Measurement · Weighing · Control

Analog Signal Transmitter AST 5P

Program version 1.1.x

Operating Instructions, Quick Installation

BLH NOBEL
A VPG Brand

PRECAUTIONS

Read this instruction before installing, operating or servicing this instrument. The instruction helps you use the instrument safely and efficiently. Follow the instructions provided here and in the following chapters. Save this instruction for future reference.

WARNING

Only permit qualified personnel to install and service this instrument.

DO NOT allow untrained personnel to operate, clean, perform service, or in any other way handle this instrument.

Meaning of symbols in this document

Ground symbol

WARNING
Warning text

Warning text that points out a risk that you need to be aware of

INTENDED USE

The AST 5P is a measuring unit intended for industrial systems. Its basic function is to convert the signals from transducers into useful information. Transducer excitation is included as well as parameter-controlled signal processing, indication of output signal levels and error monitoring.
The product has an interface for communication, a connection for strain gauges, two digital inputs, two relay outputs and an analog output.

CE considerations

The product is classified as class B group 1 equipment. This means that:
* the product is not designed to intentionally generate and/or use radio frequency energy; and
* even though intended for industrial use, this product can also be used in domestic environment or environment sharing low voltage power supply network with residential environment without any special measures.

FCC considerations

The product is classified as class B digital device, according to the US Federal Regulations.

WARNIING

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential environment. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio and television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- reorient or relocate the receiving antenna;
- increase the separation between the equipment and receiver;
- connect the equipment into an outlet on a circuit different from that to which the receiver is connected;
- consult the dealer or an experienced radio/TV technician for help.

CONTENTS

Introduction

..... 1

Operating instructions

General 3
Power supply 3
Start-up 3
View alternatives 4
Zero setting 5

Installation

Mechanical installation 7
Electrical installation 7
Set-up program deltaCOM 9

Quick set-up, calibration

General 11
Common parameters 11
Data sheet calibration 15
Dead weight calibration 18

Parameter overview

..... 23

Quick set-up list

..... App. 1

Introduction

AST 5P is a high performance transmitter, designed for industrial measuring by means of strain gauge transducers. Excitation supply is included as well as parameter controlled signal processing, display of output signal levels and error monitoring.

This instruction includes the basic installation and set-up, required for correct measuring with the instrument.

Additional installation and set-up of more instrument functions, not covered by this description, can also be performed.
For a complete instrument description, refer to publication:
“601 801 Technical Manual AST 5P”

This description deals with the following points:

- using the AST 5P panel for measuring;
- quick installation;
- ‘quick set-up’ for AST 5P;
- data sheet calibration;
- deadweight calibration in two points;
- set-up program deltaCOM.

This description does NOT deal with the following points:

- connection of relay outputs;
- connection of digital inputs;
- complete set-up (password, filters etc.);
- adjustment of levels and relay functions;
- adjustment of the analog output;
- setting of communication parameters;
- table calibration;
- troubleshooting;
- diagnostics.

Operating instructions

General

This section describes display and function key operation for AST 5P in normal operating mode.

Power supply

Power supply to the signal transmitter should not be turned off during weekends and over night. Continuous power supply to electronics and transducers prevents moisture condensation in the units.

Start-up

As soon as power is connected to the instrument, start-up is performed.
The text ‘AST 5P’, the program version and the serial number of the module are displayed for about five seconds. Then AST 5P is automatically switched over to the operation mode.

If the instrument is set for operator start-up, the text ‘Press ENTER to start operation!’ is displayed until the key to the right is pressed and the instrument enters operating mode.

If an error occurs, the start-up is aborted and an error message is displayed.
Error codes and error corrections are described in section “Troubleshooting” in the technical manual for AST 5P.

As AST 5P is in operating mode, a view with the weight value and the instrument address is displayed.
For the internal relays in use, the status is displayed (R1/R2: On or Off).

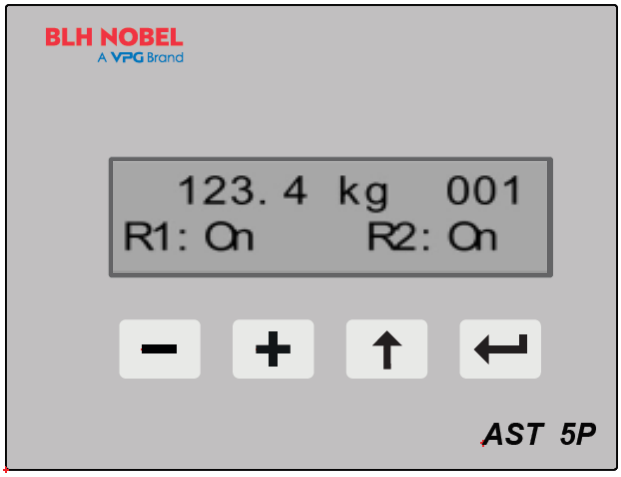


Figure 1. Front view of AST 5P in operating mode. A weight value and information about address and relay status being displayed

View alternatives

AST 5P set-up may allow display of more views than Weight value. In that case the function keys [+] and [−] are used, according to Figure 2, to select a view.

Weight value, normal view
This view displays the actual measurement value, here called weight value, and the instrument address. For the relays in use the status, On or Off, is displayed.

