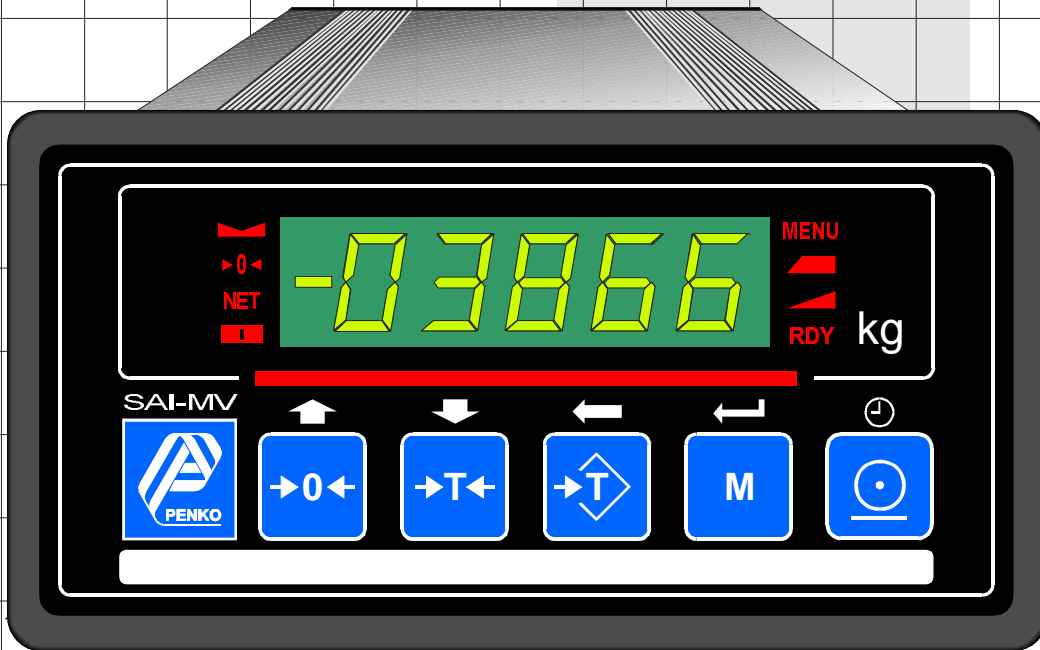




Manual



Weigh Indicator type SAI-MV

Weigh Indicator type SAI-MV

E-sai-mv

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

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The Netherlands

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web-site: www.penko.com

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Dimensions and mounting:

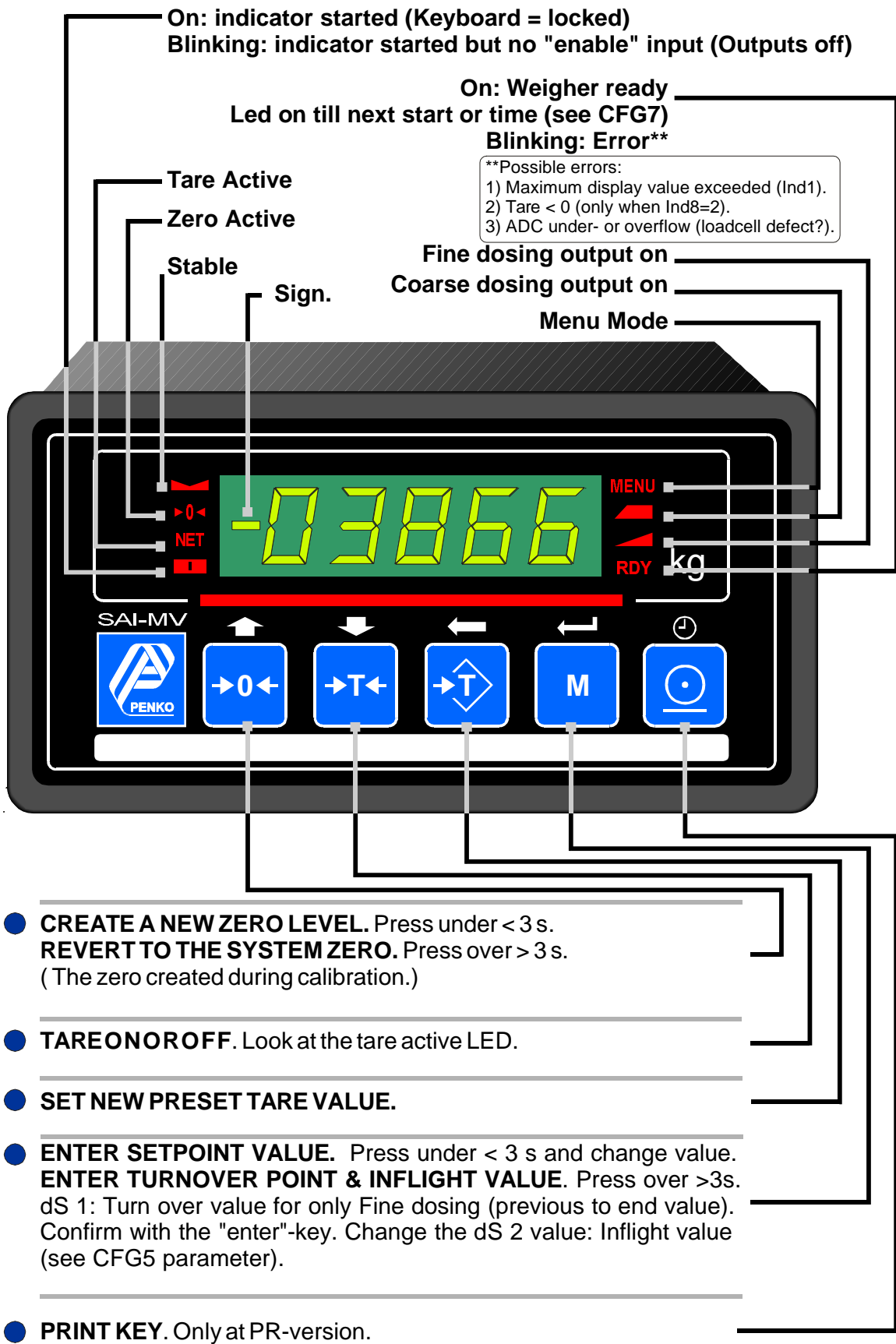
Dimensions and mounting 2-1

Appendix:

Appendix-A: Description of PC-protocol

Appendix-B: Example SAI-MV with weighing platform

SAI-MV: explanation of front keys



Wiring connections for SAI-MV in ALU-mouting

DIPSWITCH SETTINGS S2.

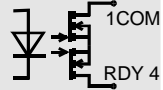
1,2,3 & 4 closed - Line termination for RS 422.
 1,2,3 & 4 open - No line termination for RS422.

RS422 is optional hardware.

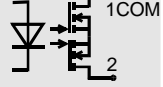
Don't close 1,2,3 & 4 in use with RS232.

7 closed- input function equal to front keys.
 7 open- input function with zero, print- and tare functions.
 8 closed- normal active mode.
 8 open- configuration\ADC mode active.

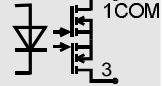
READY OUTPUT AFTER DOSING



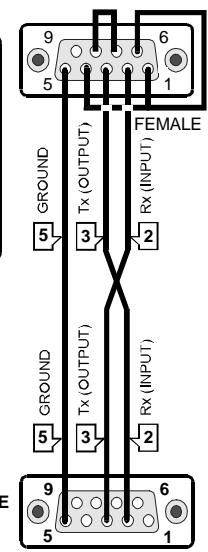
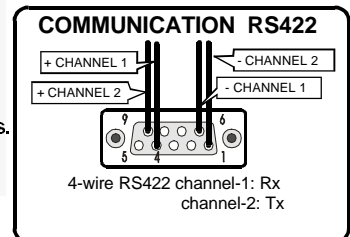
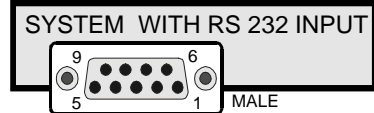
OUTPUT SP-1 COARSE DOSING



