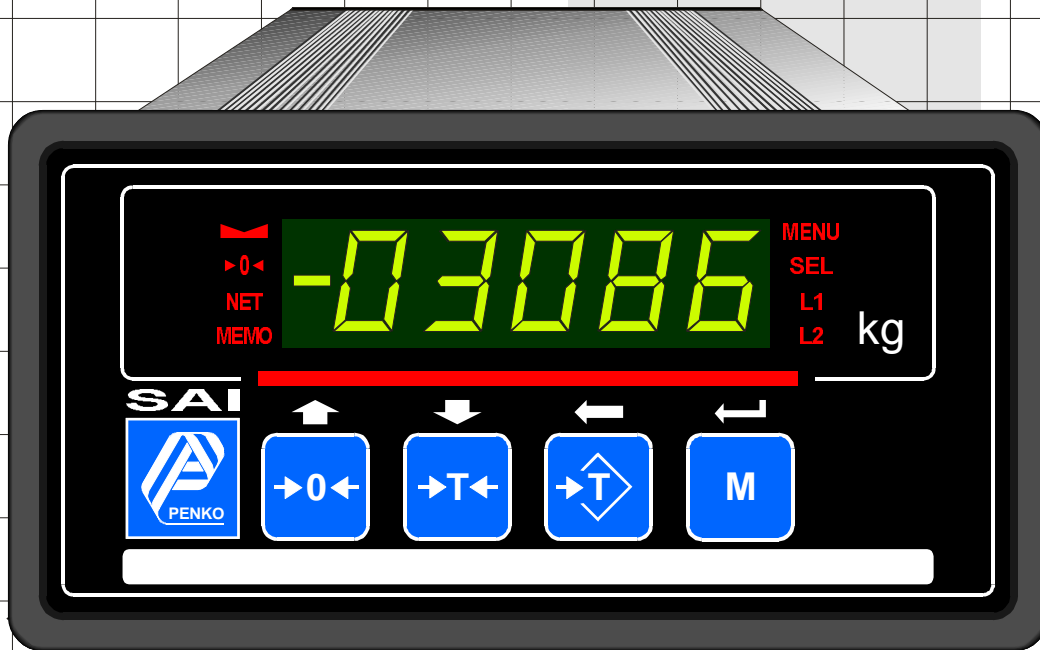




Manual



Weigh Indicator type SAI

Weigh Indicator type SAI

ESSENTIAL INSTRUCTIONS

READ THIS PAGE BEFORE PROCEEDING!

Penko Engineering, manufactures, and tests its products to meet many national and international standards. Because these instruments are sophisticated technical products, you must properly install, use, and maintain them to ensure they continue to operate within their normal specifications. The following instructions must be adhered to and integrated into your safety program when installing, using, and maintaining Penko products. Failure to follow the proper instructions may cause any of the following situations to occur: Loss of life; personal injury; property damage; damage to this instrument; and warranty invalidation.

- Read all instructions prior to installing, operating, and servicing the product. If this Instruction Manual is not the correct manual, telephone +31-318-525630 and the requested manual will be provided. Save this Instruction Manual for future use.
- If you do not understand any of the instructions, contact your Penko representative for clarification.
- Follow all warnings, cautions, and instructions marked on and supplied with the product.
- Inform and educate your personnel in the proper installation, operation, and maintenance of the product.
- Install your equipment as specified in the installation instructions of the appropriate Instruction Manual and per applicable local and national codes. Connect all products to the proper electrical sources.
- To ensure proper performance, use qualified personnel to install, operate, update, program, and maintain the product.
- When replacement parts are required, ensure that qualified people use replacement parts specified by Penko. Unauthorized parts and procedures can affect the product's performance and place the safe operation of your process at risk. Look alike substitutions may result in fire, electrical hazards, or improper operation.
- Ensure that all equipment doors are closed and protective covers are in place, except when maintenance is being performed by qualified persons, to prevent electrical shock and personal injury.

WARNING

ELECTRICAL SHOCK HAZARD

Making cable connections to and servicing this instrument require access to shock hazard level voltages which can cause death or serious injury.

Relay contacts made to separate power sources must be disconnected before servicing.

Electrical installation must be in accordance with the CE directions and/or any other applicable national or local codes.

Unused cable conduit entries must be securely sealed by non-flammable closures to provide enclosure integrity in compliance with personal safety and environmental protection requirements.

For safety and proper performance this instrument must be connected to a properly grounded three wire power source.

Proper relay use and configuration is the responsibility of the user.

Do not operate this instrument without front cover secured. Refer installation, operation and servicing to qualified personnel.

Penko Engineering b.v.

Wageningse laan 52-54

3903LA Veenendaal

The Netherlands

Tel ++(0)318-525630

Fax ++ (0)318-529715

e-mail: info@penko.com

web-site: www.penko.com

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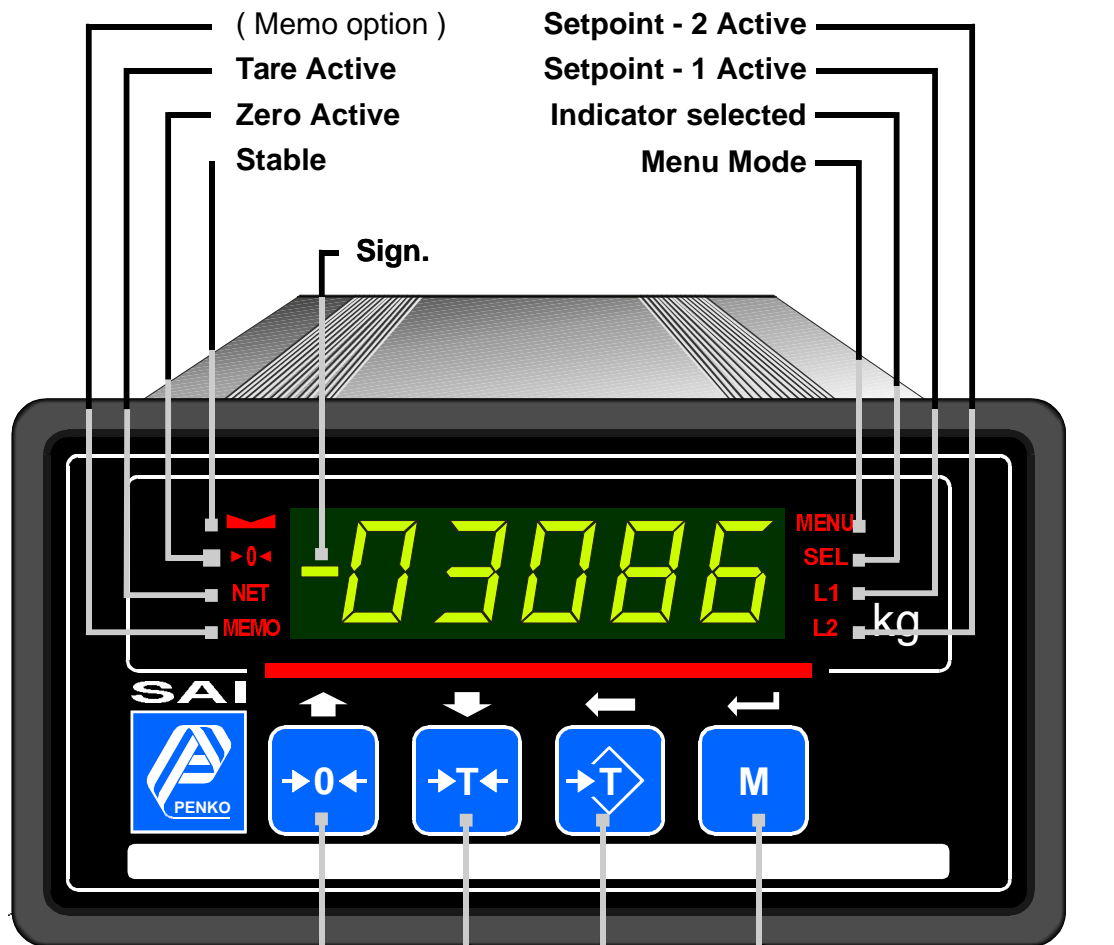
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Appendix-A: PC-protocol description
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- **CREATE A NEW ZERO LEVEL.**
Press < 3 seconds. Zero LED on.
REVERT TO THE SYSTEM ZERO.
Press > 3 seconds. Zero LED off.
- **TARE ON OR OFF.**
Tare active LED on or off.
- **SET NEW PRESET TARE VALUE.**
- **ENTER SETPOINT VALUES.**
Press < 3 seconds. and then press the "preset tare value-key".
<SP--1> & <SP--2>.
- **CALIBRATE the 0/4-20 mA or the 0-10 V.**
Press > 3 seconds.
"Start value"<dAC 00> "End value"<dAC 10>.

WIRING CONNECTIONS FOR SAI AC-VERSION IN ALU-MOUNTING.

DIPSWITCH SETTINGS S2.

1,2,3 & 4 closed - Line termination for RS 422.
 1,2,3 & 4 open - No line termination for RS422.

RS422 is optional hardware.