Zero setting
This view displays the weight value and the address, and on the second line the text 'Zero' above the key [↵] .
Zeroing of the weight value is performed as [↵] is pressed.
The zeroing performed in this view is only temporary. After power-off or reset it will be replaced by the zero setting from the latest calibration.

Analog output
This view displays the weight value and the address and also the actual analog output signal.

Level settings
This view displays the switching levels for the two supervising channels.
If these channels are not in use, level 0 is displayed.

Input signal
This view displays the actual input signal from the connected transducer(s).
The instrument address and status for the used relays are also displayed.

S/N:, Progr
This view displays the instrument serial number and the version of the installed program.

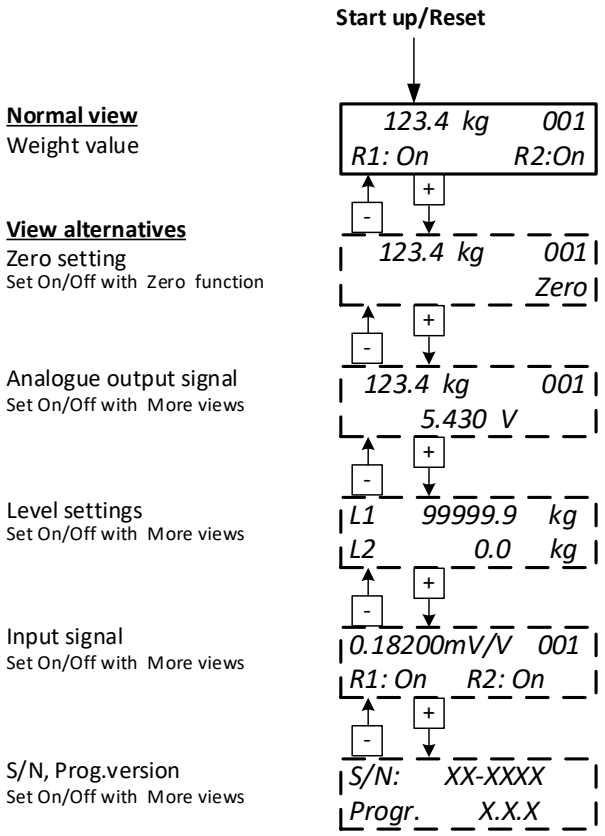


Figure 2. AST 5P in Operating mode can always display the weight value. Depending on the setting, display of alternative views can be selected by keys + and –

Zero setting

Zero setting in normal operation can be performed if the ‘Zero setting’ view is enabled, see previous page, but that zero setting is only temporary.
To perform a zero setting, saved in the instrument memory, the normal operation must be interrupted and the following sequence in set-up mode carried out.
This type of zero setting is included in the calibration sequences, but a separate zero setting may also be needed, for example if the equipment on the scale has been changed, influencing the weight.

Procedure

1. Check that the scale is unloaded before performing the zero setting.
2. Switch to set-up mode by holding ESCAPE (⇧) pressed for 2 seconds.
3. Enter the valid password, if this is demanded.
4. The text ‘Main menu Quick set-up’ is displayed.
   Press ENTER (↵).
5. The first parameter name, ‘Language’, is displayed.
   Press + a number of times until ‘Set zero’ is displayed. The parameter value for ‘Set zero’ is a live weight value.
6. Press ↵ . The parameter value is set to zero and a blinking cursor appears to the left on the second line.
   (The zero setting can be cancelled by pressing ⇧)
7. Press and hold ↵ for 2 seconds to confirm the new setting.
   The cursor disappears and a live weight value is displayed.
8. Press + , read and make a note of the ‘Zero offset’ value in Appendix 1.
   (The ‘Zero offset’ value can be used for set-up of a replacement instrument.)
9. Press ⇧ .
   The display changes to ‘Main menu Exit set-up.’
10. Press ↵ .
    The display changes to ‘Save changes? No Esc. Yes’.
    (Press ⇧ (Esc.) if you do not wish to exit from the set-up mode.)
11. Press − (No) to cancel the change and return to the previous zero setting,
    or
    Press ↵ (Yes) to save the new zero setting in the instrument.
12. AST 5P restarts with the selected zero setting.

Installation

Mechanical installation

Each signal transmitter module AST 5P contains several circuit boards, built into a protective plastic housing. The module can be snap-mounted on a 35 mm wide DIN rail. Mounted modules should have at least 10 mm free space on each side.

Electrical installation

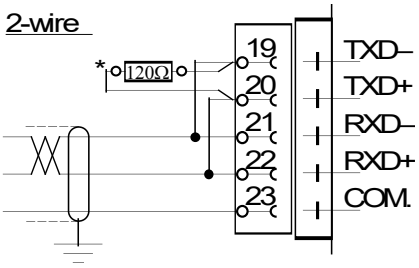
All electrical connections to the AST 5P module, including possible connection to ground, are made via plug-in terminal blocks. For all interfaces, except for the power input, shielded cables must be used. All other cabling should be routed away from power cables in order to avoid risk for electromagnetic interference. Input and output signals for AST 5P are galvanically isolated from each other to facilitate connection to various external equipment.
There are no limitations on the length of the cables connected to AST 5P as long as it is possible to ensure proper function of the corresponding interface.
Cable connection is shown in the diagrams below.