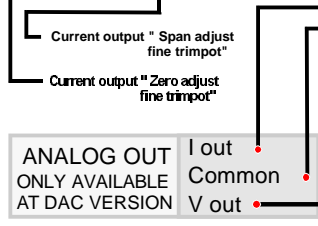
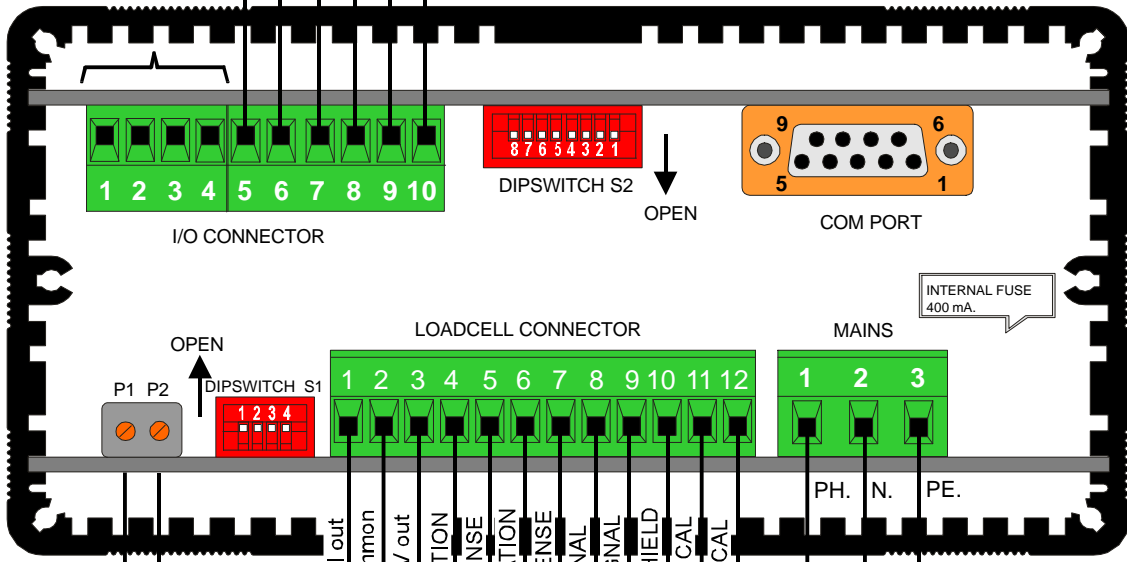
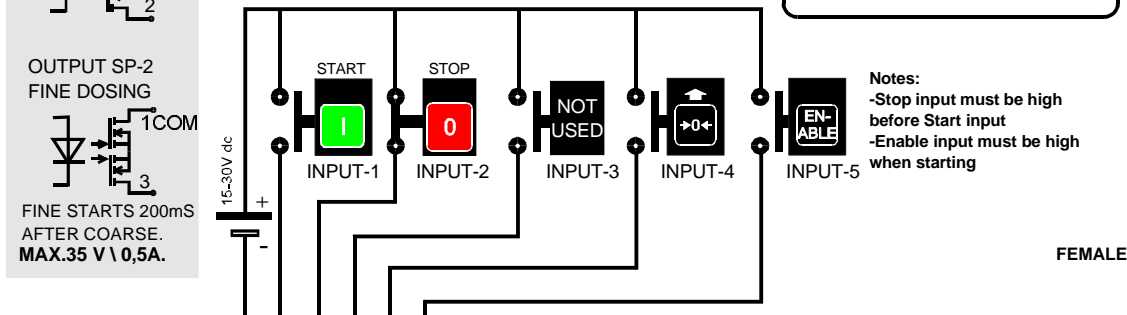
OUTPUT SP-2 FINE DOSING



FINE STARTS 200mS AFTER COARSE.
 MAX.35 V \ 0,5A.



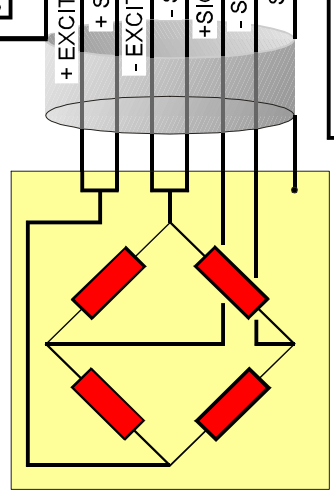
Notes:
 -Stop input must be high before Start input
 -Enable input must be high when starting



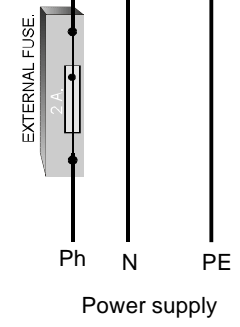
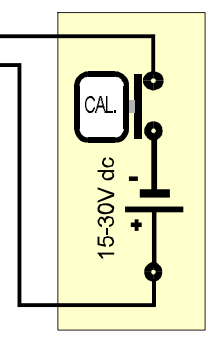
DIPSWITCH SETTINGS S1.



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



NEUTRAL. 115 OR 230V~ 50/60 Hz.
 PHASE. 115 OR 230V~ 50/60 Hz.



Wiring connections for SAI-MV in Stainless steel mouting

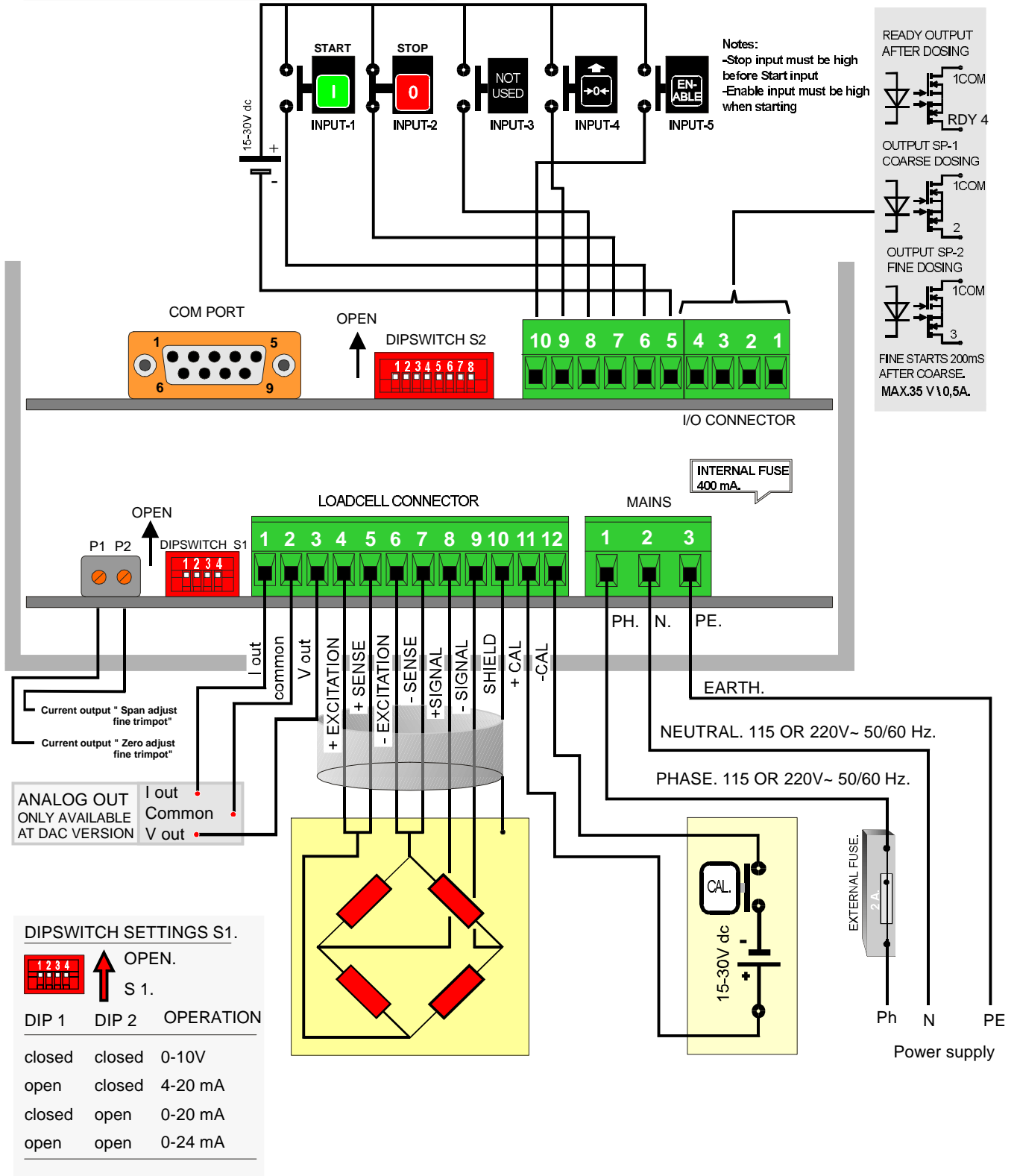
DIPSWITCH SETTINGS S2.