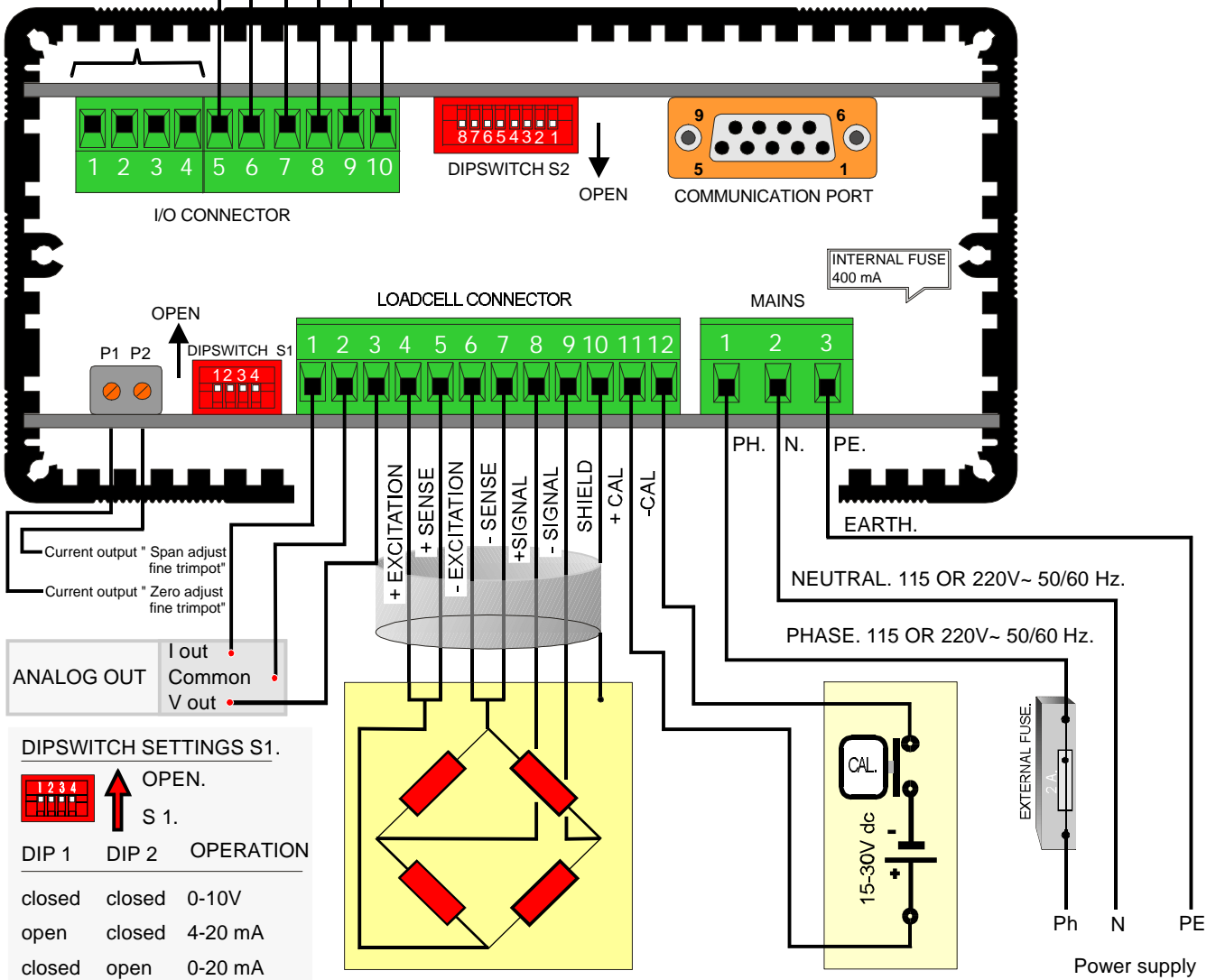
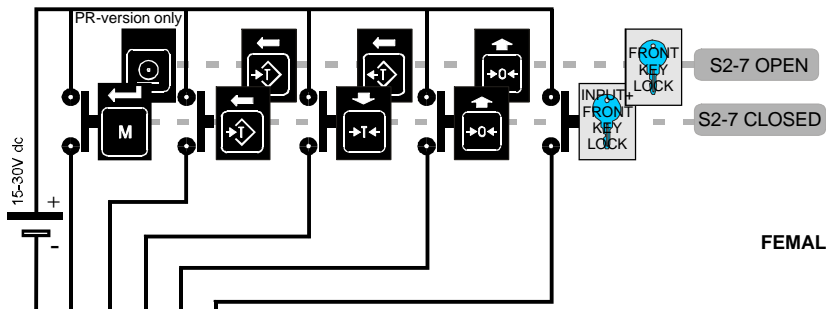
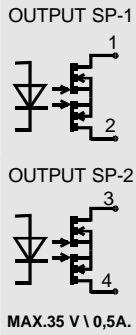
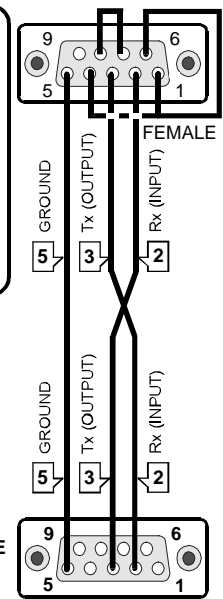
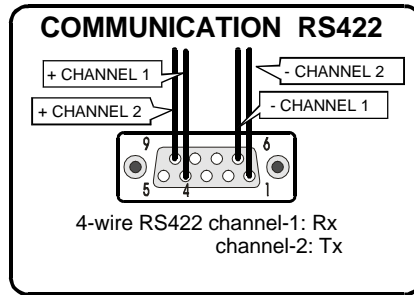
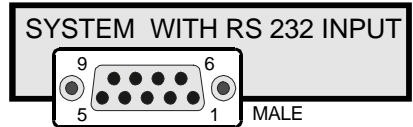
Don't close 1,2,3 & 4 in use with Rs232.

7 closed- input function equal to front keys.

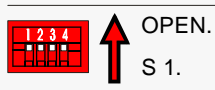
7 open- input function with front key lock and modified tare.

8 closed- normal active mode.

8 open- configuration\ADC mode active.



DIPSWITCH SETTINGS S1.



DIP 1	DIP 2	OPERATION
closed	closed	0-10V
open	closed	4-20 mA
closed	open	0-20 mA
open	open	0-24 mA



WIRING CONNECTIONS FOR SAI DC-VERSION IN ALU-MOUNTING.

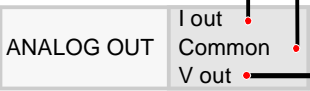
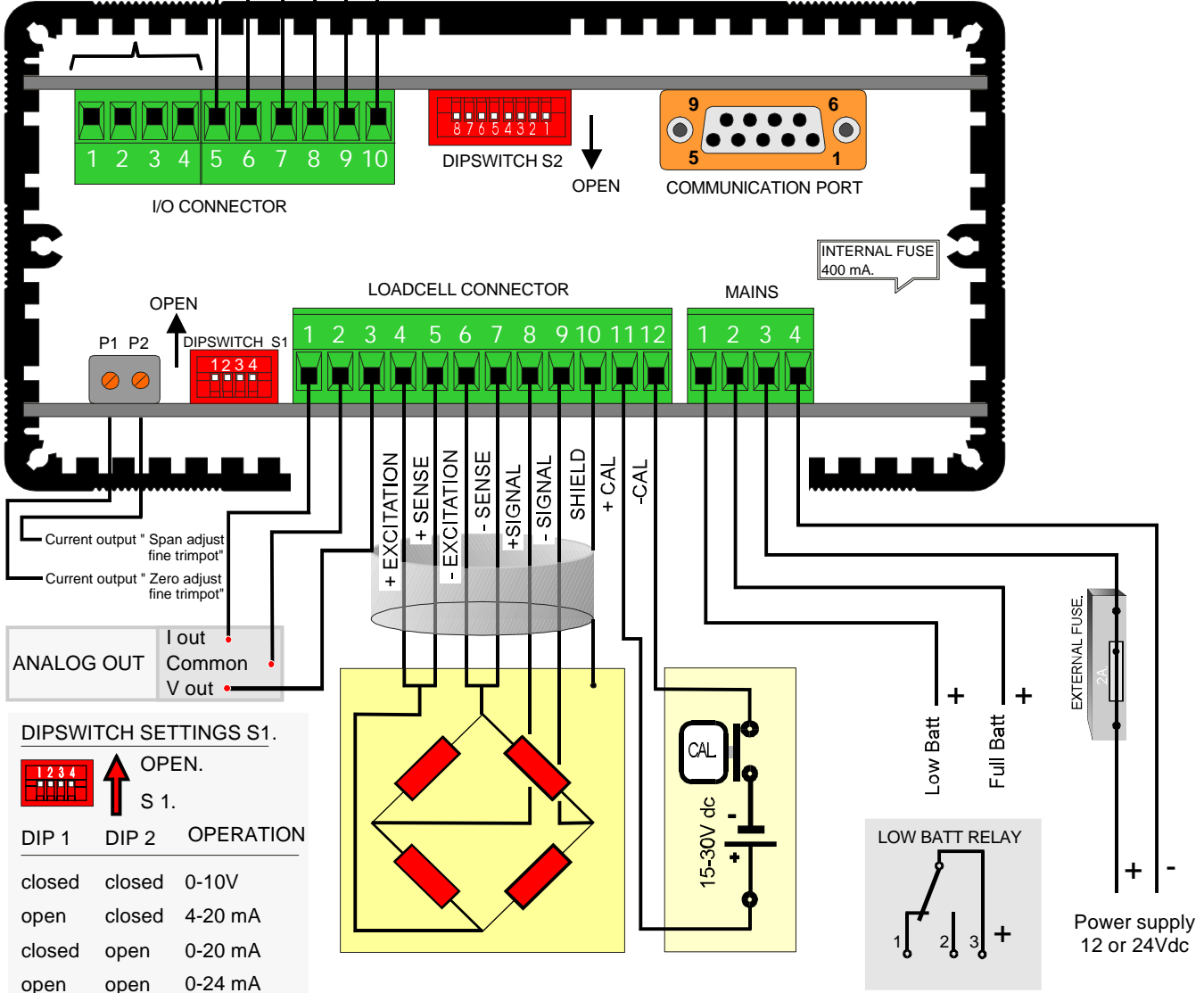
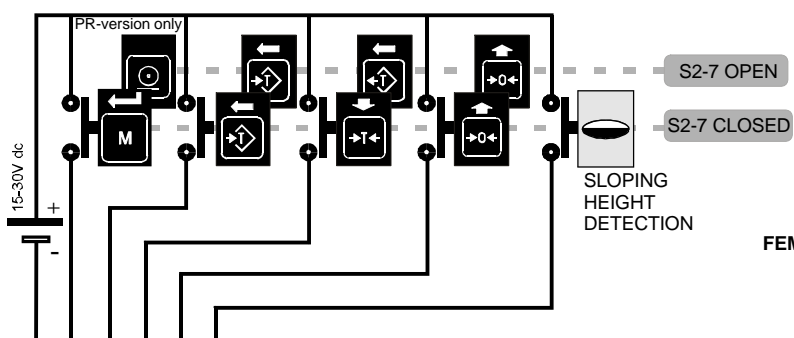
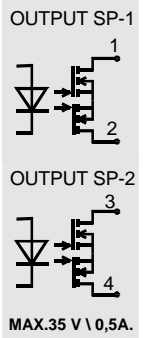
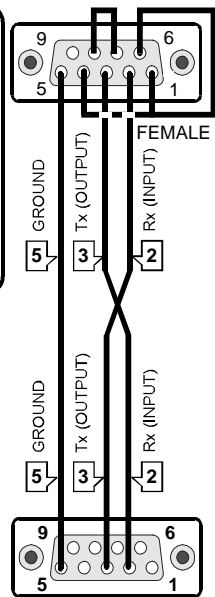
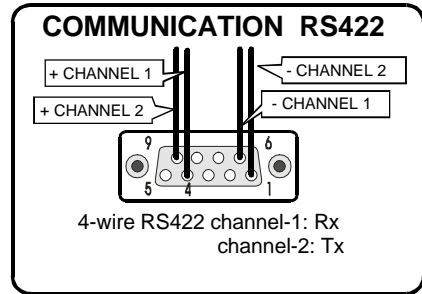
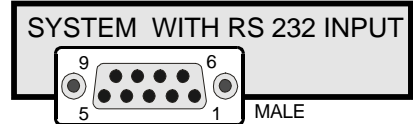
DIPSWITCH SETTINGS S2.

1,2,3 & 4 closed - Line termination for RS 422.
 1,2,3 & 4 open - No line termination for RS422.