Serial communication

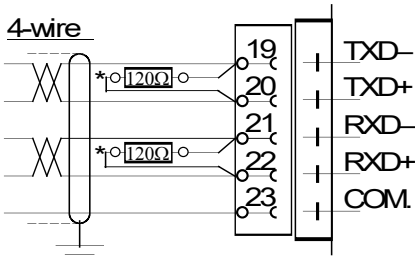
Connections are made to terminals 19 – 23.
All AST 5P have a serial port for RS485 on 2-wires or 4-wires with common earth (COM). If necessary, a converter unit should be connected to adapt the interfaces.

The line must have 120 Ohm termination at both ends. For AST 5P it should be mounted on separate terminals and connected according to the diagrams. Refer to manufacturer instructions for termination at the control unit (PC), or at the converter unit.

Shielded cable with twisted pairs must be used and the cable shield must be connected to ground, preferably to a ground terminal on the mounting rail close to AST 5P. Make sure that the shield length between the cable and the grounding point is as short as possible.



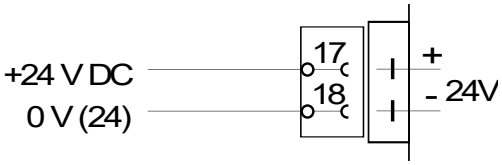
* Terminating resistor on separate terminals at the last unit on the line.



* Terminating resistor on separate terminals at the last unit on the line.

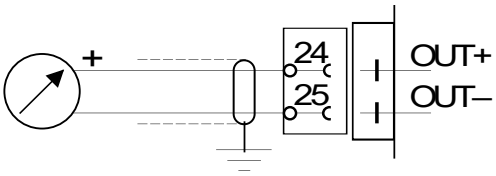
Power supply

Connections are made to terminals 17, 18.
The AST 5P module is powered by 24 VDC.



Analog output

Connections are made to terminals 24, 25.
The measurement value is presented as a current or voltage signal, according to set-up selection.
Shielded cable must be used and the cable shield must be connected to ground, preferably to a ground terminal on the mounting rail close to AST 5P. Make sure that the shield length between the cable and the grounding point is as short as possible.



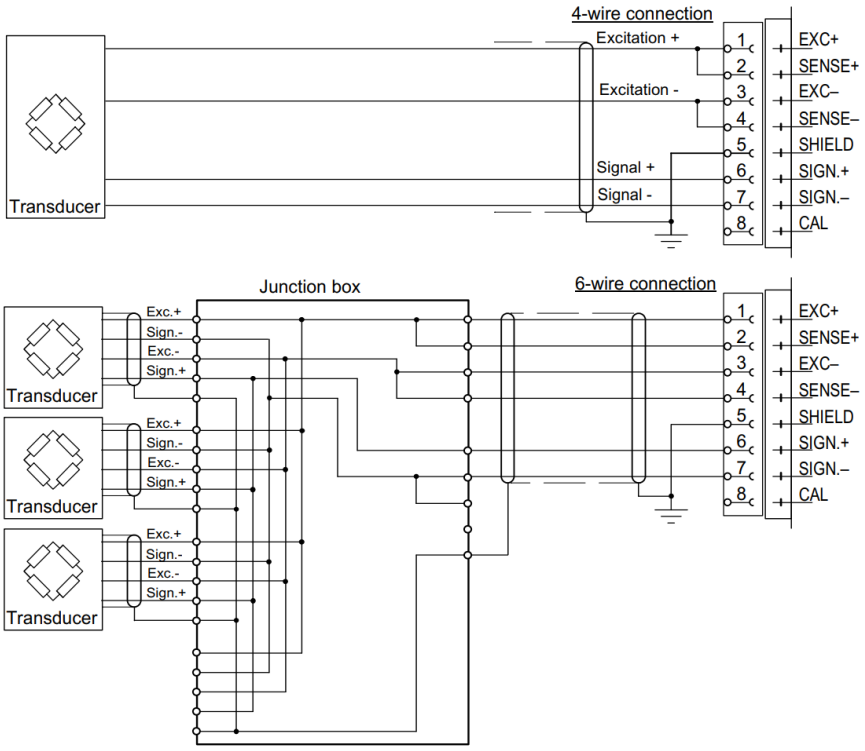
Transducer input

Connections are made to terminals 1 – 7. Terminal 8 shall be left unconnected. Transducer connection should be handled with great care to achieve good measuring data. Shielded cable must be used. Integrated transducer cables may not be shortened.

> ***WARNING***
> *Transducer cables must be routed at least 200 mm away from 110-240 V, 50/60 Hz power cables. For power cables carrying other frequencies or high power, an even wider distance is preferable.*

4-wire connection should be used if the integrated transducer cable is long enough to be connected directly to the AST 5P. By 4-wire connection, excitation and sense must be interconnected at AST 5P, see diagram below. The cable shield and terminal 5 must be connected to ground via the mounting rail close to AST 5P. Make sure that the shield length between the cable and the grounding point is as short as possible.

6-wire connection should be used if the integrated cable must be lengthened or if several transducers should be connected to one AST 5P unit. The cable shield and terminal 5 must be connected to ground via the mounting rail close to AST 5P. Make sure that the shield length between the cable and the grounding point is as short as possible.



