Manual

AGRETO Hydraulic Scale

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1 Introduction

Thank you that you have chosen an Agreto three-point scale. You have acquired a robust tool for daily practice.
The Agreto three-point scale may be used solely for internal use as a checkweigher. A use for the legal transactions is not permitted.
Please read this manual carefully before using the scale in operation.
In this manual, as usual "weight" is used in common parlance, the term for the mass.

2 Scope of Delivery

- 1 Pressure sensor with 4 m signal cable
- 1 Weighing display with weighing software, housing and mounting bracket
- 4m Cable for weighing signal
- 2m Power supply cable
- 1 Manual

3 Intended Use

The AGRETO hydraulic scale is designed for installation in the lifting hydraulics of forklift trucks and front loaders with single-acting lift cylinders.

The pressure sensor measures the pressure in the hydraulic circuit, the display converts this pressure into the weight and displays it.

In order to get meaningful values, the system must be calibrated after fitting with a known weight.

To perform weighings the instructions in this manual must be followed.

When using the system in front loaders, the position of the load and the lifting height has a significant influence on the accuracy.

A weighing on the basis of the hydraulic pressure in the rear hydraulics of a tractor is not possible due to the different leverage and rotational movements of the lifting rod!

4 Security

4.1 Safety Instructions for the buyer

Important!

Make sure that each person who works for the first time with the AGRETO Hydraulic Scale, has read and understood this manual.

4.2 Safety instructions for the operator

Danger!

The AGRETO Hydraulic Scale may only be operated by persons who are familiar with the operation of the device.

Precaution!

Keep the work area clean! Soiled areas contributes to accidents.

Danger!

Risk of injury from tip-over / fall and inattention while working with the measuring instrument getting on and off the tractor.

4.3 Personal Protective Equipment

WARNING!

For people who work with the device, the wearing of safety shoes is required.

4.4 Residual Hazards

Working with the device residual risks may arise for persons and objects that cannot be prevented by design or technical protection measures.

WARNING!

The AGRETO Hydraulic Scale must not be operated in explosive areas.

5 Technical Specifications

5.1 Pressure Sensor

- Maximum pressure: 250 bar
- Overload 120%, breaking load 150%
- Accuracy: +/- 0,1%
- Working temperatur: -20 to +65 ° C
- Temperature compensation: -10 bis +50 °C
- Hydraulic connection: M14 x1,5 inner angle 37°

5.2 Weighing Indicator

- 6-digit LCD display mit 20mm digit height, LED-illuminated
- Power supply 12 bis 24 VDC

- Working temperature: -10 to +50 Grad Celsius
- Real time watch
- Tare by pressing a button (zero position of the empty device)
- Sum function (also possible via external switch)
- Erschütterungsfest und spritzwassergeschützt
- Vibration damped display for reading while driving

5.3 Cabling

- 5m specially coated weighing signal cable
- Waterproof screw connector (IP68)
- 2m power supply cable for the weighing indicator

6 Installation

6.1 Installation of the Pressure Sensor

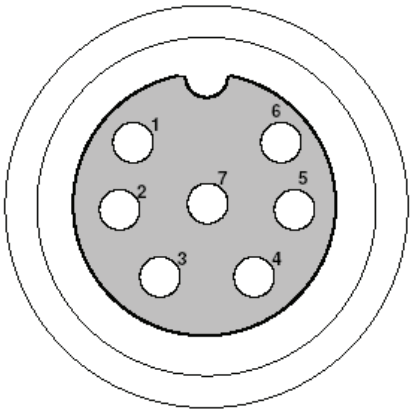
- Find a suitable place between the controller and cylinder in the pressure line of your hydraulic system. If any control valves and blocking valves are used, the pressure sensor must be mounted between these valves and the cylinders.
- Disconnect the hydraulic line at a threaded connection and arrange the necessary fittings, such as T-piece, socket, etc., these are very individual and are not supplied with the hydraulic scale.
- If no proper separation point is present, you must remove a piece of hose and let press in a T-piece.
- Mount the pressure sensor and route the signal cable to the area of the weighing indicator.

6.2 Installation of the Weighing Indicator

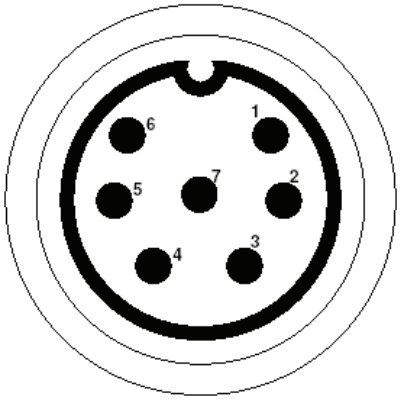
- Place the weighing indicator at a suitable location in the vehicle.
- Connect the power cable to positive and negative to the on-board electrics. The display can be operated from 12 to 24 V.
- Connect the plugs of the weighing signal cable.

