or last line is transmitted to the printer first. For the LCA printers it is preferable to send the last line first. Thus „UP" has to be selected.

ZE: baudrate of the printer - selectable between 1200 and 19200 baud.

ZF: number of data bits of the printer - selectable are 7 or 8 data bits.

ZG: number of stop bits of the printer - selectable are 1 or 2 stop bits.

ZH: parity of the printer - selectable are NONE, EVEN, and ODD parity.

In the PCSPRO additional functions can be choosen:

- Printer init. After reset, communication failure to the PLC or after printer parameter changing 0 up to 8 characters where sended to the printer. Default adjustment is "OD, 0A", --> line feed
- Substitute characters for free definable display characters. It can be 8 characters free defined in the PCS display, but not printed. Therefore are for this 8 characters to define substitute characters. Select in the PCSPRO menu *Project - Printer parameter* and enter the HEX codes of the wanted characters in the fields 1-8.

Tip!
At PCS plus is only RS 232 operation possible!

15.2 Printer status

The programmable controller is informed about the status of the printer using bit 15 of DW7. Only with RTS/CTS handshaking, the „Ready" printer state is clearly defined. With XON/XOFF handshaking, „Busy" will only be signaled after receiving XOFF. Without handshaking „Ready" will always be signaled
A communications loss with the programmable controller will always result in aborting the printing.

15 Printer (PCS 095, PCS 095.1, PCS 095.2 and PCS plus)

15.3 Hardcopy

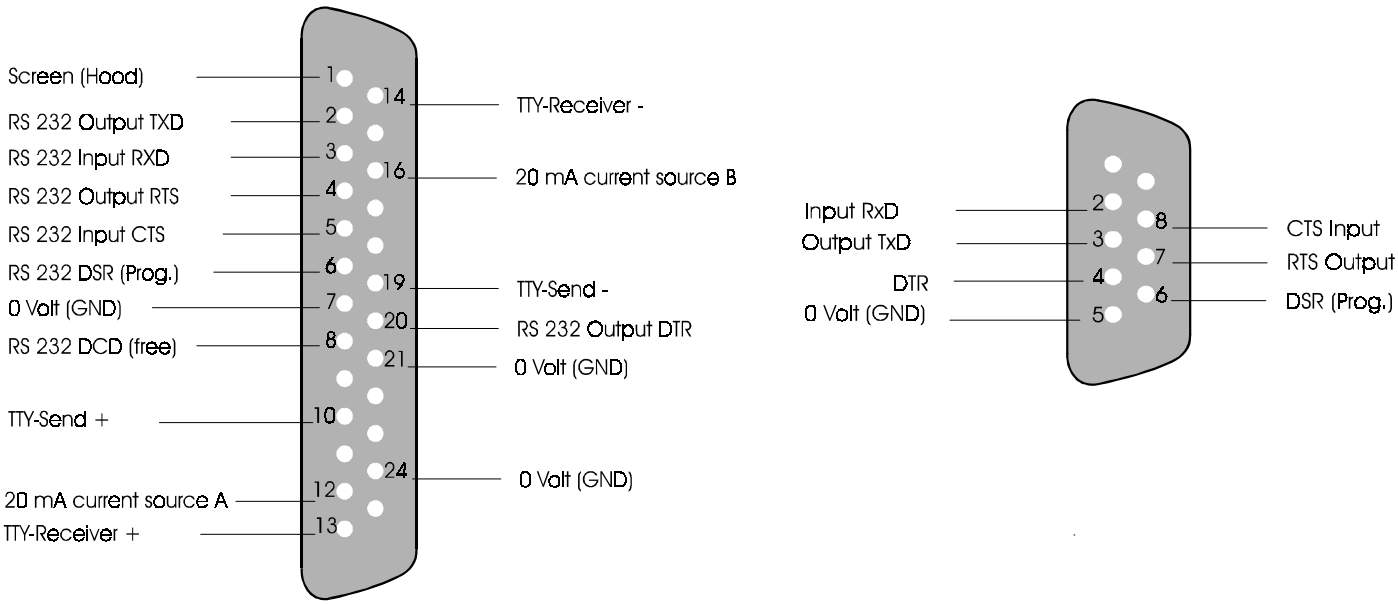
From the programmable controller you can initiate a printout of the current display contents via a hardcopy function. For this, the 0 -> 1 transition of bit 12 of DW 13 is monitored. The contents of the display is copied to the printer buffer and printing is started if the rising edge is detected. Bit 12 of DW 7 is set if the printout has been completed. This bit (12 of DW7) stays set until the requesting bit 12 of DW 13 is reset to 0.