Set-up program deltaCOM

AST 5P must be connected to transducer(s) and power supply, and in addition it can be connected to a PC with Windows from which set-up can be performed. The set-up program deltaCOM from BLH Nobel can be used.

By use of deltaCOM it is possible to find all AST 5P modules communicating with the PC, and to study and edit all set-up parameters for these modules.

Quick set-up, calibration

General

Set-up of all parameters in AST 5P can be performed from the PC program deltaCOM from BLH Nobel.

Parameter values can also be changed via function keys on the front panel where parameters are accessed via ‘Setup’ (described in the Technical Manual) or via ‘Quick Setup’ as described in this section. An overall view of the available parameters and the use of the function keys during ‘Quick Setup’ is described at the end of the document in section ‘Parameter overview’.

Calibration is essential for the instrument to give correct measurement results.
Two calibration methods are available in the ‘Quick set-up’:
Data sheet calibration, for calibration when load cell data is available and the installation is free from disturbing mechanical forces.
Dead weight calibration, normally the most accurate calibration method, where known weights are used to give well defined loads on the scale.

Before selection of calibration method, the value of some common instrument parameters must be set.

All parameter values from the calibration should be noted in the set-up list, see Appendix 1. These values are useful later, if the instrument must be replaced.

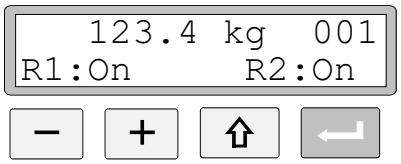
Common parameters

These parameters are defining: the language, measurement unit and resolution for the instrument and also the capacity and signal type for the analog output.

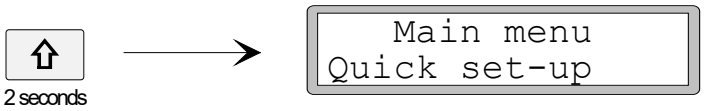
Set-up

1. Access ‘Quick set-up’

At normal operation AST 5P displays the actual measurement value and the module address. Status for the internal relays (R1/R2) in use is also displayed.



Press and hold the ESCAPE key for 2 seconds.



This switches the instrument into Set-up mode, displaying the main menu for ‘Quick set-up’.
As AST 5P is in Set-up mode, normal measuring functions are interrupted!

2. Showing the parameters.

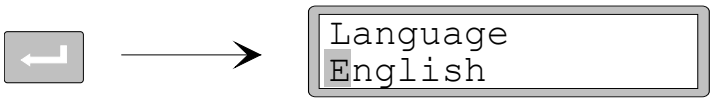
Press ENTER.

The first parameter in ‘Quick set-up’ will be displayed.

3. Edit the language (a choice parameter).

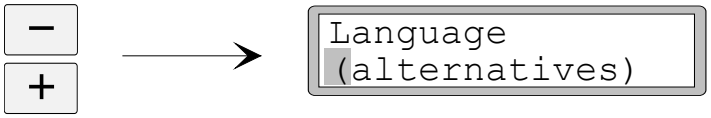
‘Language’ is a choice parameter with a number of alternatives available.

Press ENTER to make editing possible.

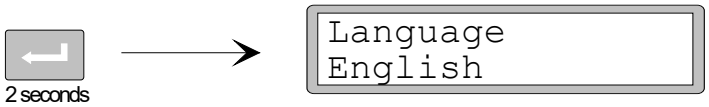


A cursor starts blinking to the left on the parameter value line.

Press + to step forwards to next alternative, or press − to step backwards to the previous alternative, until the correct alternative is displayed.



Press ENTER for 2 seconds to accept the displayed alternative.



The cursor disappears and the displayed alternative is activated.

4. Edit the measurement unit for the instrument.

By this parameter, the unit of the measurement value is defined.

Press + to get parameter ‘Measurement unit’ displayed.

Press ↵ if the measurement unit should be edited, and edit the value as in point **3** above.

5. Edit the instrument resolution.

With this parameter, the number of decimals and the resolution of the last digit of the measurement value are defined.
This parameter influences all measurement values using the measurement unit.

Press + to get parameter 'Resolution' displayed.

Press ↵ if the resolution should be edited, and make the editing as in point **3** on page 8.
In the following examples, resolution with two decimals is used.

6. Edit the instrument capacity (numeric parameter).

This parameter defines the capacity of the instrument, i.e. the weight value that corresponds to full range at the analog output.

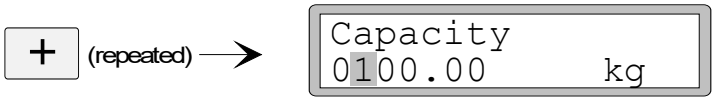
Press + to get the parameter 'Capacity' displayed.

Press ENTER to make editing possible.

A cursor starts blinking to the left on the parameter value line, indicating which sign or digit that can be edited.

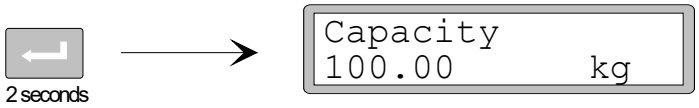
Press ENTER to move the cursor, step by step to the right in the parameter value, to the digit to edit.