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 zero, print- and tare functions.
 8 closed- normal active mode.
 8 open- configuration\ADC mode active.



Factory settings & room for your settings

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 (1/10 sec)	< Ind A >	5	.....
Display filterband	< FIL 1 >	4	.....
Display filterfactor	< FIL 2 >	1	.....
Zero suppressing	< FIL 3 >	2	.....
Analog output function	< daC 4 >	1	.....
Set zero value analog output	< daC 5 >	0	.....
Set end value analog output	< daC 6 >	2000	.....
Stable time in ms (time-out)	< CFG 1 >	0	.....
Positive or Negative weighing	< CFG 2 >	1	.....
Nett or Gross weighing	< CFG 3 >	1	.....
K.E.B.T. (time in ms)	< CFG 4 >	0	.....
Inflight	< CFG 5 >	1	.....
Wait time after dosing	< CFG 6 >	100	.....
Display hold time (ms)	< CFG 7 >	2000	.....
Coarse output delay time (ms)	< CFG 8 >	50	.....
Fine output delay time (ms)	< CFG 9 >	200	.....
Turn over point	< dS 1 >	100	.....
Inflight value	< dS 2 >	0	.....
Setpoint-1 value	< SP 1 >	500	.....
Setpoint-2 value	< SP 2 >	2000	.....

INDICATION OF CALIBRATION POINTS.



SEGMENT 1
INCLUDING CALIBRATIONPOINT 1



SEGMENT 4
INCLUDING CALIBRATIONPOINT 4



SEGMENT 2
INCLUDING CALIBRATIONPOINT 2



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



SEGMENT 3
INCLUDING CALIBRATIONPOINT 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.

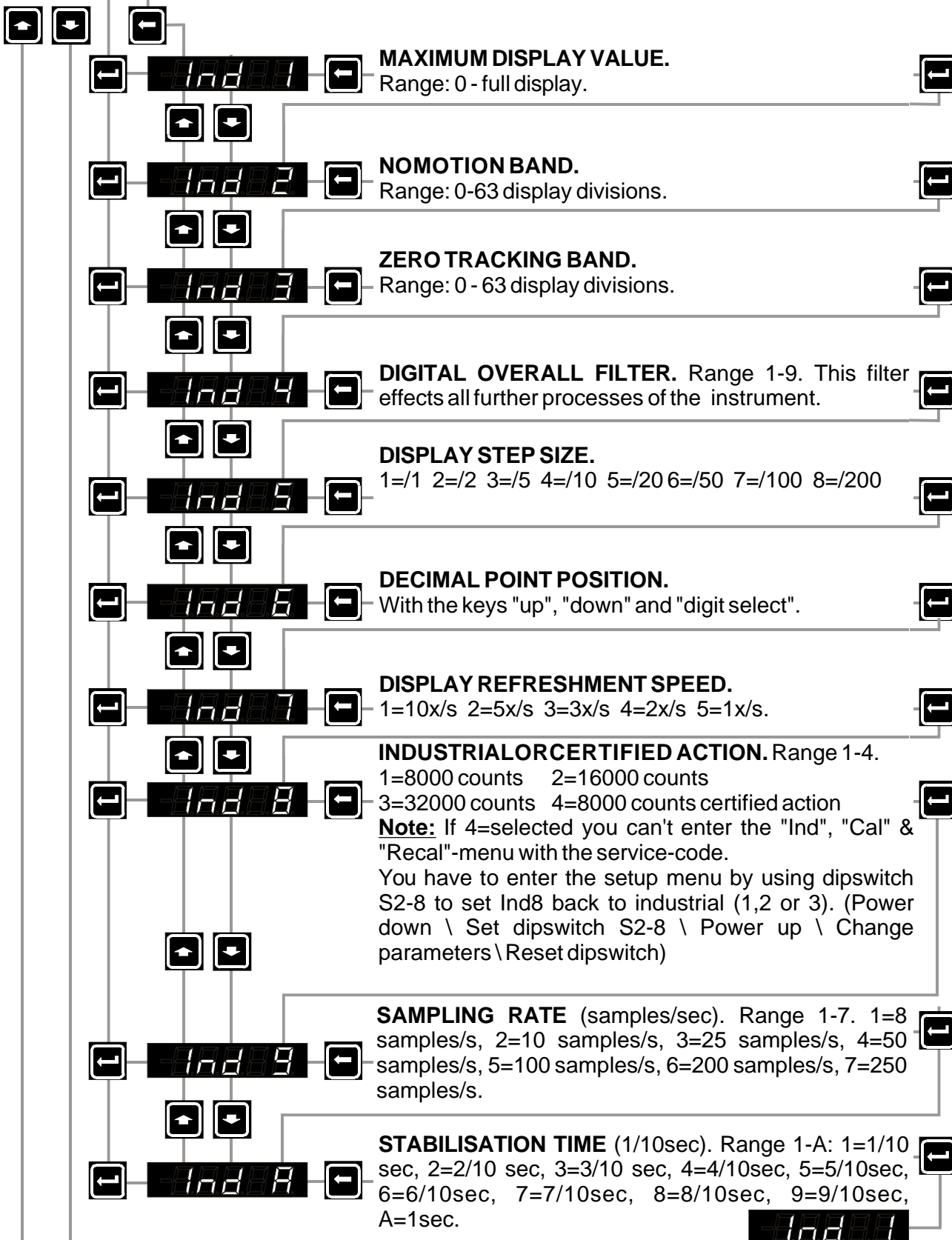
SAI-MV

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

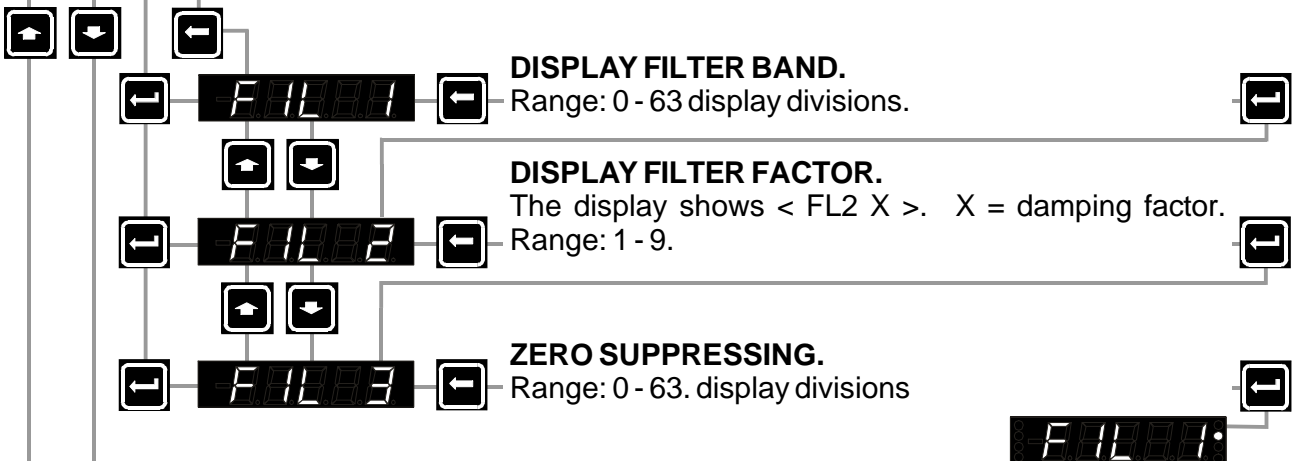
FILTER SETTINGS: SEE NEXT PAGE.