15.4 Printing of messages

From the programmable controller you can initiate a printout of all marked messages. The message word area DW 15 .. 22 is checked for 0 -> 1 transitions if bit 13 of DW 13 is set to 1. The corresponding message(s) are marked for printing if one or more transitions are detected. A currently active printout is signaled via bit 13 (set to 1) of DW 7. All markings are deleted if bit 13 of DW 13 is set to 0. All lines of the messages are printed. The printing process as well as fetching the variables from the programmable controller is line orientated, i.e. the variables are inserted at the time the corresponding line will be printed.

15.5 Connector assignment RS 232/TTY

Connector assignment (rear view on the female connector)



Warning!
If external current loop sources are used, the maximum e.m.f. may not exceed 15V. Furthermore, real current sources with a maximum of 22 mA are required. Otherwise malfunctions may occur in the PCS and in the programmable controller!

16 Technical data

16.1 Datas PCS 009 and PCS 009plus

Dimensions:	front panel cut out: mouting depth without connector: external dimensions insertable foil:	131+1 mm x 199+1 mm 52 mm 147.2 mm x 215 mm 98 mm x 13.5 mm
Weight:	1000 g	
Operating voltage:	+24 V DC + 20% - 15%, protected against reversed polarity	
Current consumption:	lav = 250 mA at 24 volt	
Noise immunity:	see manufacturer information	
Protection class:	according to IEC 529,	rear: IP 20 front: IP 65 (in a built-in condition)
Humidity:	0...75% without condensing on the rear	
Vibration resistance:	3 g at 50 Hz in all directions, min 5 hrs 3 g at 100 Hz in all directions, min 1 hr	
Temperature:	storage: operation:	-25...+70°C 0...+50°C
Data storage:	Flash-EEPROM, min 10,000 write cycles	
Front foil:	polyester	
Keys:	mechanical with tactile feedback	
Display:	4 x 20 characters, 5 x 8 matrix, 5 mm character height	
Fuse:	PCS 009: PCS 009plus:	630 mA, small fuse, slow-blow, 1 spare fuse aA, slow-blow