Press + (or −) until the wanted digit value is displayed (1 in this example).



When necessary, press ENTER again to move the cursor to another digit to edit.

Press ENTER for 2 seconds when the capacity parameter value is correct.

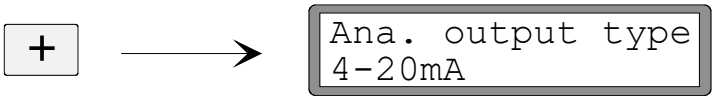


The cursor disappears, and the edited parameter value becomes active.

7. Edit the analog output type.

The signal type for the analog output is defined by parameter ‘Ana. output type’ that has a number of alternatives.

Press + to get parameter ‘Ana. output type’ displayed.



Press ↵ if the parameter should be edited, and make the editing as in point **3** on page 8.

8. Chose a calibration type.

Two calibration types can be chosen in ‘Quick set-up’: Data sheet or Deadweight. As a new calibration shall be performed, AST 5P must first be set for editing, indicated by a cursor at the parameter value. Then one of the alternatives must be chosen and accepted.

Press + to get the parameter ‘Calibration type’ displayed.

The value points out which type of calibration that was performed last time.

If a new calibration shall be performed, press ENTER to set the instrument for editing.

A cursor starts blinking to the left on the parameter value line.

Chose an alternative for the parameter like in point **3** on page 8.

When ↵ is pressed for 2 seconds, the chosen calibration type gets active and the calibration can start.

The choice of calibration type determines which parameters will follow:
For Data sheet, see point **9** on page 11.
For Deadweight, see point **9** on page 14.

Data sheet calibration

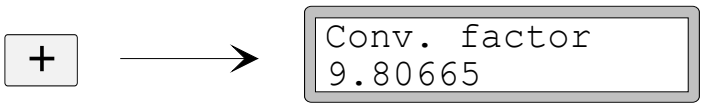
This calibration type can be used when transducer data is available, the load is evenly distributed on the support points and the weighing installation is not influenced by disturbing external forces.

Before editing of the following parameters is started, set-up of common parameters, described in point **1 – 8** on pages 7 – 10 should be performed.

9. Edit the conversion factor.

If the 'Data sheet' alternative was selected at **8** on page 10, next parameter will be 'Conv. factor'. This parameter defines a constant by which a weight value, expressed in the measurement unit, should be multiplied to be expressed in the data sheet unit.
Default value for the parameter, 9.80665, can be used when the data sheet unit is Newton (N) and the measurement unit is 'kg'.
If data sheet unit and measurement unit are equal, the value should be 1.00000.

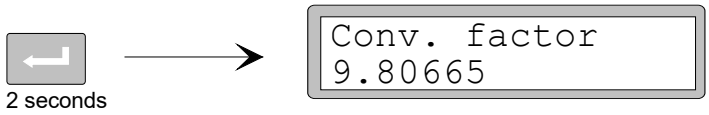
Press + to get the parameter 'Conv. factor' displayed.



Press ENTER to make editing possible.

A cursor starts blinking to the left on the parameter value line.
Now editing can be performed for each digit individually.
See point **6** on page 9 (numeric parameter).

Press ENTER for 2 seconds when the conversion factor is set to a correct value.

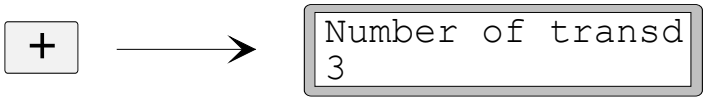


Cursor and leading zeros disappear, and the edited conversion factor will be active.

10. Edit the number of transducers.

This parameter defines the total number of support points for the load, including transducers and fixed supports.

Press + to get the parameter 'Number of transd' displayed.



Press ↵ if the parameter value should be edited, and make the editing as in point **6** on page 9 (numeric parameter).

11. Set the rated load for one transducer.

It is assumed that all transducers connected to the instrument have the same rated load and impedance. The rated load for one transducer, expressed in the data sheet unit used to calculate the conversion factor (see point **9** on page 11), should be entered.

*** **Note!** If the data sheet value is for instance 5 kN, this parameter should be set to 5 000 (N).***

Press + to get the parameter 'Rated load' displayed.

Press ↵ if the parameter value should be edited, and make the editing as in point **6** on page 9 (numeric parameter).

12. Set the rated output for the transducers.

Rated output for each transducer, a value in mV/V, is given in the data sheet. For fixed support points the rated output should be set to "0.00000".

Press + to get the parameter 'Rated output 1' displayed.

Press ↵ if the parameter value should be edited, and make the editing as in point **6** on page 9 (numeric parameter).

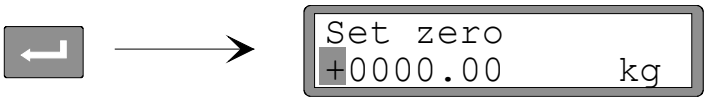
Parameters will follow for the number of support points given at point **10** on page 11. Set the parameter value to the rated output for each transducer/fixed support.

13. Set the scale to zero.

This parameter displays the weight value with actual settings (but with one decimal more than what is set in 'Resolution'). Use it to set the weight value to 'zero' for the unloaded scale.