Ind 1



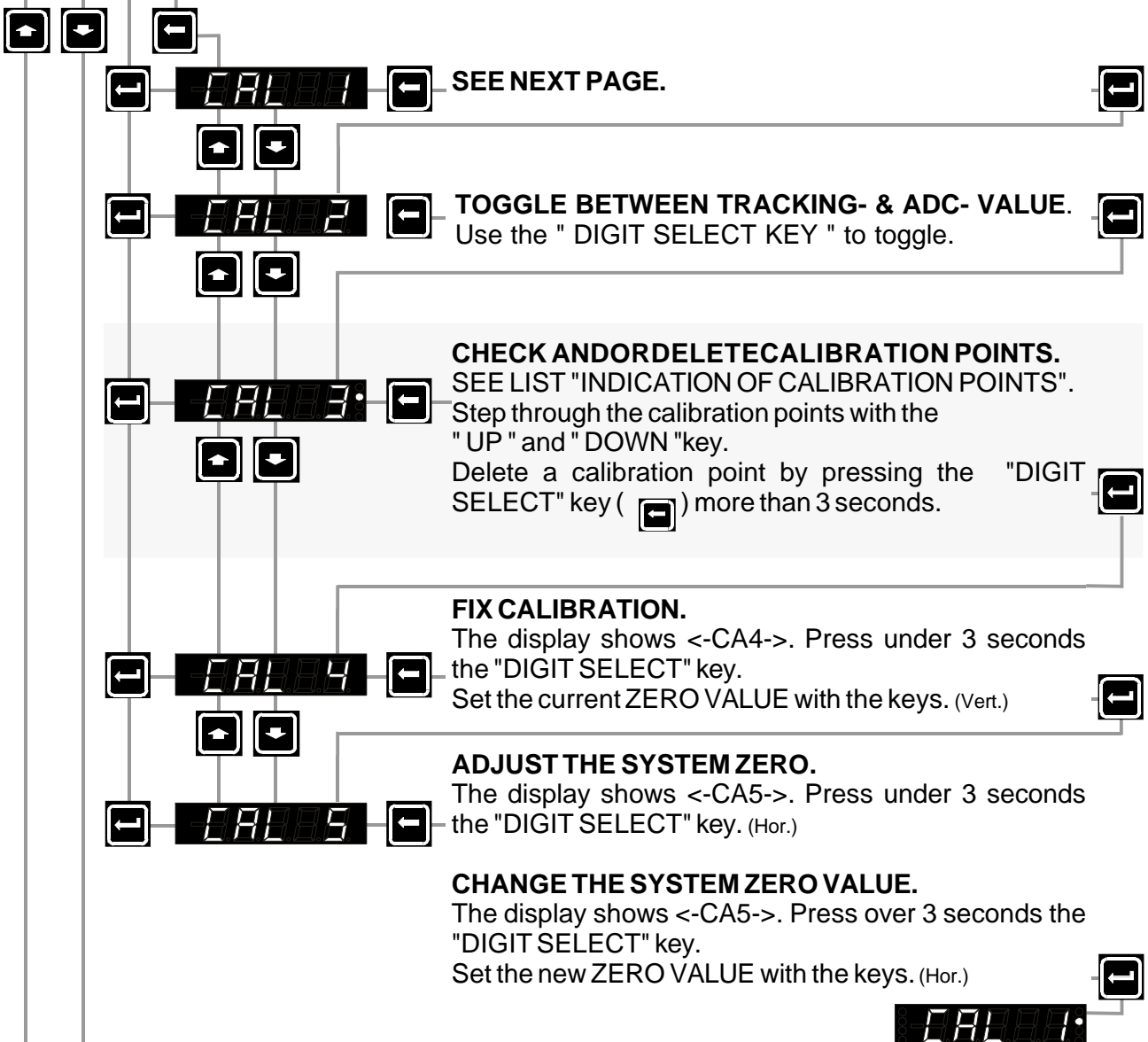
---FIL

DISPLAY FILTER SETTINGS



---CAL

CALIBRATION FACILITIES.



---DAE

DACMENU.
See page 1-4.



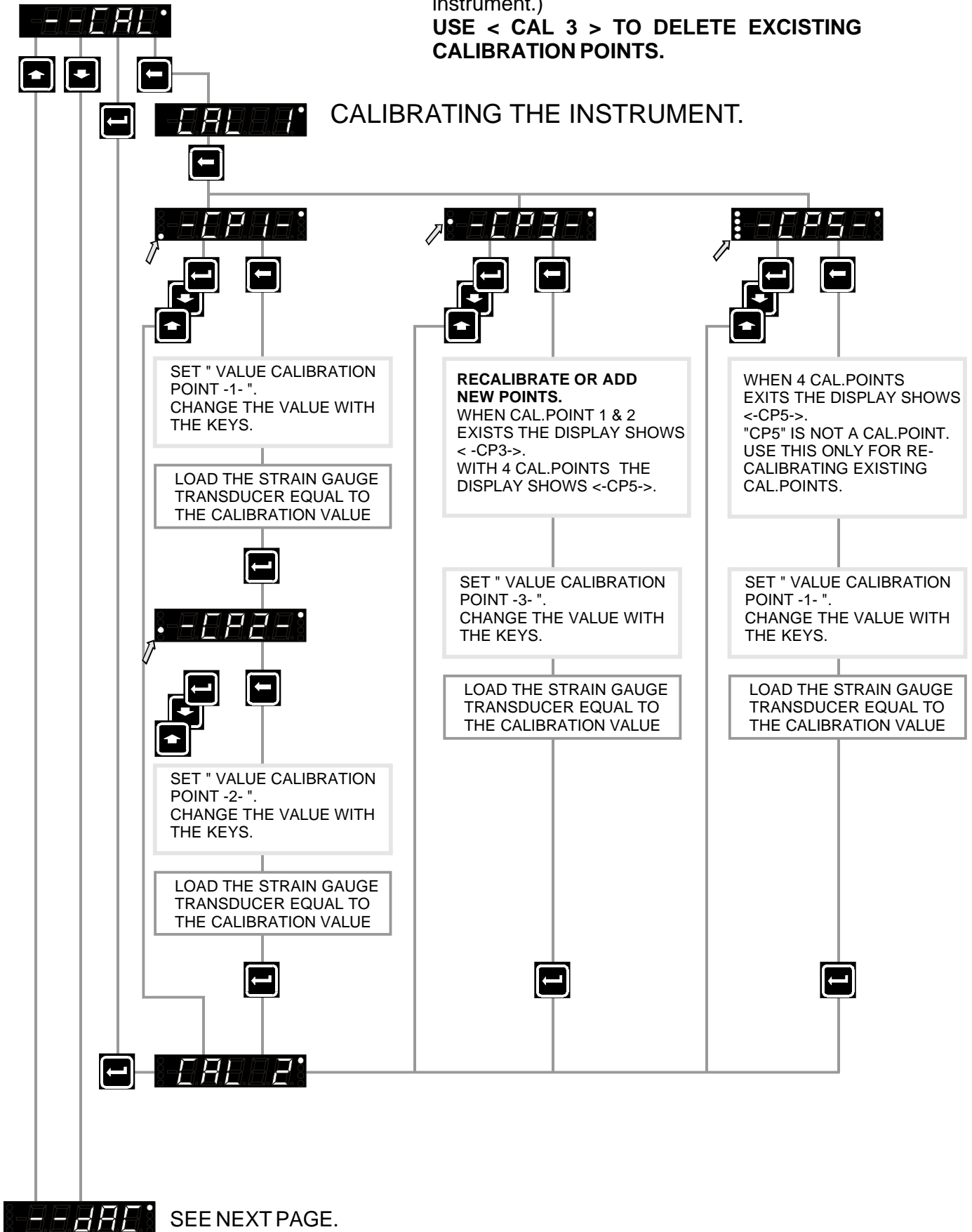
CALIBRATION FACILITIES

DELETE THE EXISTING CALIBRATION POINTS FIRST.

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

USE < CAL 3 > TO DELETE EXCISTING CALIBRATIONPOINTS.