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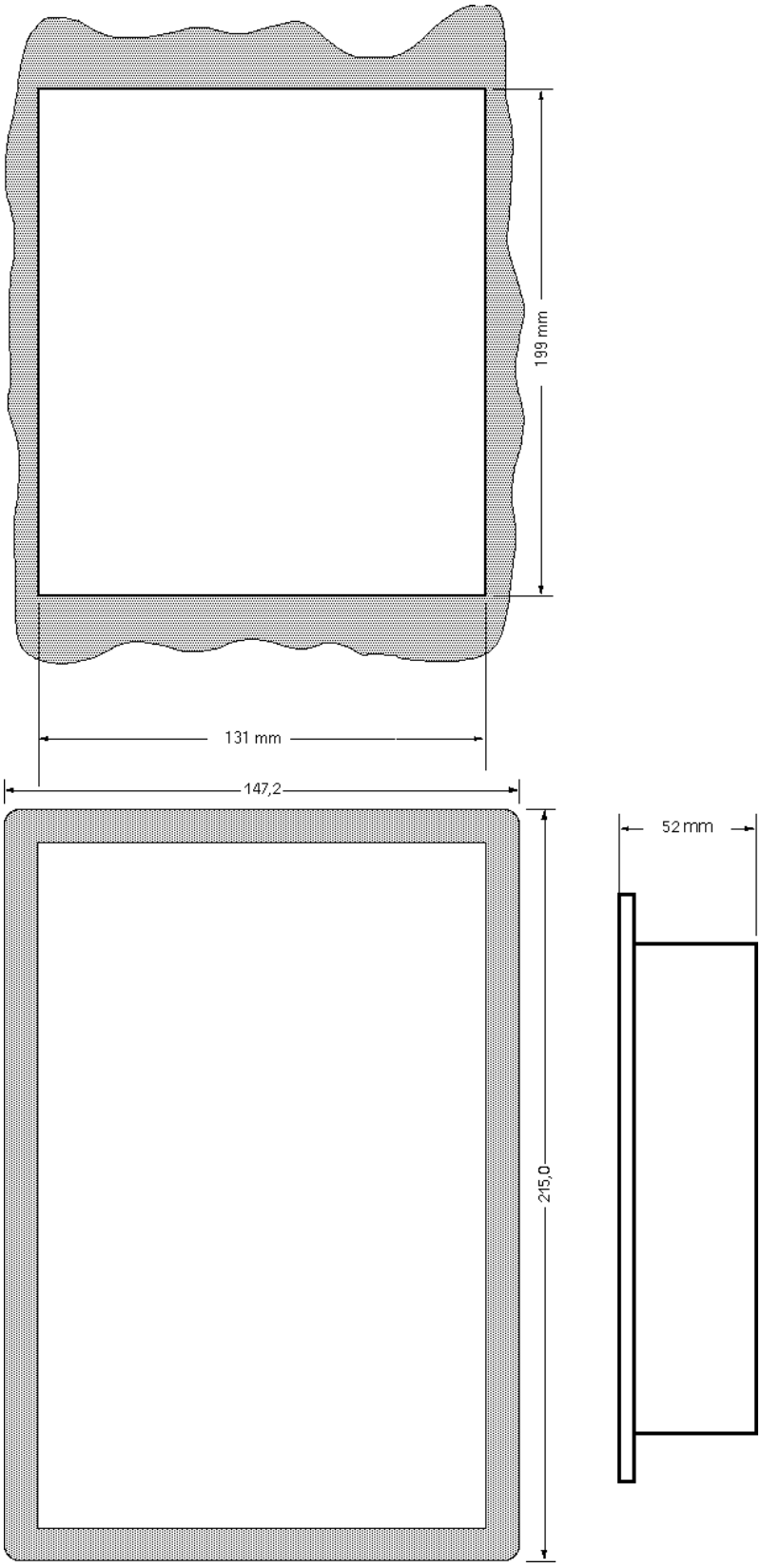
Measurement drawing PCS 009 and PCS 009plus



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16.2 Datas PCS 090 and PCS 090plus

Dimensions:	front panel cutout:	194+1 mm x 128+1 mm
	distances of the borings (4.5 mm):	horizontal 207 mm, vertical 90 mm
	mounting depth without connector:	50 mm
	external dimensions:	215 mm x 144 mm
	insertable foil:	186 mm x 14 mm
Weight:	1000 g	
Operating voltage:	+24 VDC ± 20%, protected against polarity reversal	
Current consumption:	Iav = 250 mA at 24V	
Noise immunity:	see manufacturer information	
Protection class:	according to IEC 529,	rear: IP 20 front: IP 65 (in a built-in condition)
Humidity:	0..75% without condensing on the rear	
Vibration resistance:	3g at 50Hz in all directions, min. 5 hrs	
		3g at 100Hz in all directions, min. 1 hr
Temperature:	storage:	-25..+70°C
	operation:	0..+50°C
Data storage:	Flash-EEPROM, min. 10,000 write cycles	
Front foil:	polyester	
Pushbuttons:	mechanical with tactile feedback	
Display:	2 x 40 characters, 5 x 8 matrix, 5 mm character height	
Fuse:	PCS 090:	400 mA, small fuse, slow-blow, 1 spare fuse
	PCS 090plus:	1A, slow-blow