RS422 is optional hardware.

Don't close 1,2,3 & 4 in use with Rs232.

7 closed- input function equal to front keys.
 7 open- input function with front key lock and modified tare.
 8 closed- normal active mode.
 8 open- configuration\ADC mode active.



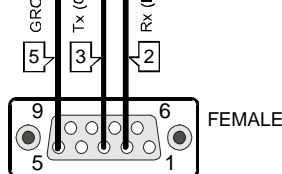
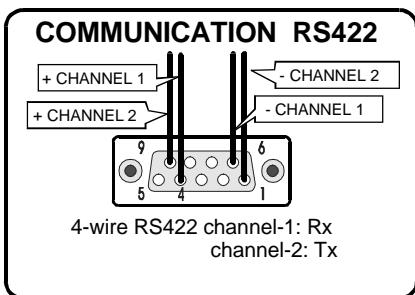
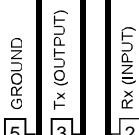
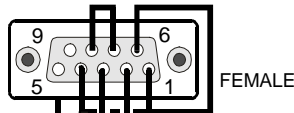
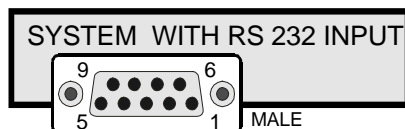
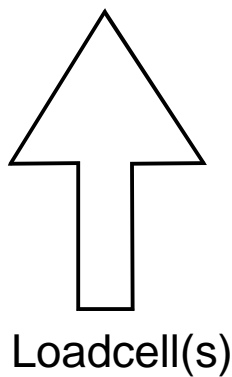
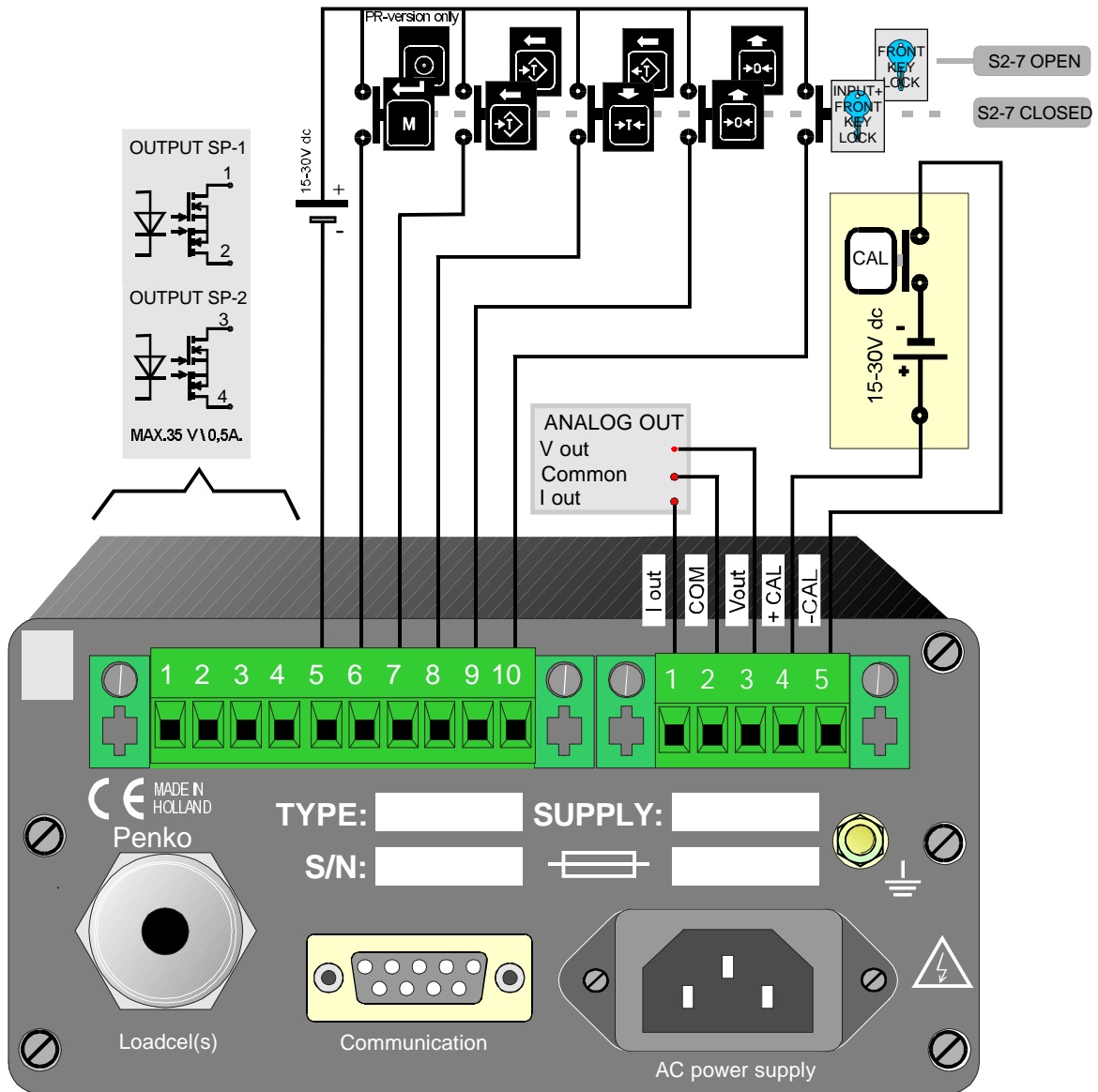
DIPSWITCH SETTINGS S1.



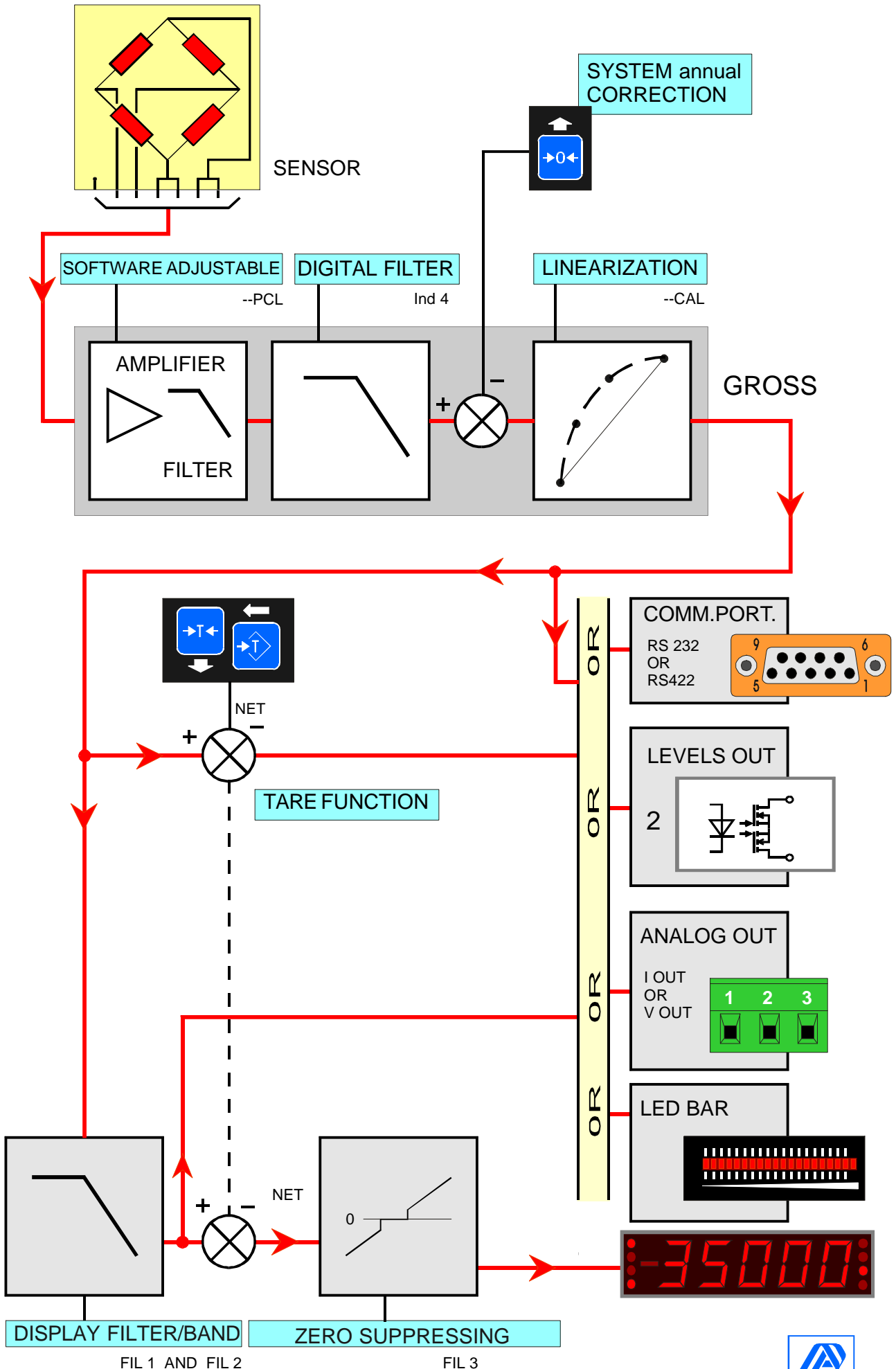
DIP 1	DIP 2	OPERATION
closed	closed	0-10V
open	closed	4-20 mA
closed	open	0-20 mA
open	open	0-24 mA



WIRING CONNECTIONS FOR SAI AC-VERSION WITH SEALKIT



SAI: SIMPLIFIED BASIC BLOCK DIAGRAM.



ROOM FOR YOUR SETTINGS

FACTORY PRESETTINGS

DESCRIPTION	DISPLAY	SETTING (F)	SETTING
The maximum display value	< Ind 1 >	2009	.....
No motion band	< Ind 2 >	3	.....
Zero tracking band	< Ind 3 >	3	.....
Digital overall filter	< Ind 4 >	3	.....
Display step size	< Ind 5 >	1	.....
Decimal point position	< Ind 6 >	none	.....
Display refreshment speed	< Ind 7 >	3	.....
Industrial or Certified	< Ind 8 >	1	.....
Sampling rate	< Ind 9 >	7	.....
Stabilisation time	< Ind A >	5	.....
Display filter band	< FIL 1 >	4	.....
Display filterfactor	< FIL 2 >	1	.....
Zero suppressing	< FIL 3 >	2	.....
Mode setpoint 1.	< Fun 1 >	1	.....
Mode setpoint 2.	< Fun 2 >	1	.....
Action Setpoint 1.	< ACn 1 >	2	.....
Action Setpoint 2.	< ACn 2 >	+2	.....
Analog output function	< daC 4 >	1	.....
Set zero value analog output	< daC 5 >	0	.....
Set end value analog output	< daC 6 >	2000	.....
Indicator number.	< Chn 1 >	0	.....
Transmit value mode.	< Chn 2 >	1	.....
Baudrate	< --bdr >	1	.....
Ledbar measuring channel.	< bAr 1 >	0	.....
Minimum value ledbar.	< bAr 2 >	0	.....
Maximum value ledbar.	< bAr 3 >	2000	.....
Ledbar displaying: dot or bar.	< bAr 4 >	1	.....
Value setpoint 1	< SP 1 >	500	.....
Value setpoint 2	< SP 2 >	2000	.....