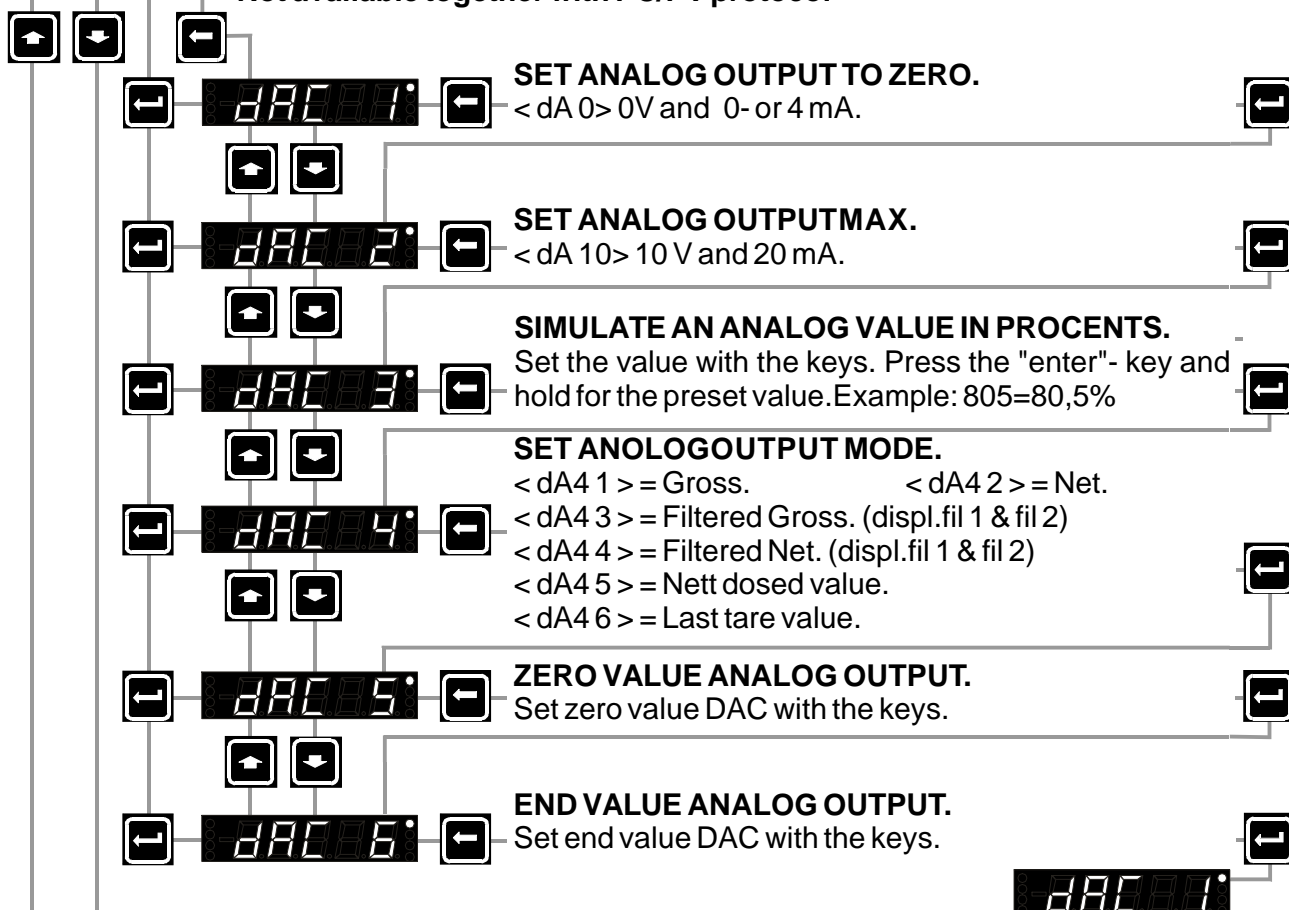
CALIBRATING THE INSTRUMENT.



--dA0

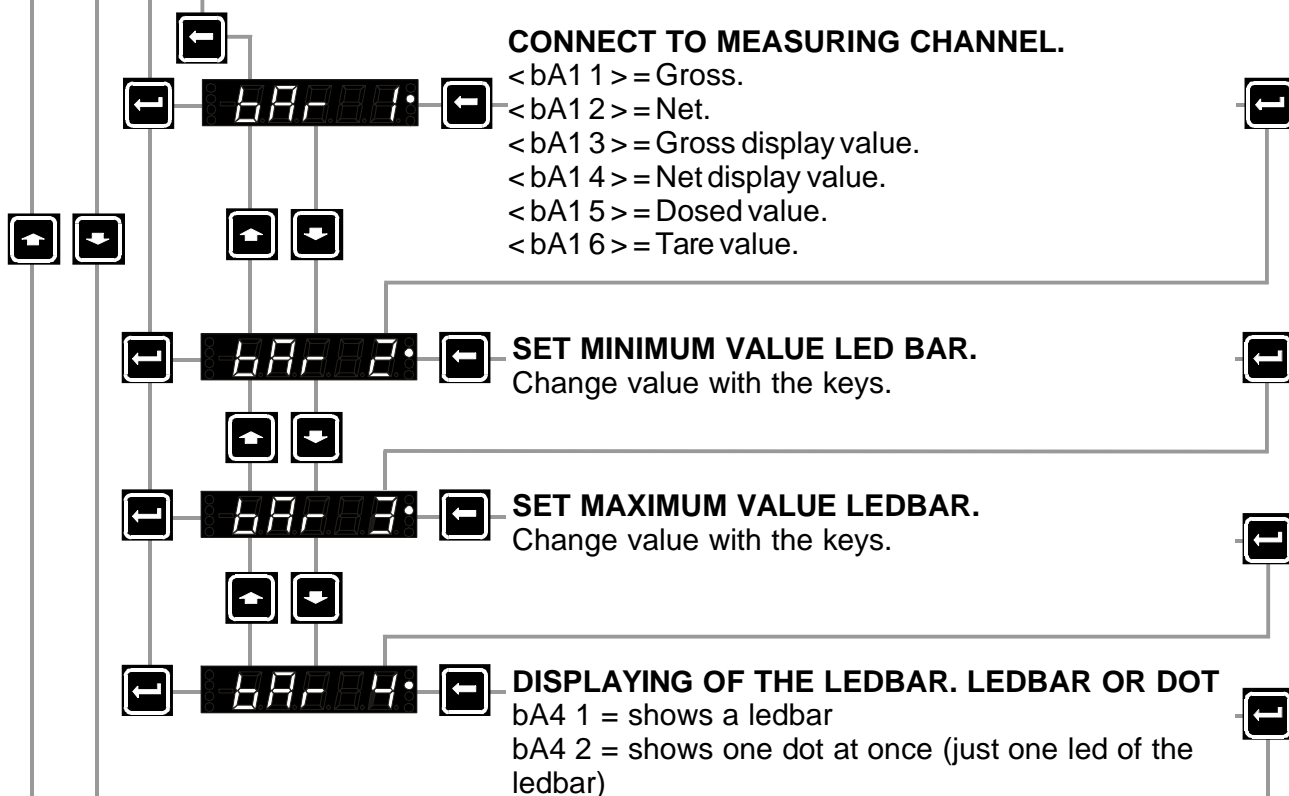
THE 0-10V AND 0/4-20mA OUTPUTS

Not available together with PC/PV protocol



--bA0

LEDBAR PARAMETERS.