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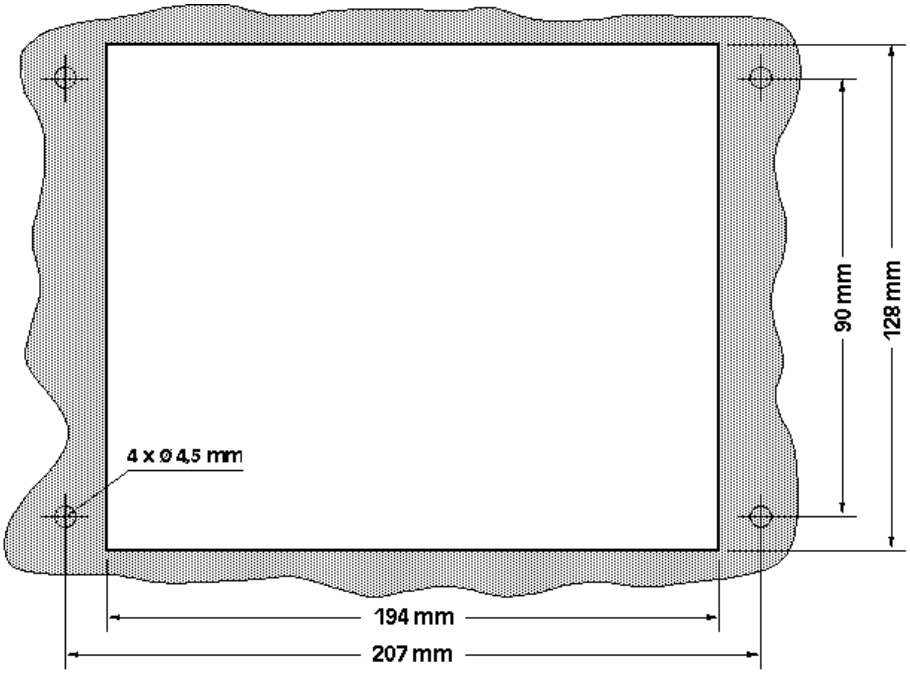
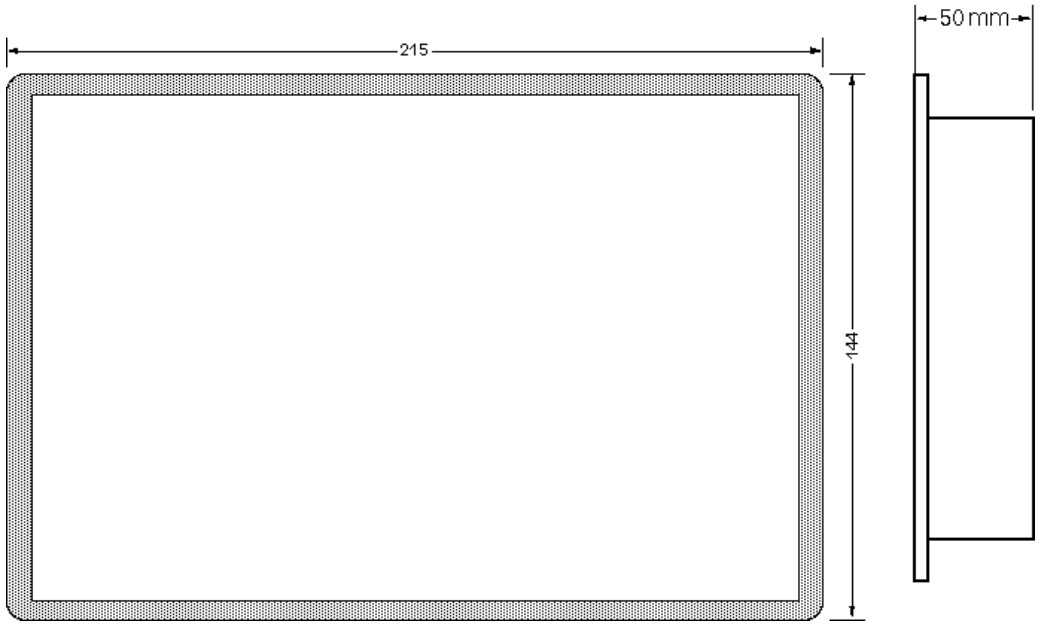
Measurement drawing PCS 090 and PCS 090plus