The weight signal cable has the following pinout:

Front view cable socket on the scale



front view cable plug connection cable



No.:	Description	Function
1	EX -	Power supply -
2	EX +	Power supply +
3	SI -	Signal -
4	SI +	Signal +
5		
6		
7		

7 Settings of the weighing indicator

The weighing indicator has several adjustable parameters that affect the operation of the system.

To use the weighing indicator with the three-point scale AGRETO following parameters are set differently from the default settings when delivered:

BUILD	CABLE: 4	(Load cell connection with 4 wires)
BUILD	RES: 5	(Resolution of the weighing indicator to 5kg)
OPTION	FILTER: 2	(Strong damping of the display)
OPTION	Z.RANGE: FULL	(Zeroing possible at any load)
SPEC	KEY.FN: SHOW.T	(Put function key to display the sum)
SPEC	REM.FN: KEY 4	(Remote control Summing key enabled)
SERIAL	TYPE: PRINT	(Type of output for remote control)

The default setting for the capacity of the display (= maximum weighing range) is set to 3000. If you must weigh heavier loads than 3000 kg the parameter BUILD CAP has to be set accordingly higher (up 999,999) so that the display during operation does not go on overload.

For operations with larger loads, the division upwards should be adjusted as otherwise the displayed value is not meaningful.

8 Calibration of Weighing Indicator

To adjust the conversion of hydraulic pressure to weight for your system the weighing indicator must be calibrated before first use.

Think of a defined lift height of your front loader, which you can reset at any time as precisely as possible and in which you want to display the weights later. Due to the construction of a front loader weighing can always be performed correctly only in this defined lift height. For forklift mast with free lift you must (usually the lower) decide at least for a lifting range.

Think of a defined position of the work tool (shovel, fork ...) which you can reset at any time as precisely as possible and in which you want to display the weights later. Due to the construction of a front loader weighing can always be performed correctly only in this defined tool position. It is advisable to spin up the tool until it stops, and always to weigh in this position. For forklift masts, there is no such limitation.

Decide whether you prefer to weigh after a lifting procedure or a lowering operation. By different pressure conditions in the system by means of friction in mechanical parts, should always be weighed just by an at least short lifting or lowering operation in the same direction.

Consider these three facts in any case already at calibration!

To carry out the calibration, please follow the steps below:

- Stand with the vehicle on a flat surface.
- Bring your empty front loader (fork lift mast) in weighing position (as described above with lift / tool position / direction of movement).
- Press and hold on the weighing display simultaneously the far right and the far left (small) button until the calibration sequence starts.
- Wait until the word BUILD appears on the display.
- Press 2x the [ZERO] button, the display will show CAL.
- Press the [TARE] button, the display will show ZERO.
- Press the [GROSS / NET] button on the display will flash the current weight.
- Press the [GROSS / NET] button, the display will show Z.inP, now the zero point is defined and confirmed with a tone.
- Press the [TARE] button, the display will show ZERO.
- Press the [TARE] button, on the display appears SPAN.

- Press 2x the [GROSS / NET] button, on the display will flash the current weight.
- Strain now the loader (forklift) with a familiar weight or fill a known amount of material in your tool. The weight should be as large as possible, best fill your device completely full.
- Bring your front loader (fork lift mast) back in weighing position (as described above with lift / tool position / direction of movement).
- Press the [GROSS / NET] button, on the display you see the last set calibration weight.
- Change the displayed number to the actually filled weight or weight used for calibration. The number digit by digit can be changed, the current point will blink. To change the current position use the [GROSS / NET] button. After the most right digits the most left digit will become active again. To change the number of the current (blinking) digit use the [PRINT] button.
- Press the [f] button, the display will show S.inP, now the calibration is performed and confirmed with a tone.
- Press the [TARE] button, the calibration is finished.
- To save the settings press and hold the left two keys on the display until the display restarts.
- To cancel the calibration procedure at any point just turn off the display.

9 Working with the Hydraulic Scale

9.1 Switching on the Weighing Indicator

Turn on the weighing indicator with the leftmost button. The display shows a startup sequence then the current weight on the scale, referenced from the zero point of the last calibration.

If you have performed calibration with the currently attached tool, and have used this tool as the zero point in this calibration, the empty device then applies the zero point. You can read the current weight of the load also after switching off and switching on the weighing indicator.

9.2 Zeroing

Press the [ZERO], the zero point of the display is reset. Use this function to zero the scale in weighing position. Thus, the zero point is set to the empty weight of the tool and the weight of the load can then be read directly.

When the weighing indicator is switched on the zero-point from the last calibration is used.

9.3 Standard Weighing Procedure

Loading / filling your tool, bring front loading (forklift mast) in weighing position and read the weight from weighing indicator.

9.4 Weighing with TARE-function

If you want to weigh goods in containers or packaging, with the Tare-function the weight of the empty container can be automatically deducted without changing the zero point of the scale.

- Make sure that the display shows zero.
- Put the empty container onto the scale.
- Wait until a meaningful weight is displayed.
- Press the [TARE] key. The weighing display jumps back to zero and shows the NET symbol. Now the weighing indicator shows only the net weight.
- Now bring the goods to be weighed in the container.
- Wait until the weighing display indicates a stable value.