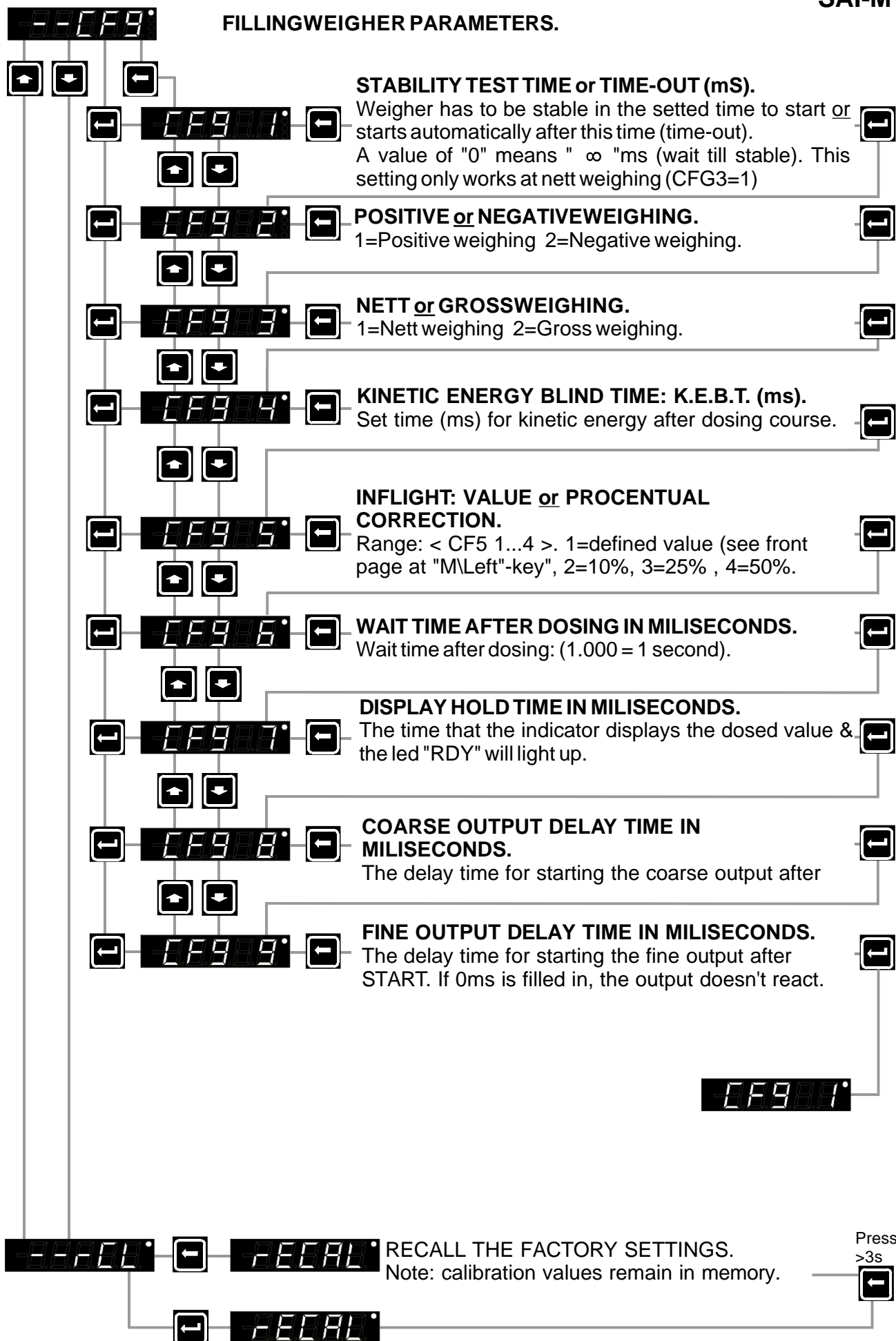


--cA9

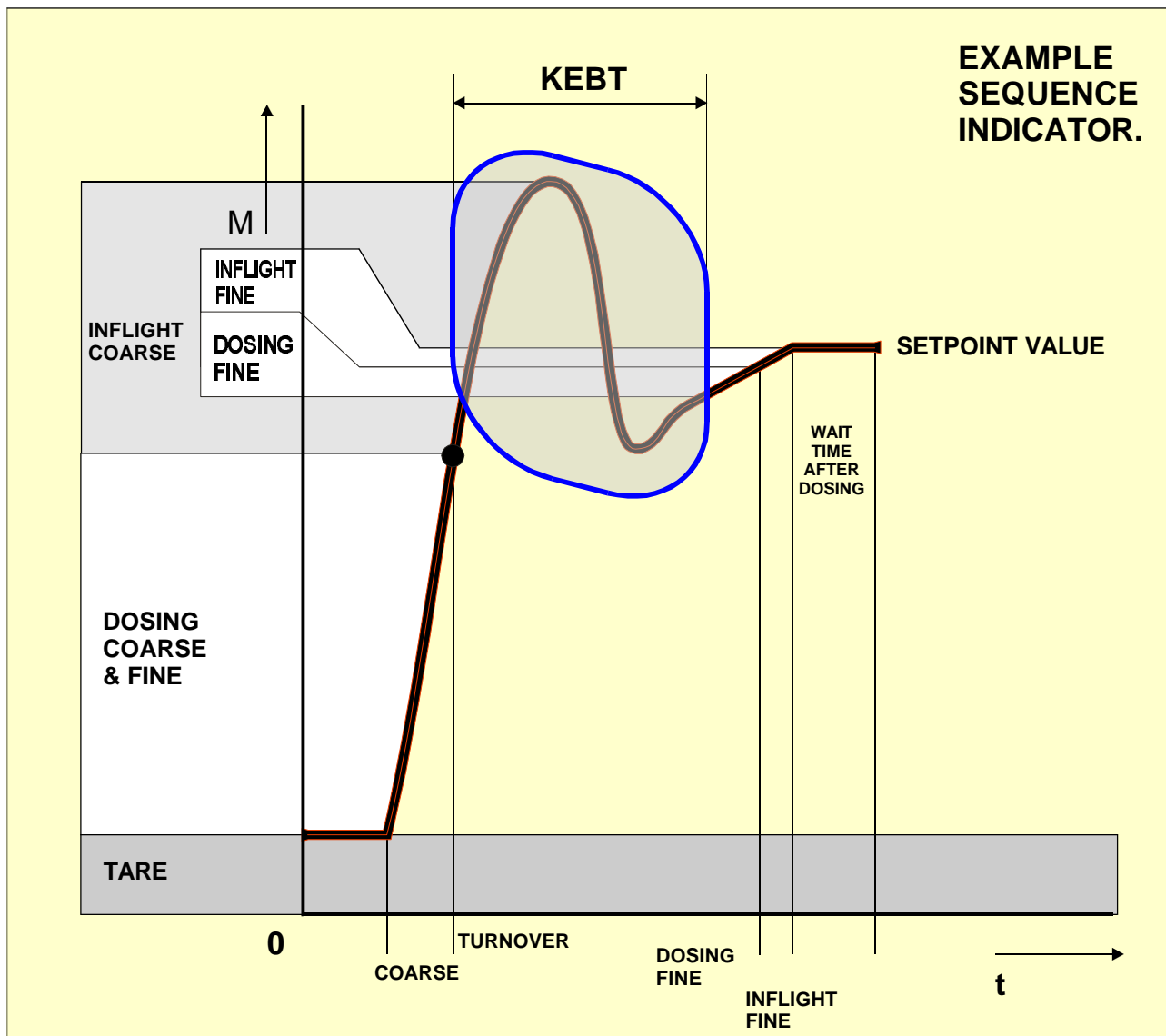
SEE NEXT PAGE

bA0 1

FILLINGWEIGHER PARAMETERS.



EXAMPLE SEQUENCE INDICATOR.



SAI-MV

ERROR CODES EXPLAINED

ERR02

INPUT VALUE TOO LARGE.

ERR03

DEAD LOAD INSTABLE.

ERR04

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

ERR05

ADC UNDERFLOW.

ERR06

ADC OVERFLOW.

ERR20

NO CALIBRATION POINTS AVAILABLE.

ERR21

RESOLUTION TOO LOW FOR CALIBRATION SEGMENT 1.

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

ERR24

RESOLUTION TOO LOW FOR CALIBRATION SEGMENT 4.

ERR29

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

ERR31

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.

ERR34

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

EEEE

NO PROPER CALIBRATION AVAILABLE.

UUUU

UNDERFLOW.

OOOO

OVERFLOW.

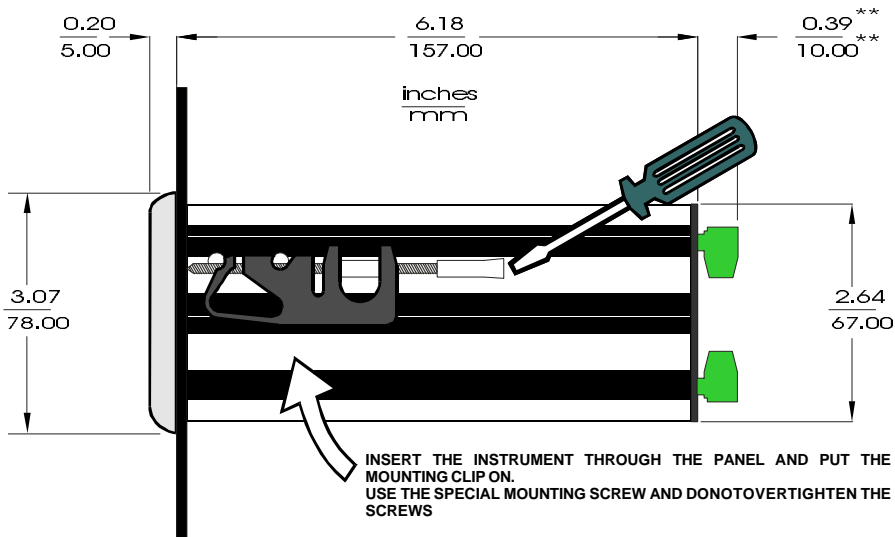
EEEE

DISPLAY OVERFLOW.