Tip!
At the PCS 090plus are no drillings necessary!



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16.3 Datas PCS 095, PCS 095.1, PCS 095.2 and PCS 095plus

Dimensions:	front panel cutout:	204+1 mm x 188+1 mm
	distances of the borings (4.5 mm):	horizontal 216 mm, vertical 128 mm
	mounting depth without connector:	50 mm
	external dimensions:	224 mm x 202 mm
	insertable foil:	192 mm x 26 mm
Weight:	1480 g	
Operating voltage:	+24 VDC ± 20%, protected against polarity reversal	
Current consumption:	Iav = 400 mA at 24V	
Noise immunity:	see manufacturer information	
Protection class:	according to IEC 529,	rear: IP 20 front: IP 65 (in built-in condition)
Humidity:	0..75% without condensing on the rear	
Vibration resistance:	3g at 50Hz in all directions, min. 5 hrs 3g at 100Hz in all directions, min. 1 hr	
Temperature:	storage:	-25..+70°C
	operation:	0..+50°C
Data storage:	Flash-EEPROM, min. 10,000 write cycles	
Front foil:	polyester	
Pushbuttons:	mechanical with tactile tfeedback	
Display:	4 x 40 characters, 5 x 8 matrix, 5 mm character height	
Fuse:	PCS 095:	1 AT, small fuse, slow-blow, 1 spare fuse
	PCS 095plus:	1A, slow-blow, no spare fuse