INDICATION OF CALIBRATION POINTS.



SEGMENT 1
INCLUDING CALIBRATION POINT 1



SEGMENT 4
INCLUDING CALIBRATION POINT 4



SEGMENT 2
INCLUDING CALIBRATION POINT 2



CALIBRATION POINT " 5 ". All cal-points
in use. Recalibr. 1 out of 4, or delete first
1 out of 4.



SEGMENT 3
INCLUDING CALIBRATION POINT 3



FIRST USE OF THE INDICATOR: SAI

Use this service code method to enter the setup menu. Press at the keys within 7 seconds after each other, in the right order.



Enter the setup menu

Set Ind5 for the display step size



DISPLAY STEP SIZE.

Choose between 1-8. Press at the UP or DOWN key to select.
1= /1 2=/2 3=/5 4=/10 5=/20 6=/50 7=/100 8=/100.
Confirm the choose value with ENTER.

Change Ind1 to set the maximum nett weight value



MAXIMUM DISPLAY VALUE.

Range: 0 - full display. Change the value and confirm with ENTER.
The display shows "=====" above this value.

Delete previous calibration points



DELETE CALIBRATION POINTS.

Delete all previous made calibration points with CAL3. First choose a calibration point with UP or DOWN. Press the LEFT-key >3 seconds and the chosen point will be deleted.

Calibrating the Zero point (Cp1)



CALIBRATING OF THE INDICATOR.

When all calibration points are deleted the indicator shows Cp1. Be sure the weigher is unloaded, then press the ENTER key. The indicator now shows Cp2. Enter the reference value as Cp2, load the weigher with this reference value and press ENTER. Exit the setup menu with Enter. Now it's a weighing indicator. Further you can set all other parameters like filtering, communication etc.

Calibrating a gain point (CP2)

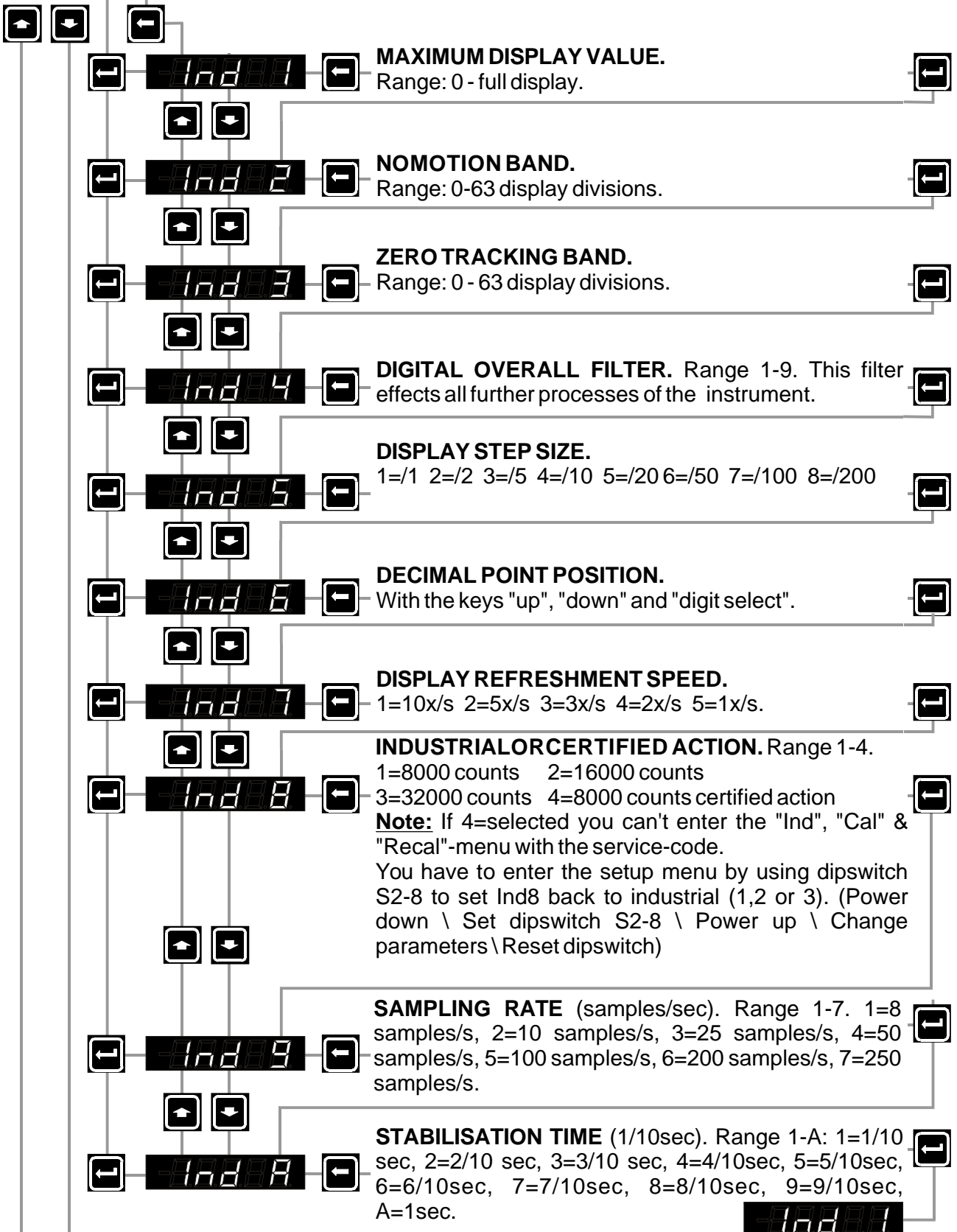
ENTERING THE SETUP MENU.

Use this service code method to enter the setup menu. Press the buttons within 7 seconds after each other, in the right order.



--Ind

SET THE INDICATOR PARAMETERS

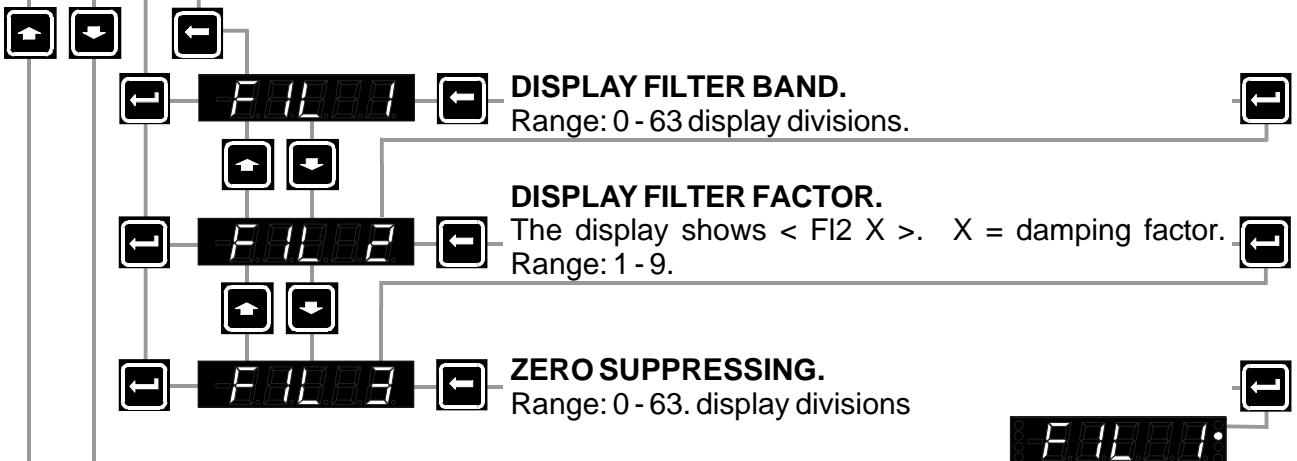


--FIL

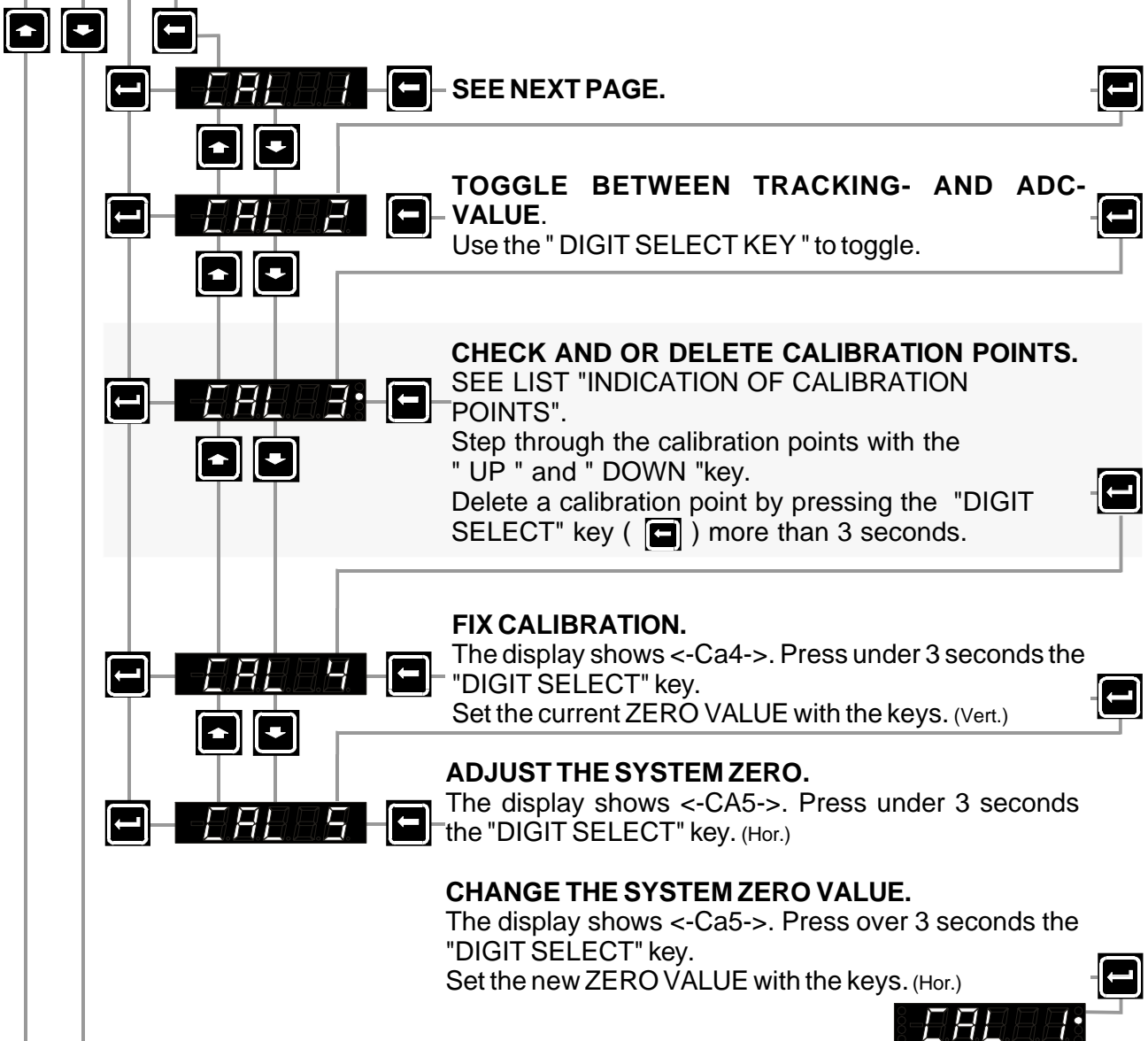
FILTER SETTINGS: SEE NEXT PAGE.