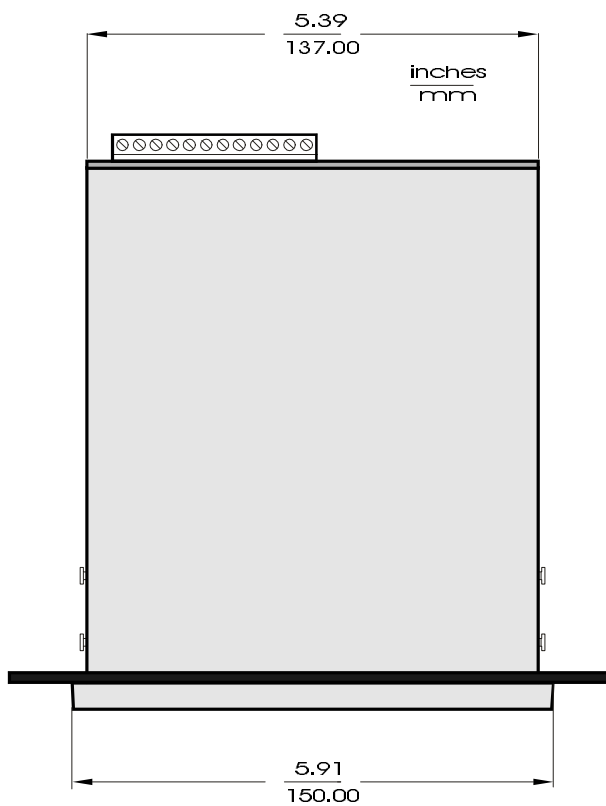
PRESS THE " M " BUTTON TO PROCEED.

DIMENSIONS & MOUNTING



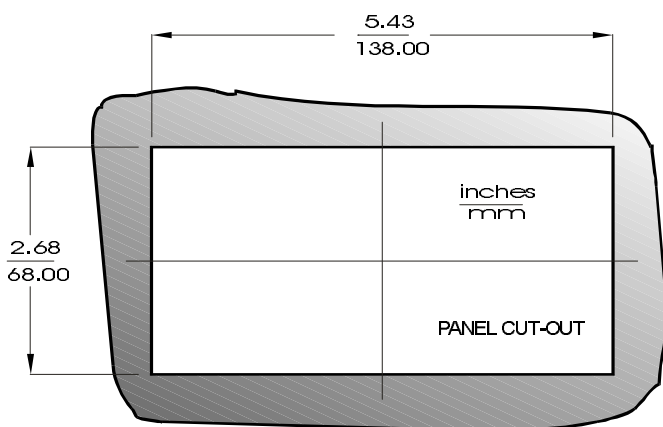
When the panel cut-out has been completed, unclip the mounts from the sides of the indicator and insert the instrument into the panel from the front.

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 precut panel.

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

See the fig. on this page.

Appendix-A: PC-protocol description for indicator SAI-MV-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
SP<CR>	P+001.00<CR>	Get Preset tare 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
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 filtered 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
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<CR>	OP:001<CR>	Get channel only when device is opened
OP<number><CR>	OK<CR>/ERR<CR>	Open channel connection
CL<CR>		Close channel connection
LW<CR>	W+00100+001003805<CR>	Get filtered net, gross, status and checksum
LF<CR>	F+00100+001003805<CR>	Get Fast net, gross, status and checksum

Protocol description SAI-MV PC

Command	Respons strings	Operation
LN<CR>	N+00100+001003805<CR>	Get filtered Net, fast net, status and checksum
DS<CR>	S+0100.0<CR>	Get Setpoint
DS<value><CR>	Ok<CR>/ERR<CR>	Set Setpoint
DI<CR>	I+0001.0<CR>	Get Inflight
DI[value]<CR>	Ok<CR>/ERR<CR>	Set Inflight
DO<CR>	O+0010.0<CR>	Get Oveturn point
DO<value><CR>	Ok<CR>/ERR<CR>	Set Oveturn point
DM<CR>	M:0001<CR>	Get dose mode
DD<CR>	D+0100.1<CR>	Get dosed value
DC<CR>	OK<CR>/ERR<CR>	Clear dose mode (clears dose bit, nett & tare of dosing)
LD<CR>	D+01000+001003805<CR>	Get dosed value, tare, current weigher status
DT<CR>	T+0001.000<CR>	Get dosed total (max.4.000.000)
DR<CR>	OK<CR>/ERR<CR>	Clear total and dose mode

Auto transmit commands

Command	Respons	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

Respons strings

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

Update rate in auto communication mode

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

Protocol description SAI-MV PC

Information dose bits, command 'DM'

The response string are two hexadecimal bytes from each 2 characters. The first byte digits 1 and 2 are always zero. The second byte digit 3 and 4 represents the status bits.

<u>Bit number</u>	<u>Bit definition</u>
7 (digit 3)	coarse output
6	fine output
5	not used, always 0
4	not used, always 0
3 (digit 4)	error
2	run enabled
1	running
0	dose ready

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(course)
* 4(tare)	* 64(fine)
* 8(start)	* 128(ready)

Example: S:035000,

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

000(deciaml) = no blinking information

Status bits

<u>Bit number</u>	<u>Bit definition</u>
7 (MSB)	indicator error
6	tare active
5	zero corrected
4	weight stable
3	within zero range
2	above maxload
1	setpoint 2
0 (LSB)	setpoint 1

Protocol description SAI-MV PC

Special commands 'GW', 'SW' and 'Lx'

The 'GW' and 'SW' are commands with checksums with these commands it is possible to get net, gross and status data. The respons strings don't have decimal point information. The 'SW' update rate is two times slower than the other commands.

Respons string

W	+00100	+00100	38	05	<CR>	Data
Id	Nett value	Gross value	Status	Checksum	End of string	

Status bits

<u>Bit number</u>	<u>Bit definition</u>
7 (MSB)	indicator error
6	tare active
5	zero corrected
4	weight stable
3	within zero range
2	above maxload
1	setpoint 2
0 (LSB)	setpoint 1

Example: 38(hex) = 0011 1000(binair)

bit 5, zero corrected
bit 4, weight stable
bit 3, within zero range

Calculating the checksum. The checksum is the inverted sum of all ASCII characters.

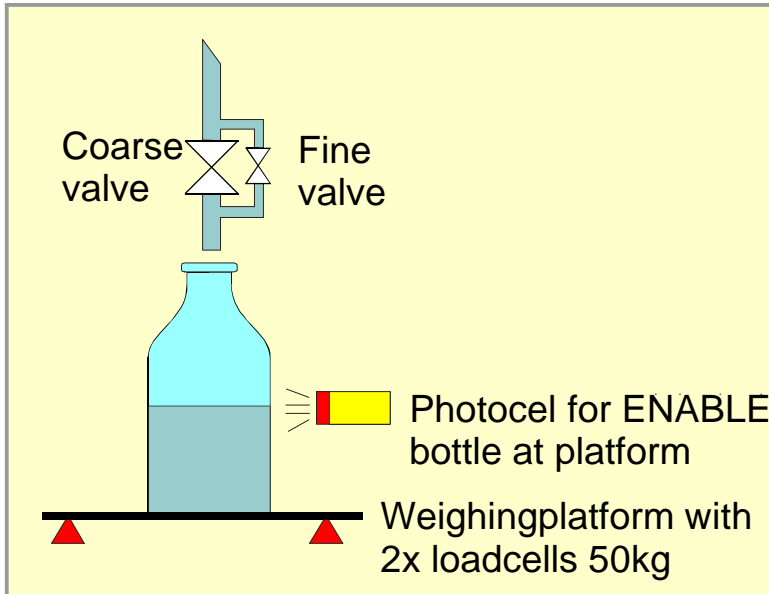
Example:

respons string:

W+00100+001003805<CR>

1. Add all characters 'W'+ '+' + '0' + '0' + '1' + '0' + '0' + '+' + '0' + '0' + '1' + '0' + '0' + '3' + '8'
total is 2FA(hex). Remove most significant digit, result is FA(hex).
2. Invert hex value, result is 05(hex).
3. Convert hex value to characters, result is '0' '5'.

Appendix-B: Example SAI-MV with weighingplatform



Weighing data:

- Number of loadcells=2
- Capacity per loadcell 50kg
- Total weigcapacity 2x50=100kg
- Dead load platform 5kg
- Nett weigh capacity needed 75kg
- Loadcell supply 10Vdc
- Resolution loadcell 2mV/V

Indicator resolution 16 bit. This means that the signal of the loadcells
0-100kg => 0-20mV => 0-60000 ADC-parts

Example: at 50kg (inclusive dead load of platform) the outputsignal 10mV is 30000 ADC parts. The number of ADC parts can be read out at the Cal2 menu.