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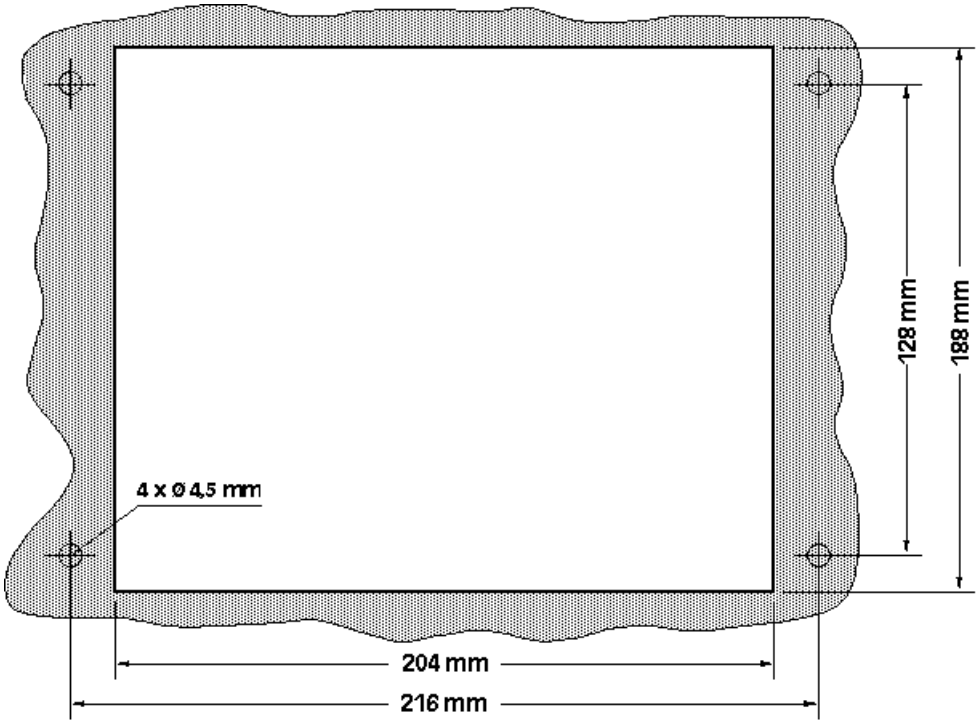
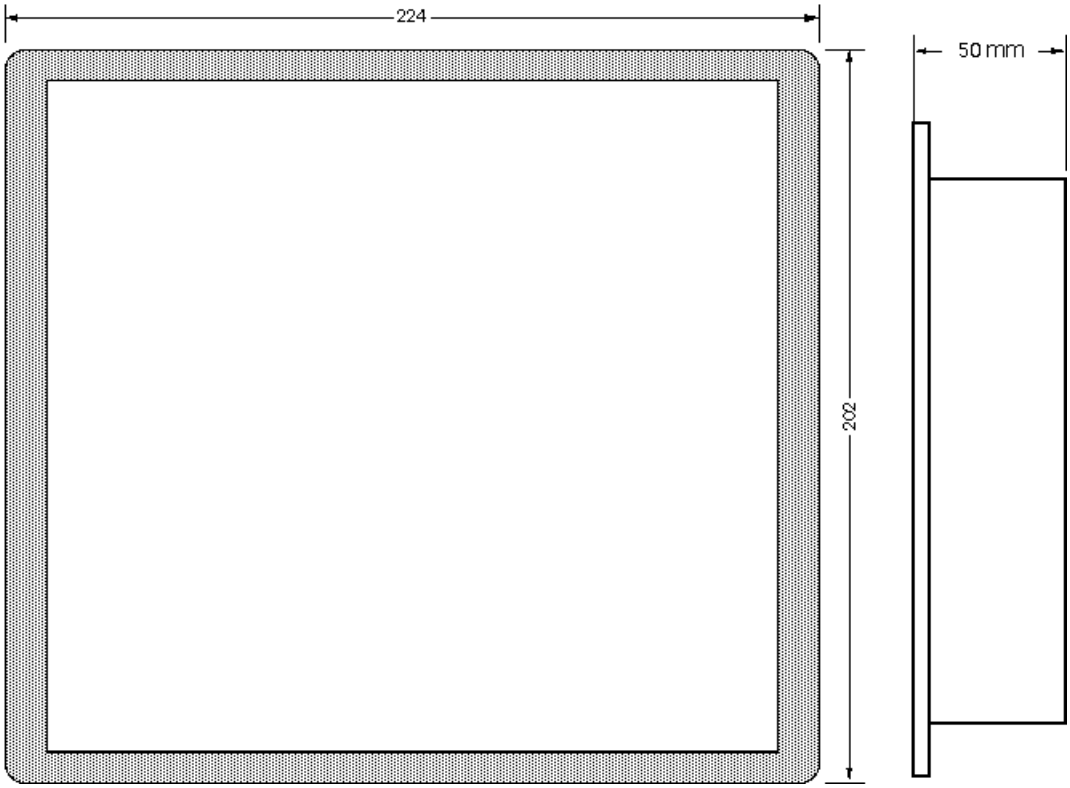
Measurement drawing PCS 095, PCS 095.1, PCS 095.2 and PCS 095plus



Tip!
At the PCS 095plus are no drillings necessary!