DISPLAY FILTER SETTINGS



CALIBRATION FACILITIES.



SETPOINT ACTION & HYSTERESIS VALUE.

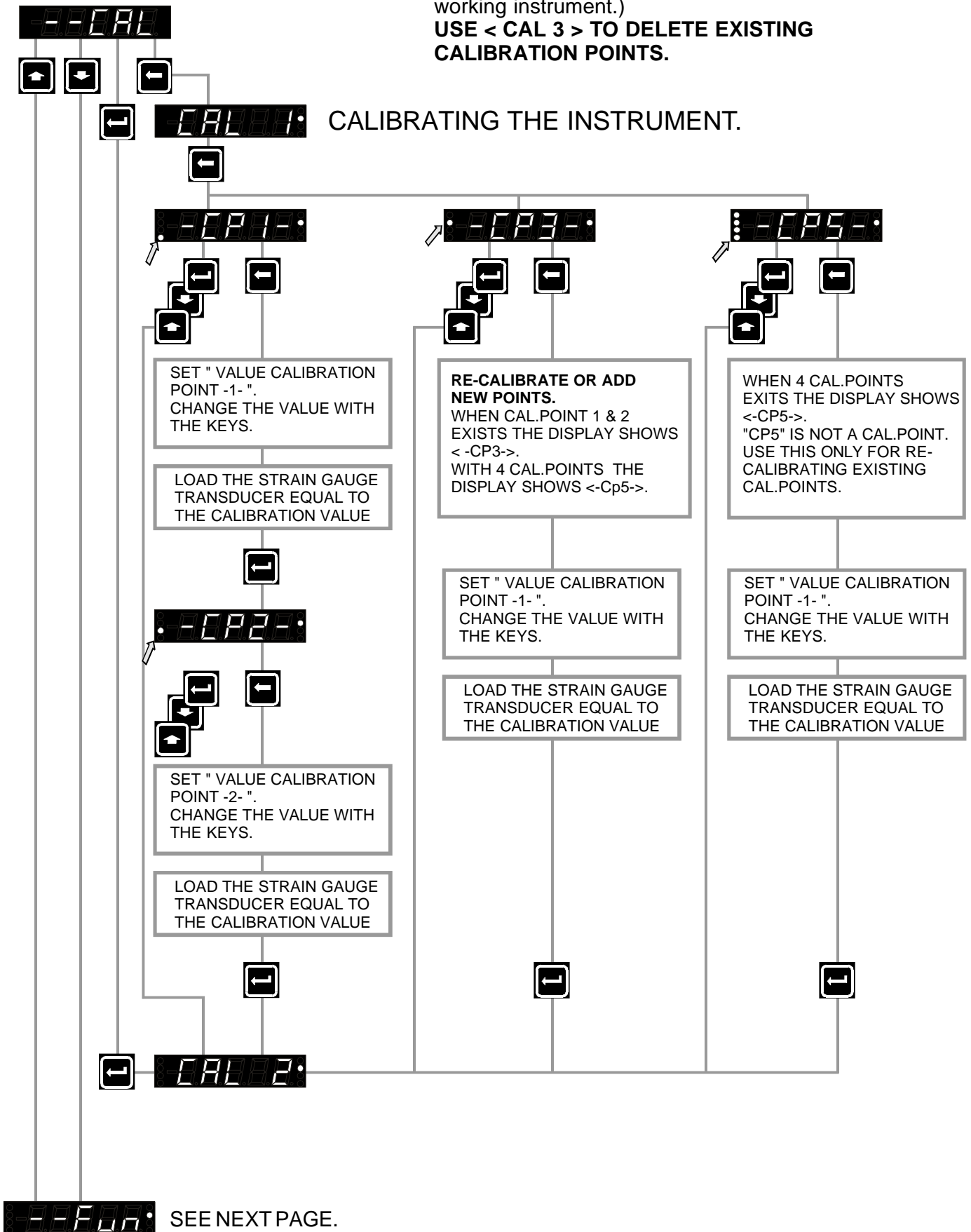
See page 1-4

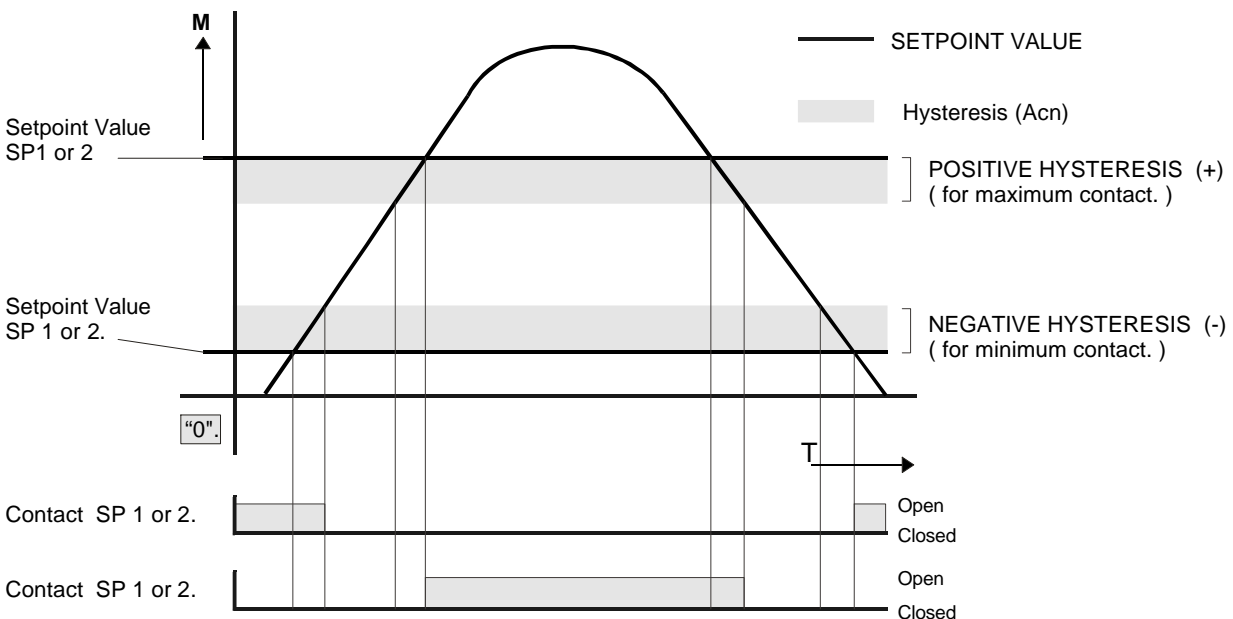
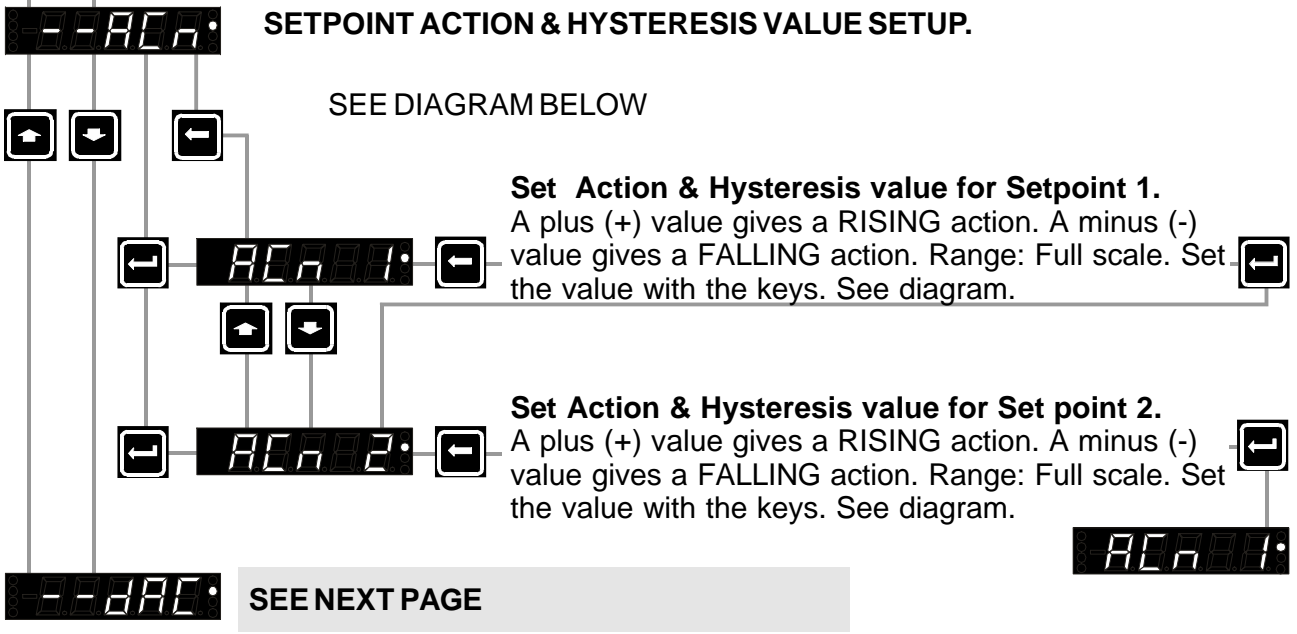
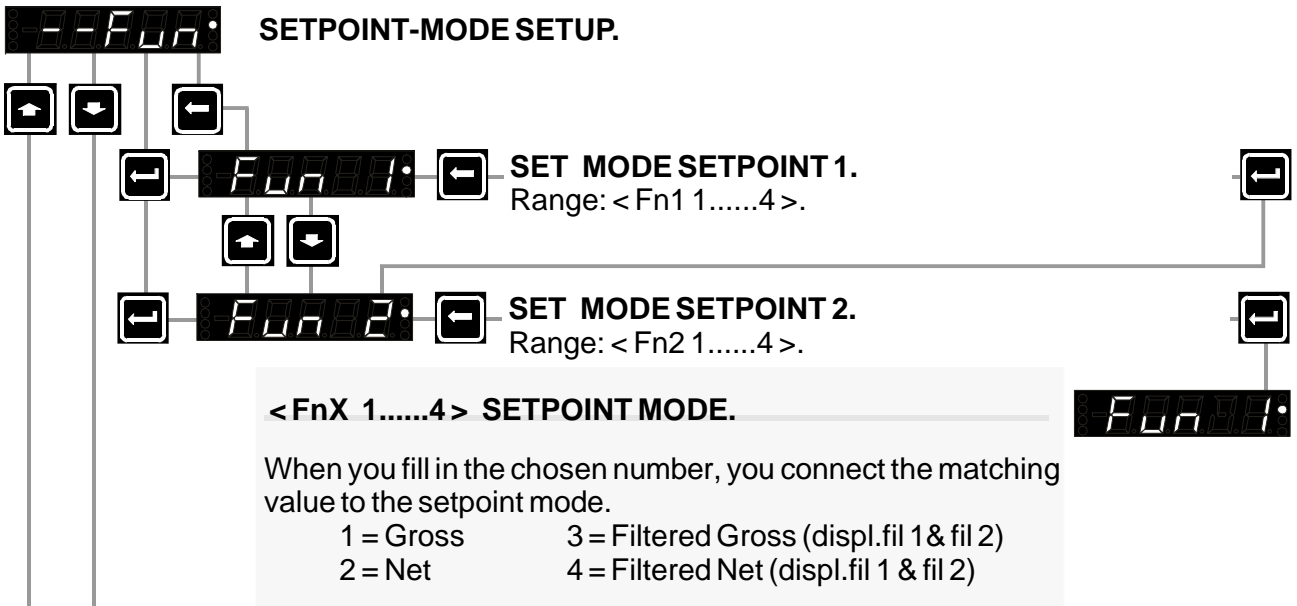
CALIBRATION FACILITIES