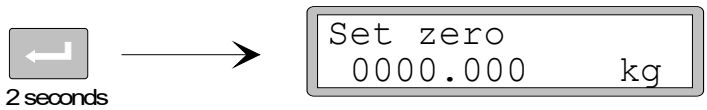
Press + to get parameter 'Set zero' displayed, and check that the scale is unloaded.

Press ENTER to set the parameter value to zero.



The value is set to zero with leading sign and a cursor blinking.

Press ENTER for 2 seconds.

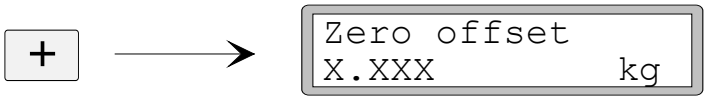


The cursor disappears and the zero setting is accepted.

14. Read the zero offset.

By installation later of a replacement instrument, it is useful to know the total zero offset value for the scale.

Press + to get parameter ‘Zero offset’ displayed.



Make a note of the zero offset value in the Quick set-up list, appendix 1.

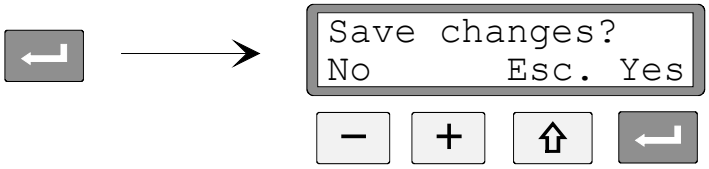
15. Exit ‘Quick set-up’.

Press ESCAPE to get to ‘Main menu Exit set-up’.

16. Save the changes.

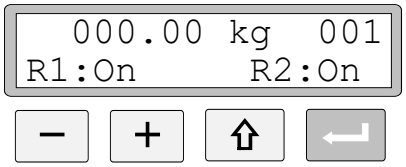
Before ‘Quick set-up’ is closed, the new parameter values should be saved, i.e. copied to a specific memory in the instrument.
Alternatively the new values can be cancelled, and all parameters will resume the values they had before ‘Quick set-up’ was started.

Press ENTER to get the sub menu displayed.



(Press ⇧ if you do not wish to exit from the set-up mode.)
Press ↵ to answer ‘Yes’, and save the new parameter values.
Press − to answer ‘No’, and cancel the new parameter values.

In both cases ‘Quick set-up’ is finished and the instrument switches over to Operating mode, displaying a measurement value that depends on the load and the active parameter values.



The scale is now ready for use.

Dead weight calibration

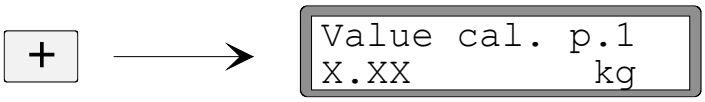
This is the most accurate calibration type. It requires that known weights to at least two-thirds of the scale capacity are available.
Below, a dead weight calibration in two points is described.

Before editing of these parameters is started, set-up of common parameters, described in point **1 – 8** on pages 7 – 10 should be performed.

9. Set the value for calibration point 1.

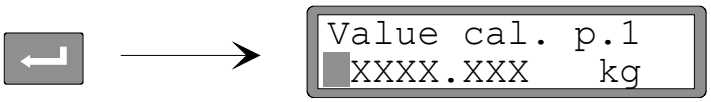
If the 'Deadweight' alternative was selected at **8** on page 10, next parameter will be 'Value cal. p.1'. This parameter defines the known load on the scale for the lower calibration point.

Press **+** to get the parameter 'Value cal. p.1' displayed.



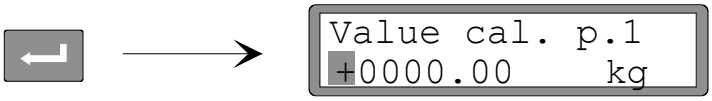
The displayed parameter value is the load on the scale that was set for the lower calibration point in the last calibration, normally zero (= unloaded scale).

Press ENTER.



Actual measurement value for the scale is displayed (as a 'live' weight value) with a cursor and one decimal more than what is set in parameter 'Resolution'. Check the load on the scale (normally unloaded).

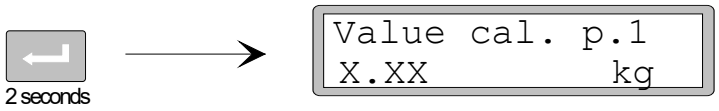
Press ENTER again to make editing possible.



The displayed parameter value is the value for calibration point 1 from the last calibration, with leading sign and a cursor.

The parameter value can be edited, according to point **6** on page 9 (numerical parameter), to correspond to the actual load on the scale, normally zero.

Press ENTER for 2 seconds.

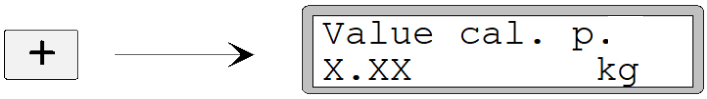


This finishes the editing and the load that is set for the lower calibration point is displayed without cursor.