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16.4 Memory organization

A Flash-EEPROM (electrical erasable static memory) with 32 KB is available in the PCS 009, PCS 090, PCS 095, PCS 095.1 for storing the program (data record), the driver, and other possible functions. Initially a detailed memory map of the required storage space is not available since the occupation depends on the driver (different memory requirements), the possibly used functions, and the number of used variables, texts, and menus. An exceeding of the available memory is already noticed by the comfortable programming software PCS*PRO*. Therefore, you can react well in time.

The following applies for the setting up of texts, menus and variables:

- The texts for communication errors are partly in the EPROM programme and in the driver. They cannot be amended. They are set up in the version G in the English language note from.
- The total amount of lines cannot be given, as the texts are filed in a compressed form and the memory for texts, menu nodes and variable inscriptions are dynamic.
- Similar variable inscriptions (character strings) as well as different variables are simply filed. If storage space is limited, then by using similar inscriptions instead of texts space will be saved.
- Every variable occupies 7 bytes in the head, in the trailer, numerous variables require between 6 and 22 bytes. BIT-, STRING- and CSTRING- need 2 bytes per inscription.
- 3 further bytes are necessary per text line (in addition to those for the text itself).
- Every created menu node occupies 8 bytes.

Memory organization at PCS plus:
The available memory sizes dependent on the number of the projected data sets.

	Memory for data sets	Memory for separate recipes	Memory for common recipes
PCS 009	1 with 32 kByte	-	-
PCS 090	1 with 32 kByte	-	-
PCS 095	1 with 32 kByte	-	-
PCS 095.1	4 with per 32 kByte	-	-
PCS 095.2	4 with per 32 kByte	-	-
PCS 009plus	2 with per 32 kByte 1 with 64 kByte	2 with per 4 kByte 1 with 8 kByte	8 kByte
PCS 090plus	2 with per 32 kByte 1 with 64 kByte	2 with per 4 kByte 1 with 8 kByte	8 kByte
PCS 095plus	6 with per 32 kByte 3 with 64 kByte	6 with 4 kByte 3 with per 10 kByte	32 kByte

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16.5 Programming cable PCS 733

You require the following cable for the transfer of the program, i.e., of the data record (driver, functions, variables, texts and menus). In addition this cable can be used for the simulation of the PLC to the PC.

Connection PC/PG - PCS 009, PCS 090, PCS 095, PCS 095.1:

PCS	Female connector 25 pin	PIN	Cable PCS 733	Male connector	PC 25 pin	PC 9 pin
	DSR	6		DTR	20	4
	RTS	4		CTS	5	8
	CTS	5		RTS	4	7
	TXD	2		RXD	3	2
	RXD	3		TXD	2	3
	GND	7		GND	7	5
	Screen	1 Hood		1 Hood	Screen	

16.6 Maintenance

The PCS 009, PCS 090, PCS 095, PCS 095.1 do not require any regular maintenance.

Warning!
Static charge of the front panel is possible. Clean only with a moist cloth.

This is especially important, when using the PCS 009, PCS 090, PCS 095, and PCS 095.1 in an Ex area.

Warning!
The LCD display contains poisonous substances. Do not touch the display, if it is damaged.

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16.7 Using the PCS in an Ex area

Warning!
The PCS can be pre-setup for use in Ex area 1 or 2. Depending on the application, the device must be installed according to VDE 0165 or VDE 170/171. For installation in an encapsulated enclosure with pressure protection - including test certifications which may be required - Systeme Lauer offers cooperating companies on request..

This must be specified when ordering the device. A subsequent release or certified declaration by the manufacturer is not possible. The devices can be pre-setup for use in Ex area 1 or 2.

An overpressure encapsulation with a low-pressure system is available. This means that a difference in atmospheric pressure of 2-4mbar exists between the interior space and the outside of the front. Higher pressures may cause damages to the display.

For use of the devices in Ex area 2, please refer to the specifications of the manufacturer and an explanatory memorandum published by Systeme Lauer. The specifications of the manufacturer may be used as basic documentation for the certification of the device in Ex area 2.

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