DELETE THE EXISTING CALIBRATION POINTS FIRST.

(Set by the factory, so it was already a working instrument.)

USE < CAL 3 > TO DELETE EXISTING CALIBRATION POINTS.

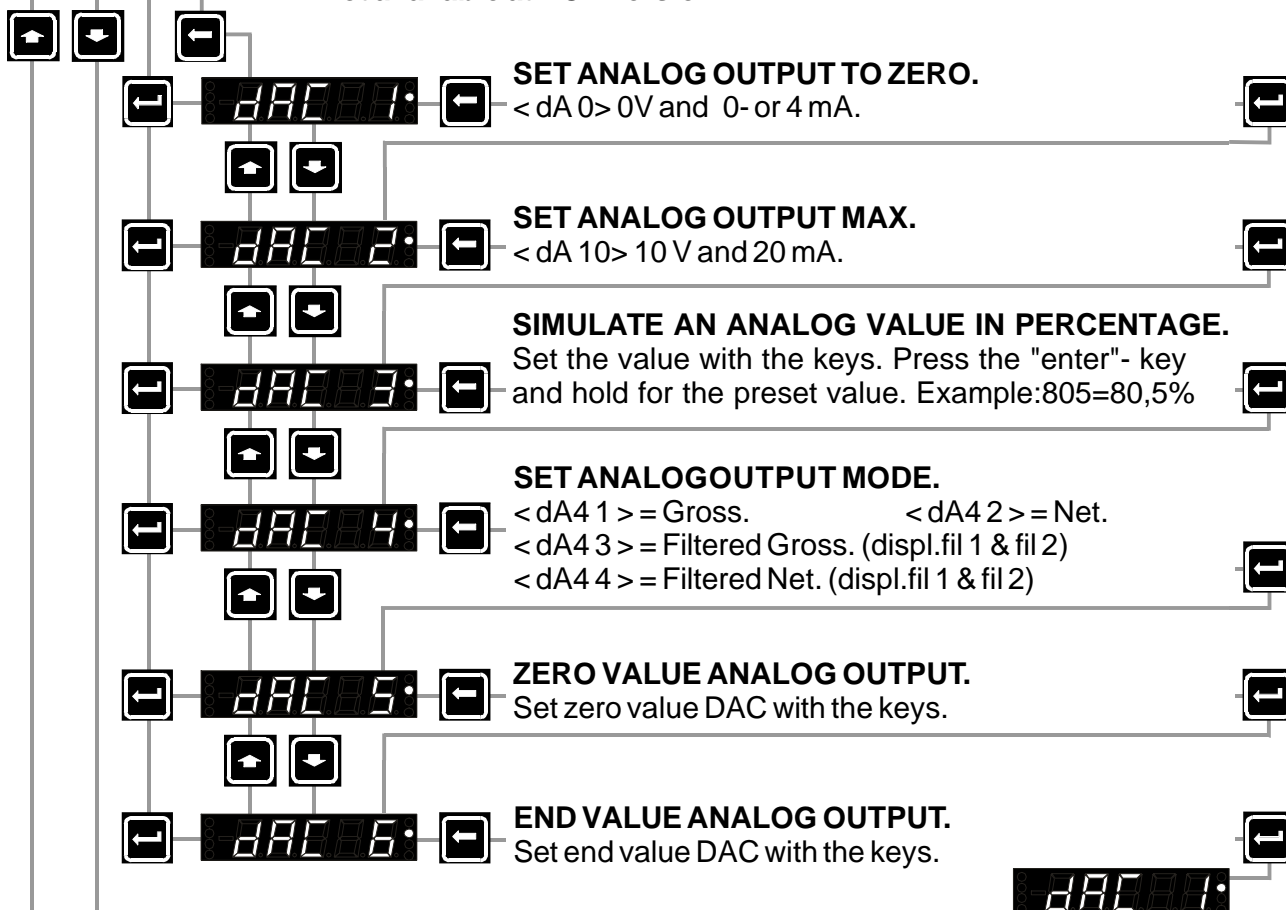




--DAC

THE 0-10V AND 0/4-20mA OUTPUTS.

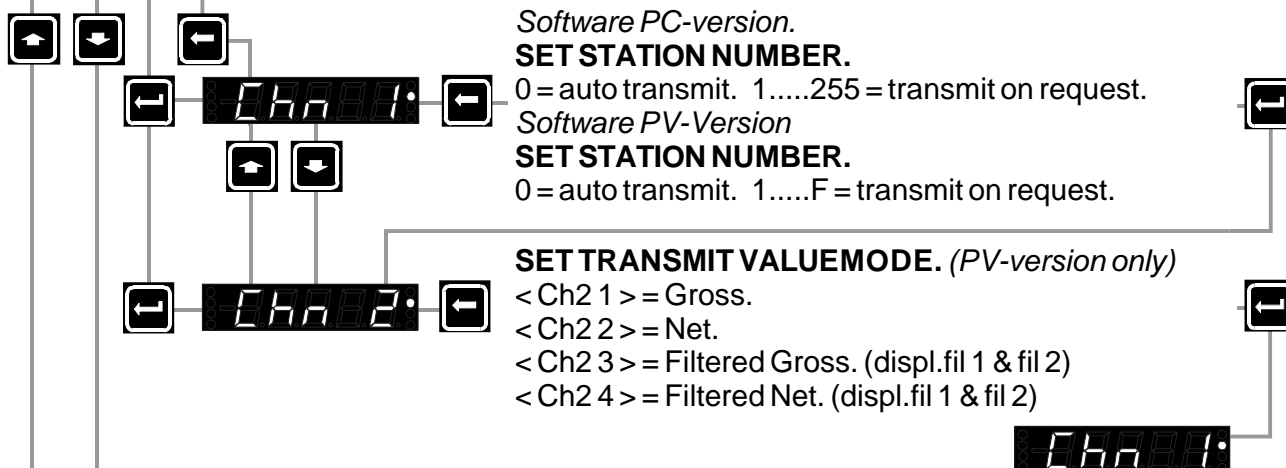
Not available at BCD version.



SET THE INDICATOR CHANNEL IDENTIFICATION.

Note: It's not possible to change the metro logic properties with the communication port. Not available at BCD-version.

--Chan



--bdr

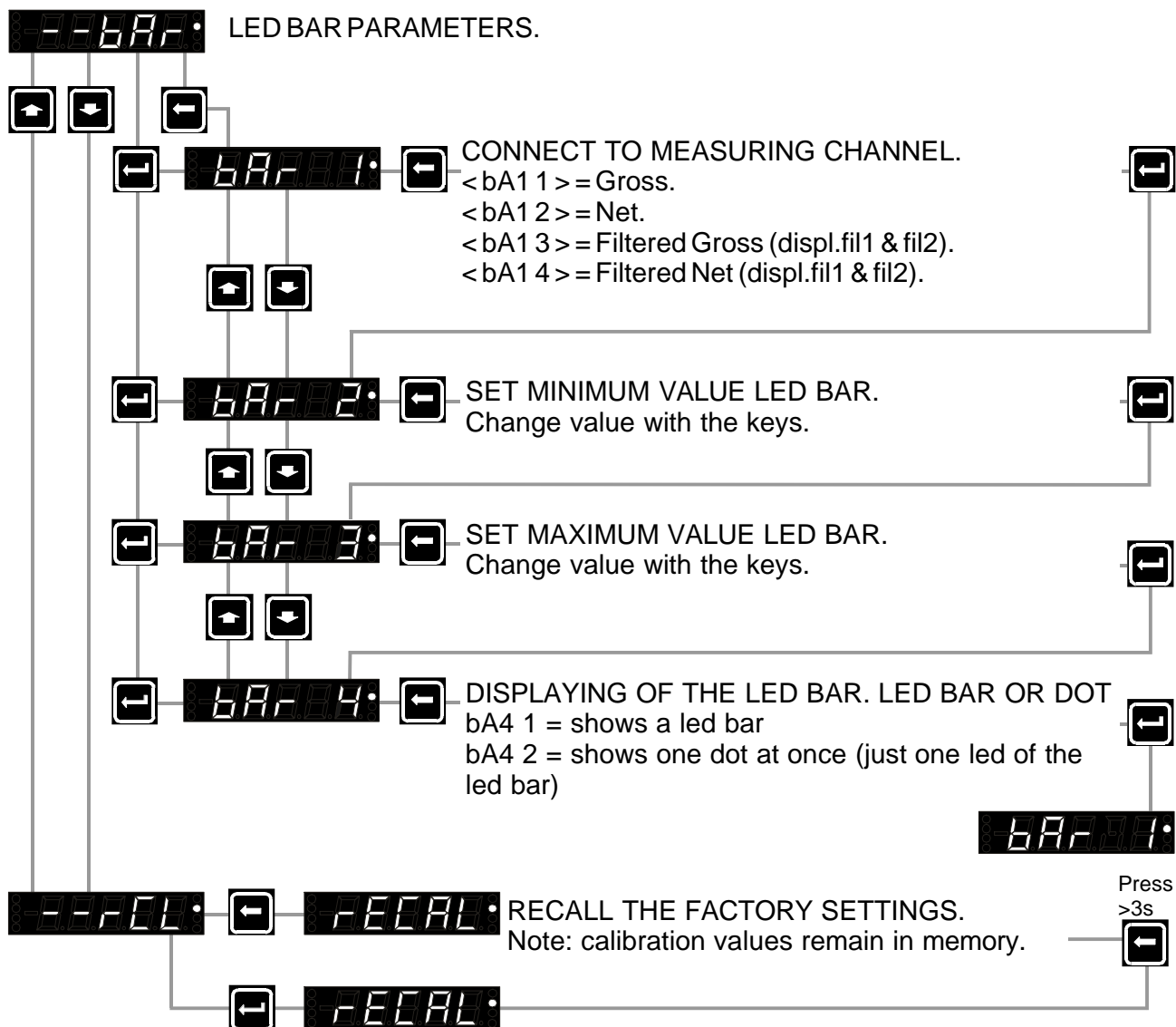
BAUDRATE. Not available at BCD-version.

bdr 1=9600 bdr 2=4800
bdr 3=2400 bdr 4=1200

↑ ↓ ←

--bAr

SEE NEXT PAGE



SAI

ERROR CODES EXPLAINED

E.F.F.02

INPUT VALUE TOO LARGE.