10. Set the value for calibration point 2.

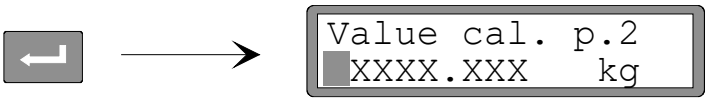
This parameter defines the known load on the scale in the higher calibration point.

Press + to get the parameter ‘Value cal. p.2’ displayed.



The displayed parameter value is the load on the scale that was set for the higher calibration point in the last calibration.

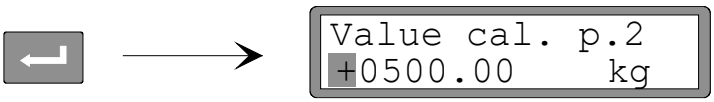
Press ENTER.



Actual measurement value for the scale is displayed (as a ‘live’ weight value) with a cursor and one decimal more than what is set in parameter ‘Resolution’.

Load the scale with known weights to at least two thirds of the scale capacity.

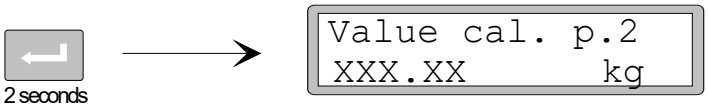
Press ENTER again to make editing possible.



The displayed parameter value is the value for calibration point 2 from the last calibration with leading sign and a cursor.

The parameter value can be edited, according to point **6** on page 9 (numerical parameter), to correspond to the actual load of known weights on the scale.

Press ENTER for 2 seconds.



Editing is finished and the load that is set for the higher calibration point is displayed without cursor.

11. Read the transducer signal for calibration point 1 (read only).

By installation later of a replacement instrument, it is useful to know the value of the transducer signals for the two calibration points.

Press + to get parameter ‘Transd.sign. p.1’ displayed.

Make a note of the parameter value in the Quick set-up list, appendix 1.

12. Read the transducer signal for calibration point 2 (read only).

Press + to get parameter ‘Transd.sign. p.2’ displayed.

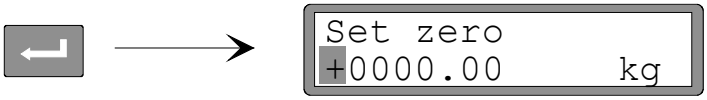
Make a note of the parameter value in the Quick set-up list, appendix 1.

13. Set the scale to zero.

This parameter displays the weight value with actual settings (but with one decimal more than what is set in ‘Resolution’). Use it to set the weight value to ‘zero’ for the unloaded scale.

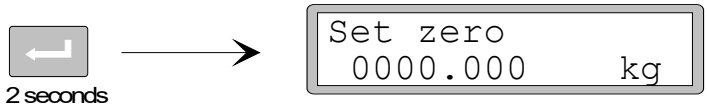
Press + to get parameter ‘Set zero’ displayed, and check that the scale is unloaded.

Press ENTER to set the parameter value to zero.



The value is set to zero with leading sign and a cursor blinking.

Press ENTER for 2 seconds.

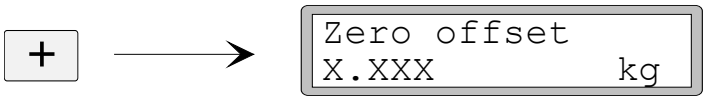


The cursor disappears and the zero setting is accepted.

14. Read the zero offset.

By installation later of a replacement instrument, it is useful to know the total zero offset value for the scale.

Press + to get parameter ‘Zero offset’ displayed.



Make a note of the zero offset value in the Quick set-up list, appendix 1.

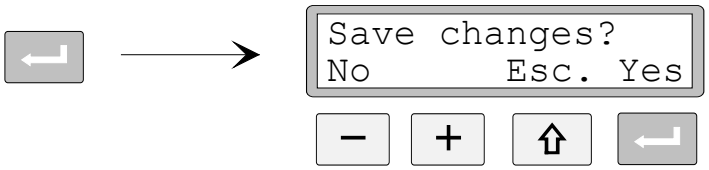
15. Exit ‘Quick set-up’.

Press ESCAPE to get to ‘Main menu Exit set-up’.

16. Save the changes.

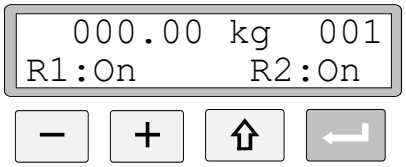
Before ‘Quick set-up’ is closed, the new parameter values should be saved, i.e. copied to a specific memory in the instrument.
Alternatively the new values can be cancelled, and all parameters will resume the values they had before ‘Quick set-up’ was started.

Press ENTER to get the sub menu displayed.



(Press ⇧ if you do not wish to exit from the set-up mode.)
Press ↵ to answer ‘Yes’ and save the new parameter values.
Press − to answer ‘No’ and cancel the new parameter values.

In both cases ‘Quick set-up’ is finished and the instrument switches over to Operating mode, displaying a measurement value that depends on the load and the active parameter values.



The scale is now ready for use.