Calibrating the SAI-MV

Use the service code to enter the setup menu.
Press at the following keys in 7 seconds:



Set Ind5 for the display step size

Ind 5

DISPLAY STEP SIZE.

Standard a SAI-MV is set at (Ind8) 8000 divisions. At this example the stepsize can set to: $\frac{75000 \text{ g}}{8000} = 9,375$ gram

Round of this is 10 g. The stepsize can be set per 1 so 75kg is at the display 75,01 or per 10 the 75kg is 75,000kg. At this example we're using per 1.

Set Ind5 to 1. Press at UP or DOWN to select.

1= /1 2=/2 3=/5 4=/10 5=/20 6=/50 7=/100 8=/100.

Confirm In5 1 with enter.

Change Ind1 to set the maximum nett weight value

Ind 1

MAXIMUM DISPLAY VALUE.

Range: 0 - full display. We set this value at 80kg because the maximum nett weight is 75kg.

Change the value and confirm with ENTER.

The display shows "=====" above this value.

Delete previous calibration points

CAL 3

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. When all calibrationpoints are deleted the SAI-MV automatic goes to CAL4. If there are no more points Error20 appears at CAL3.

Calibrating the Zero point (Cp1)

CAL 1

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.

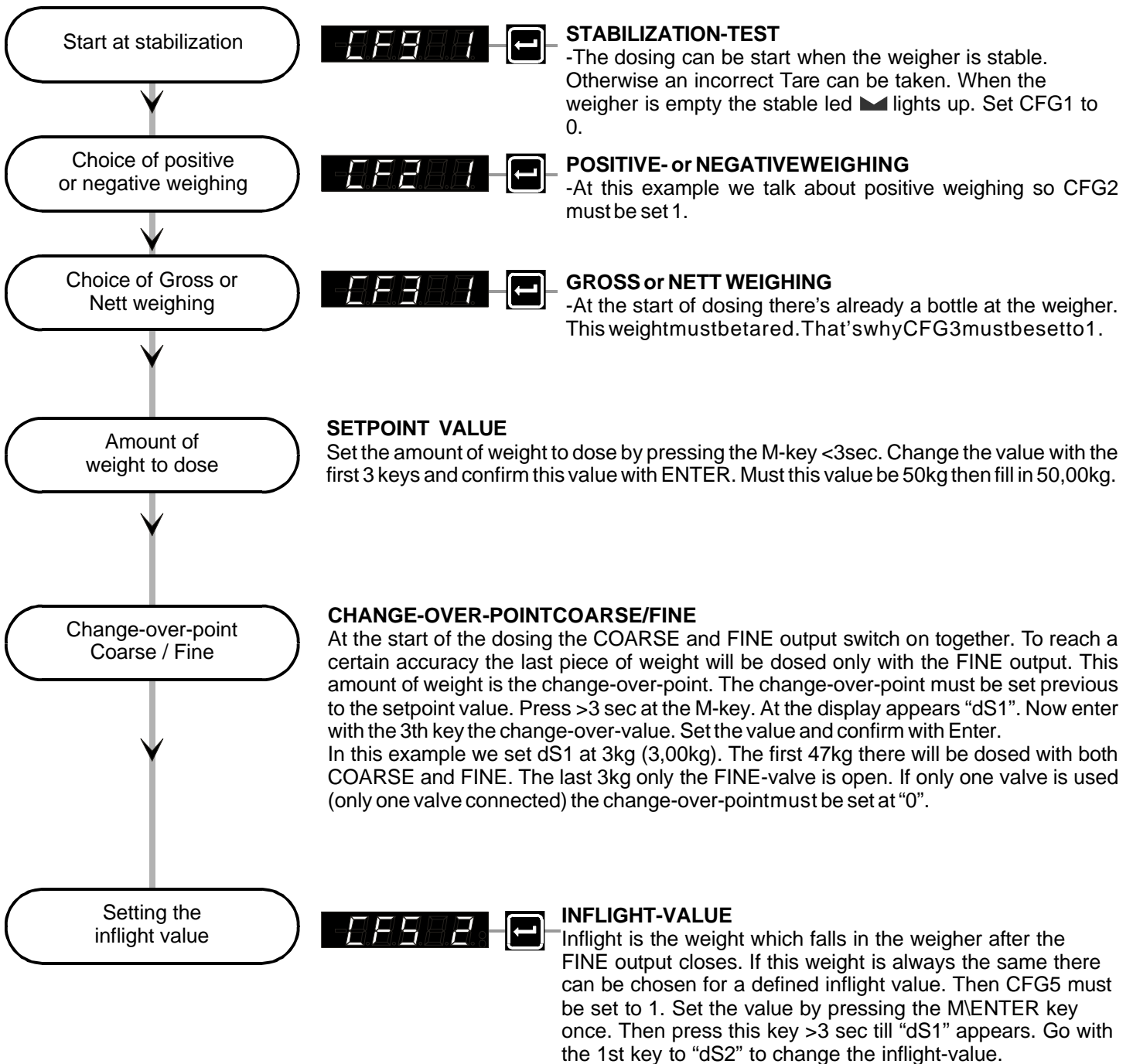
Calibrating a gain point (CP2)

Dose settings for SAI-MV

First the CFG parameters must be set.

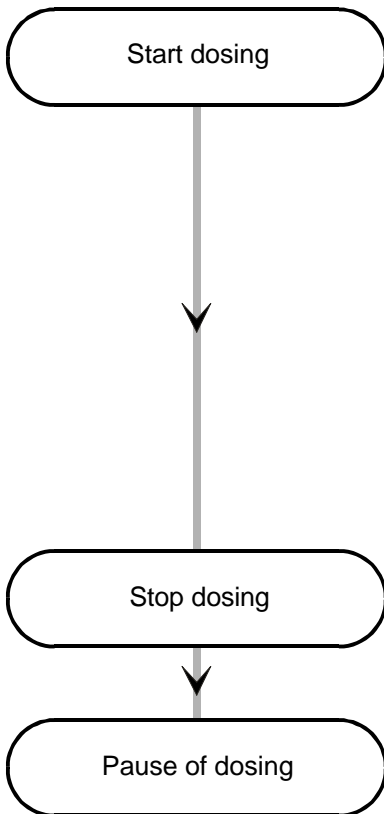
-At this example we have positive weighing so CFG2 must be set to 2.

-When starting there're already a bottle at the platform. This weight must be tared. So CFG31 must be set to 1.



It's also possible to change this value in percentage. The inflight will be measured by the SAI-MV and corrected automatic. This can happen with 10%, 25% or 50%. In this example we set CFG5 to 2 which is 10%. The actual inflight can be readout by entering dS2.

Start dosing of the SAI-MV



START DOSING

To start the dosing input-1 must be made high. There are 2 conditions to start: both STOP- and ENABLE input must be high. In this example the ENABLE input is the bottle detection. When there's no detection or 2nd start condition connect the hardware inputs for STOP and ENABLE parallel. Standard the COARSE output is high first and 200mS later the FINE output. When necessary the waiting-time after start can be changed at CFG8 and Cg9. When the turn-over-point (dS1) has been reached, only the FINE output is high. The 2 leds in the middle of the right-handed side of the display show the status of the outputs COARSE and FINE . The dosing is ready when the indicator beeps and also the indication-led RDY lights up. The dosed weight stays on the display and RDY led lights up till the setted time of CFG7 is reached or till a new start. Indication of the start is showed by the following led:

The dosing stops automatic when the dosing-value is reached. The dosing can also be stopped by interrupt the STOP-input.

It's possible to pause the dosing temporary by interrupting the ENABLE-input. The outputs will be frozen and the COARSE and FINE leds are flickering. If the ENABLE input is present again the SAI-MV continues.

Possible errors:

1] SAI-MV won't start	-Dosingvalue is "0". -STOP and/or ENABLE input are not present when starting.
2] FINE dosing doesn't react	-The inflight-value (dS2) is larger then the the setted turn-over-value for the FINE dosing (dS1).
3] COARSE and FINE dosing don't work	-The inflight value (dS2) is larger then the amount of weight for the setpoint.
4] Only 1x dosing can be started	-Dipswitch-5 is open. The indicator first needs to receive the "DC" command via the communication PC-protocol start.
5] Weigher doesn't become stable	-Increase the value of Ind2 (number of display divisions) and reduce IndA. The indicator is stable when the weigher doesn't vary more then the number of display divisions in the setted time (indA). When the indicator stays instable probable one of the loadcells is defect.