E.F.F.03

DEAD LOAD INSTABLE.

E.F.F.04

OVERFLOW "CAL 4". THE SHIFT IS TOO LARGE.
(it was larger than 32 000 internal parts)

E.F.F.05

ADC UNDERFLOW.

E.F.F.06

ADC OVERFLOW.

E.F.F.20

NO CALIBRATION POINTS AVAILABLE.

E.F.F.21

RESOLUTION TOO LOW FOR CALIBRATION SEGMENT 1.

Resolution too low for the calibration segments indicated by the last digit of this error message.

E.F.F.24

RESOLUTION TOO LOW FOR CALIBRATION SEGMENT 4.

E.F.F.29

NO CALIBRATION-POINTS LEFT. OR CAL. POINT IS NOT EXISTING.

E.F.F.31

AFTER CHANGING THE STEP SIZE.
RESOLUTION TOO LOW FOR CALIBRATION SEGMENT 1.

After changing the step size, and recalculation, the resolution is too low for the calibration segments indicated by the last digit of this error message.

E.F.F.34

AFTER CHANGING THE STEP SIZE.
RESOLUTION TOO LOW FOR CALIBRATION SEGMENT 4.

E.E.E.E

NO PROPER CALIBRATION AVAILABLE.

U.U.U.U

UNDERFLOW.

O.O.O.O

OVERFLOW.

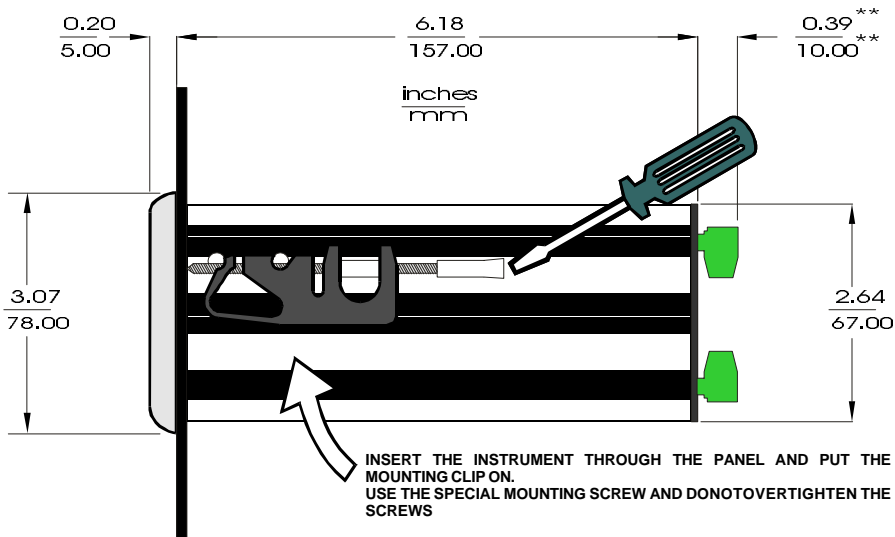
E.E.E.E

DISPLAY OVERFLOW.



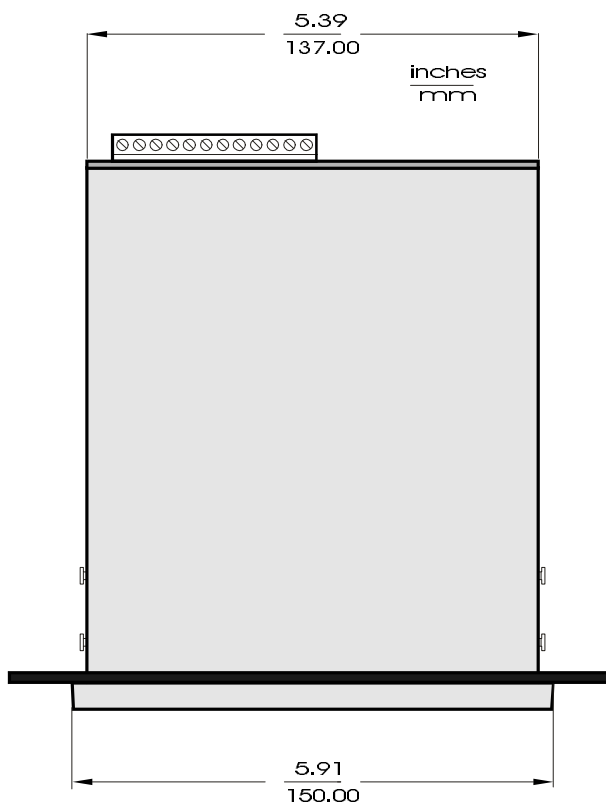
PRESS THE " M " BUTTON TO PROCEED.

DIMENSIONS & MOUNTING



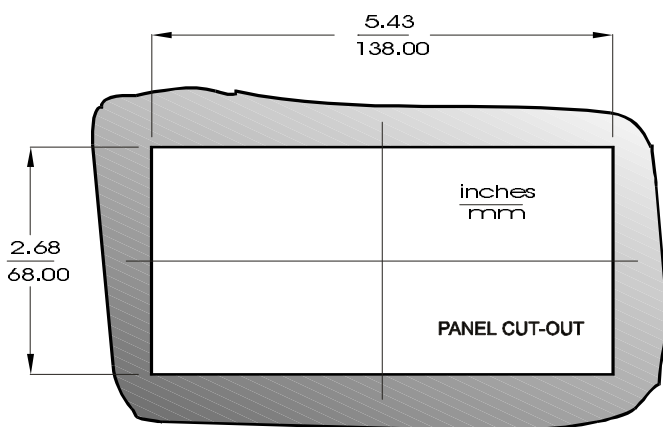
When the panel cut-out has been completed, unclip the mounts from the sides of the indicator and insert the instrument into the panel from the front.

On each side of the instrument you will find two mounting pins, use these two pins to reconnect the clips with the special mounting screw.



** At a certified version of the indicator the dimensions are not 10mm\0,59inches but 75mm\2,95inches. Be aware that you have enough space to connect the cables.

Be sure the panel is strong enough for the weight of the instrument.

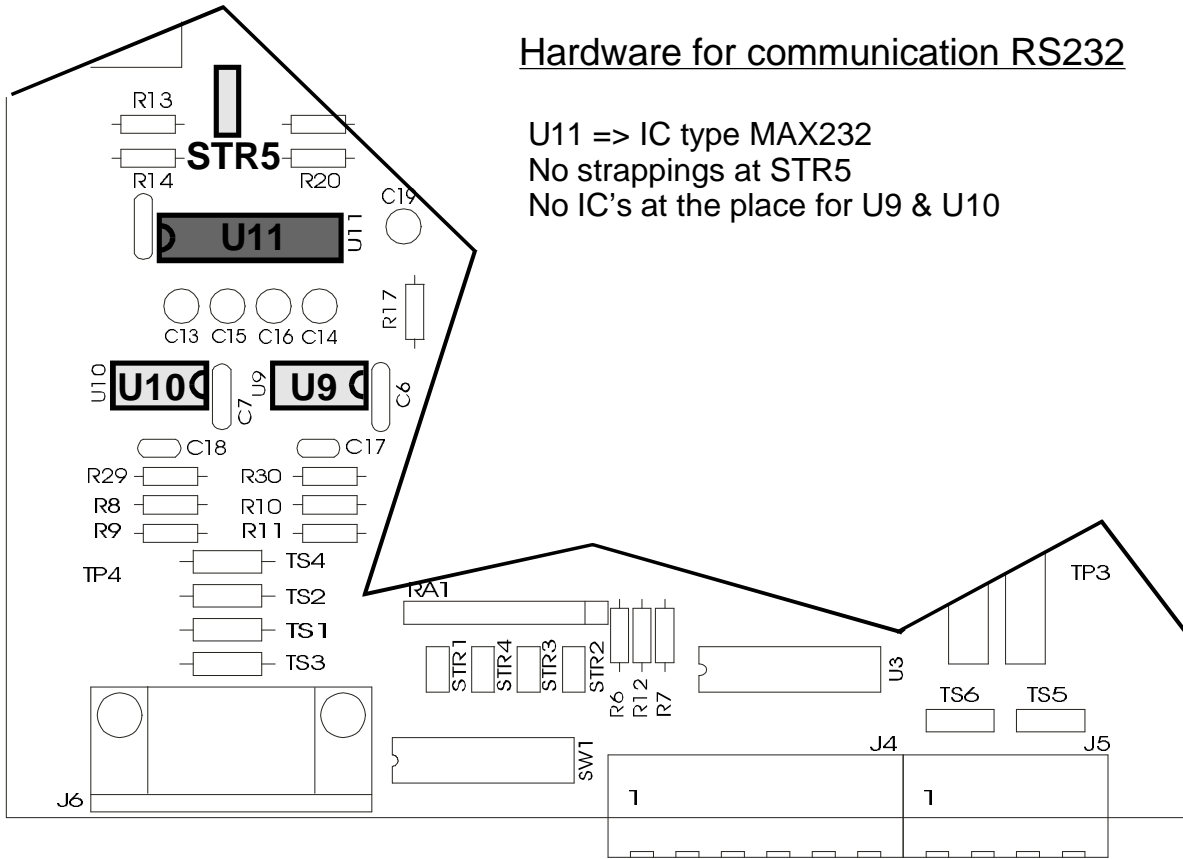


You can easily mount the instrument in a pre-cut panel.