Parameter overview

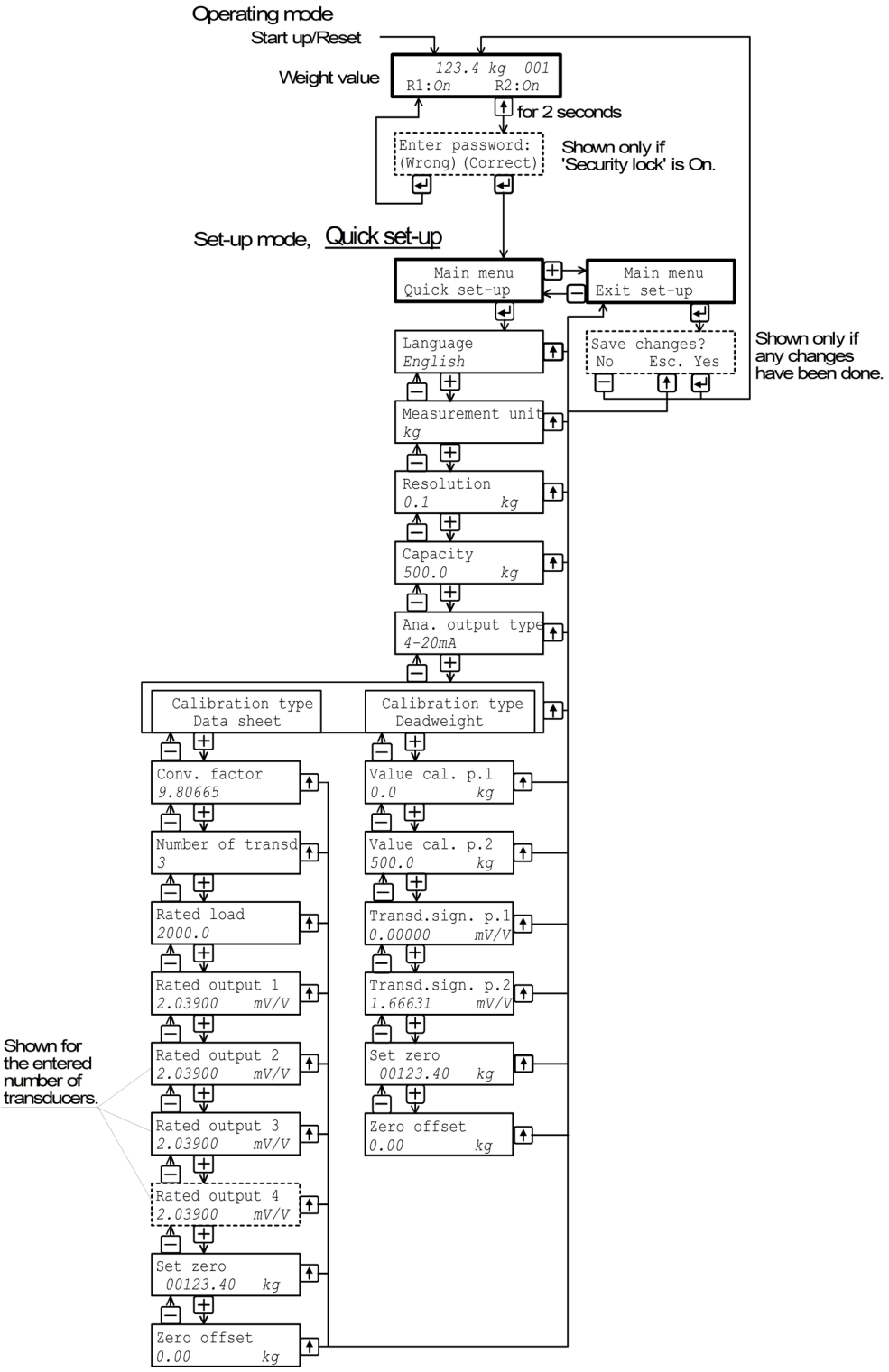


Figure 3. The diagram shows the parameters in 'Quick set-up' and how the function keys are used to view the parameters

Quick set-up list for AST 5P

Location/Notes: .....

Program version: ..... Ser. no.: ..... Date: .....

Parameter name	Default value	Set-up value	
Language	English	.....	.....
Measurement unit	kg	.....	.....
Resolution	0.1	.....	.....
Capacity	500.0	.....	.....
Ana. output type	4–20mA	.....	.....
Calibration type	Data sheet	.....	.....
Conv. factor	9.80665	.....	.....
Number of transd	3	.....	.....
Rated load	2000.0	.....	.....
Rated output 1	2.03900	.....	.....
Rated output 2	2.03900	.....	.....
Rated output 3	2.03900	.....	.....
Rated output 4	2.03900	.....	.....
Value cal. p.1	0.0	.....	.....
Value cal. p.2	500.0	.....	.....
Transd.sign. p.1	0.00000	.....	.....
Transd.sign. p.2	1.66631	.....	.....
Zero offset	0.00	.....	.....

Publication no. 601 803 R0
© Vishay Nobel AB, 2025-06-18
Subject to changes without notice.

Vishay Nobel AB
Box 423, SE-691 27 Karlskoga, Sweden
Phone +46 586 63000
blhnobel.se@vpgsensors.com
www.blhnobel.com

BLH
951 Wendell Blvd, Wendell, NC 27591, USA
Phone: 781-298-2200 Fax: 781-762-3988
blhnobel.usa@vpgsensors.com
www.blhnobel.com