The cut-out dimensions for this panel mounted instrument are standard DIN.

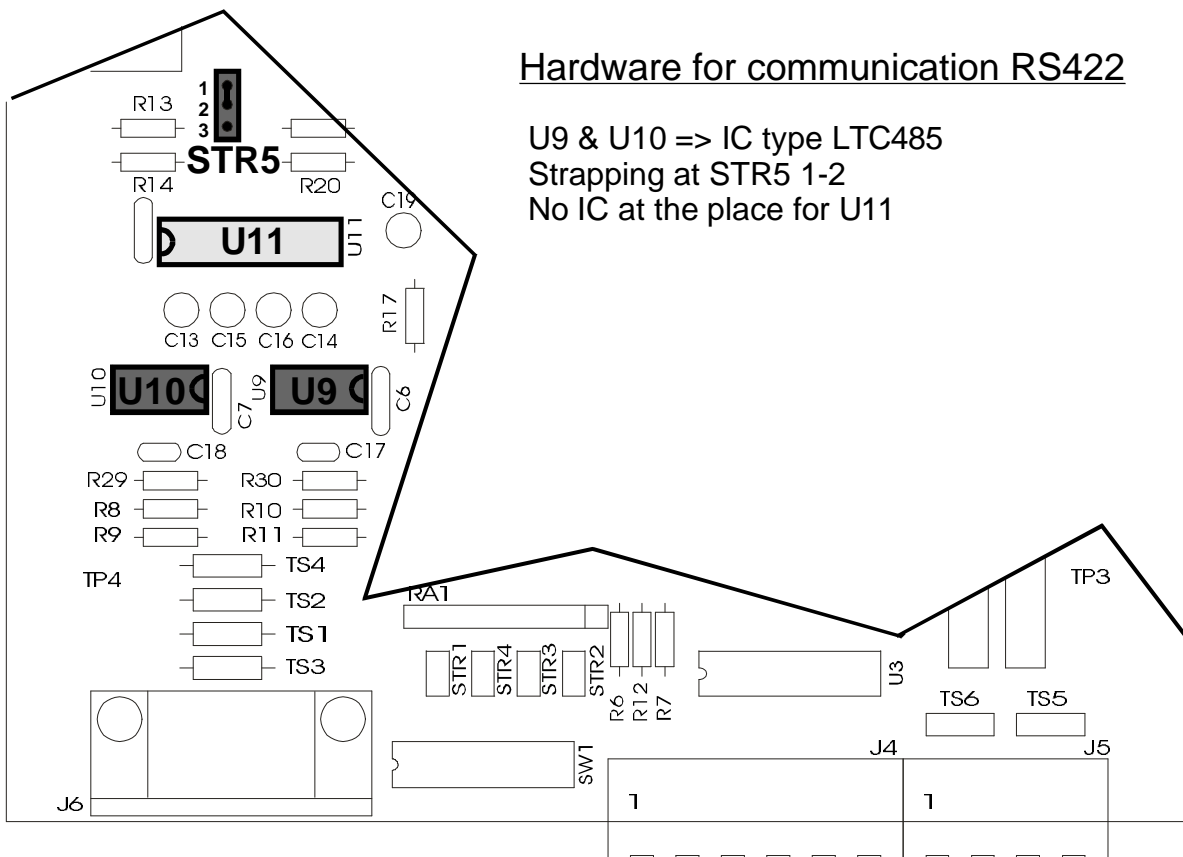
See the fig. on this page.

Hardware for communication RS232



U11 => IC type MAX232
 No strappings at STR5
 No IC's at the place for U9 & U10

Hardware for communication RS422



U9 & U10 => IC type LTC485
 Strapping at STR5 1-2
 No IC at the place for U11

Appendix-A: PC-protocol description for indicator SAI-PC

ASCII protocol format:

Baudrate	9600/4800/2400/1200
Data bits	8-bits
Stop bits	1-bit
Parity	NONE

ASCII protocol commands:

Single shot commands

Command	Response strings	Operation
SZ<CR>	OK<CR>/ERR<CR>	Set Zero value
RZ<CR>	OK<CR>/ERR<CR>	Reset Zero value
S1<value><CR>	OK<CR>/ERR<CR>	Set set point 1 value
S2<value><CR>	OK<CR>/ERR<CR>	Set set point 2 value
SP<value><CR>	OK<CR>/ERR<CR>	Set Preset tare value
ST<CR>	OK<CR>/ERR<CR>	Set Tare
RT<CR>	OK<CR>/ERR<CR>	Reset Tare
AG<CR>	OK<CR>/ERR<CR>	Set analog output in gross mode
AN<CR>	OK<CR>/ERR<CR>	Set analog output in net mode
AF<CR>	OK<CR>/ERR<CR>	Set analog output in fast net mode
D0<value><CR>	OK<CR>/ERR<CR>	Set analog 0V value
D1<value><CR>	OK<CR>/ERR<CR>	Set analog 10V value
G1<CR>	1+001.00<CR>	Get Set point 1 level
G2<CR>	2+001.00<CR>	Get Set point 2 level
GP<CR>	P+001.00<CR>	Get Preset tare
GT<CR>	T+001.00<CR>	Get Tare
GG<CR>	G+001.00<CR>	Get Gross mode
GN<CR>	N+001.00<CR>	Get Net mode
GF<CR>	F+001.00<CR>	Get Fast net
GW<CR>	W+00100+001003805<CR>	Get Fast net, gross, status and checksum only version 1.30A and up

PC-protocol description for indicator SAI-PC

IV<CR>	V:0130<CR>	Information on Version
ID<CR>	D:0201<CR>	information on Device
IS<CR>	S:033084<CR>	Information on System
OP<number><CR>	OK<CR>/ERR<CR>	Open channel connection
CL<CR>		Close channel connection

Auto transmit commands

Command	Response	Operation
SF<CR>	F+001.00<CR>	Fast display net mode
SN<CR>	N+001.00<CR>	Net mode
SG<CR>	G+001.00<CR>	Gross mode
SW<CR>	W+00100+001003805<CR>	Fast Net, gross, status and checksum

Response strings

Response	Operation
OK<CR>	Response strings
ERR<CR>	Command ignored

Update rate in auto communication mode

Menu Bdr	Baudrate	Update rate	Update rate command 'SW'
bdr 1	9600	10 msec 100x/sec	20 msec 50x/sec
bdr 2	4800	20 msec 50x/sec	40 msec 25x/sec
bdr 3	2400	50 msec 20x/sec	100 msec 10x/sec
bdr 4	1200	100 msec 10x/sec	200 msec 5x/sec

Information status bits, command 'IS'

The response string are two decimal bytes from each 3 characters. The first byte represents the on/off state of the display LEDs. The second byte represents the blinking state of the LEDs.

Display image:

* 1 (stable)	* 16 (menu)
* 2 (zero)	* 32 (sel)
* 4 (tare)	* 64 (L1)
* 8 (memo)	* 128 (L2)

Example:

S:035000,

035(decimal) = 00100011(binary), sel, zero, stable

000(decimal) = no blinking information



PC-protocol description for indicator SAI-PC

IV<CR>	V:0130<CR>	Information on Version
ID<CR>	D:0201<CR>	information on Device
IS<CR>	S:033084<CR>	Information on System
OP<number><CR>	OK<CR>/ERR<CR>	Open channel connection
CL<CR>		Close channel connection

Auto transmit commands

Command	Response	Operation
SF<CR>	F+001.00<CR>	Fast display net mode
SN<CR>	N+001.00<CR>	Net mode
SG<CR>	G+001.00<CR>	Gross mode
SW<CR>	W+00100+001003805<CR>	Fast Net, gross, status and checksum

Response strings

Response	Operation
OK<CR>	Response strings
ERR<CR>	Command ignored

Update rate in auto communication mode

Menu Bdr	Baudrate	Update rate	Update rate command 'SW'
bdr 1	9600	10 msec 100x/sec	20 msec 50x/sec
bdr 2	4800	20 msec 50x/sec	40 msec 25x/sec
bdr 3	2400	50 msec 20x/sec	100 msec 10x/sec
bdr 4	1200	100 msec 10x/sec	200 msec 5x/sec

Information status bits, command 'IS'

The response string are two decimal bytes from each 3 characters. The first byte represents the on/off state of the display LEDs. The second byte represents the blinking state of the LEDs.

Display image:

* 1 (stable)	* 16 (menu)
* 2 (zero)	* 32 (sel)
* 4 (tare)	* 64 (L1)
* 8 (memo)	* 128 (L2)

Example:

S:035000,

035(decimal) = 00100011(binary), sel, zero, stable

000(decimal) = no blinking information



Appendix-B: PV-protocol description for indicator SAI-PV

The following string format is used for the weighing units and to send to the display unit or to communicate with another device:

\$B+ID	Stat+D5	D4+D3	D2+D1	opt,dp	csum	\$FF
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1st byte: -high nibble : preamble fixed to \$B
-low nibble : indicator/channel number \$0-\$F

2nd byte: -high nibble : bit 7 not used
bit 6 hardware overflow
bit 5 display flash/software overflow
bit 4 value sign: 1=positive / 0=negative
-low nibble : digit 5 bcd value

3rd byte: -high nibble : digit 4 bcd value
-Low nibble : digit 3 bcd value

4th byte: -high nibble : digit 2 bcd value
-low nibble : digit 1 bcd value

5th byte: -bit 7 : option led 1
-bit 6 : option led 2
-bit 5 : option led 3
-bit 4 : option led 4
-bit 3 : option led 5
-bit 2 : dp info 2
-bit 1 : dp info 1
-bit 0 : dp info 0
dp info: 000 -no decimal point
001 -1 decimal position
010 -2 decimal positions
011 -3 decimal positions
100 -4 decimal positions
101 -1 + 4 decimal position
110 -2 + 3 decimal position
111 -all decimal points

note: see next page for redefinition of byte.

checksum = 1st + 2nd + 3rd + 4th + 5th

6th byte: -byte: : checksum ^ \$FF

7th byte: -byte: : \$FF post amble



PV-protocol description for indicator SAI-PV

Weighing unit opled definition type SAI-PV

- Opled1 = No motion indicator
- Opled2 = Zero set activated
- Opled3 = Tare value activated
- Opled4 = Total available
- Opled5 = Use menu active

The communication is Rs232 or Rs422 full duplex format.

Baudrate: 1200,2400,4800,9600baud
Data bits: 8
Stop bits; 1
Parity: None

The master places a request to a device with \$Cx code. Where x is the device number from \$1-\$F.

Example:

Value = +243.5 Stable, Tare active, no overflow, no rounding, no zero active on device no:

Master request: \$C1

Weighing unit answer: \$B1 \$10 \$24 \$35 \$A1 \$44 \$FF

Checksum calculation: $B1+10+24+35+A1 = 1BB$ (hex) => $FF-BB=44$ (hex)