- Read the weight - it is the net weight of the weighing goods without packaging.
- If you want to weigh several goods in the same empty containers, you can bring them successively on the scale. As long as the NET symbol is illuminated the previously determined tare will be deducted and just the net weight will be displayed
- To switch from gross to net, press the [GROSS / NET] button.
- To end the tare function, take the entire load of the scale and press the [TARE] key again.

9.5 Weighing with Sum-function

- Bring your front loader (forklifts) in weighing position, wait until the weight is stable and press the [PRINT] button. Thus, the current weight is added to the total weight.
- To read the sum you press the button [f]. The display first shows the number of weights in the summation memory (COUNT) and then the total weight of the total memory (TOTAL).
- To delete the total push and hold the [PRINT] button.
- The summation can also be triggered with an external button, which the [PRINT] key practical remote controls. Connect using a cable connection terminals TX and RX on the weighing display and run this cable isolated through a push button (NO). When the button is pressed TX and RX are connected, and the weighing indicator triggers the sum function (Press and hold to the delete function).

9.6 Switching off the Weighing Indicator

Press and hold the leftmost button until the weighing indicator goes out.

10 Troubleshooting

10.1 Error Messages during Operation

Error	Description	Resolution
(U - - - -)	The weight is below the minimum allowable weight reading.	Increase the weight or turn the scale off and on.
(O - - -- -)	The weight is above the maximum allowable weight reading.Warning - overloading may damagemechanical scale elements.	Check the condition of load cell connections. Check for damaged load cell.
(TARE) (ERROR)	Tare-Trial out of allowed range	Reduce Tare.
(ZERO) (ERROR)	Zeroing out oft he allowed range.	Reduce weight.
(STABLE) (ERROR)	Scale motion has prevented a <ZERO> or <TARE> operation from occurring on command.	Try the operation again once the scale is stable.

10.2 Setup Errors

Error	Description	Resolution
(ENTRY) (DENIED)	The instrument may be in Safe Setup and an item that needs Full Setup has been selected for editing.	Access Full Setup to edit the item.
(LIN.PT (LO)	You have tried a Linearisation below the Zero point	
(PT.TOO) (CLOSE)	An attempt has been made to place a calibration point too close to an existing calibration point.	Re-enter the calibration point. Points must be spaced by at least 2% of full scale from each other.
(RES) (LO)	The scale build is configured for less than 100 graduations.	Check the resolution (count-by) and capacity settings.
(RES) (HIGH)	The scale build is configured for more than 30,000 graduations.	Check the resolution (count-by) and capacity settings.
(SPAN) (LO)	The load cell signal range (span) is too small for these settings.	Incorrect span weight entered (must be between zero and full scale). Scale wiring incorrect. Wrong load cell capacity (too large). Wrong or no calibration weight added to scale.
(SPAN) (HIGH)	The load cell signal range (span) is too large for these settings.	Incorrect span weight entered (must be between zero and full scale). Scale wiring incorrect. Load cell capacity too small for application.
(ZERO) (LO)	An attempt has been made to calibrate zero below -2mV/V.	Scale wiring incorrect
(ZERO) (HIGH)	An attempt has been made to calibrate zero above +2mV/V.	Remove all weight from scale. Scale wiring incorrect.

10.3 Diagnostic Errors

Error	Description	Resolution
E0001	The power supply voltage is too low.	Check supply
E0002	The power supply voltage is too high.	Check scale / cables
E0010	The temperature is outside of allowable limits.	Check location
E0020	Scale build is incorrect. The number of graduations has been set too low or too high.	Fix up scale build
E0100	The digital setup information has been lost.	Re-enter setup (E0200)
E0200	The calibration information has been lost.	Re-calibrate
E0300	All setup information has been lost	Enter setup and calibrate
E0400	The factory information has been lost.	Return for Service
E0800	The EEPROM memory storage chip has failed	Return for Service
E2000	ADC Out of Range Error. This may be caused from a broken load cell cable.	Check BUILD:CABLE setting. Check load cell cable, wiring, etc.
E4000	The battery backed RAM data has lost data.	Re-enter setup
E8000	The FLASH program memory is incorrect	Return for Service

The E type error messages are additive. For example if instrument is running off batteries and the

temperature drops, the battery voltage may be too low. The resulting error messages will be E 0011

(0001 + 0010). The numbers add in hexadecimal as follows:

1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - A - B - C - D - E - F
(For example, 2 + 4 = 6, or 4 + 8 = C)

11 Warranty

Over and above statutory warranty for AGRETO hydraulic balance following warranty provisions apply :

- The AGRETO electronics GmbH guarantees the function and repairs or replaces all the parts that have a material or manufacturing damage within the warranty period.
- Warranty services will be performed by the AGRETO electronics GmbH.
- The decision on the existence of a warranty claim is sole responsibility of the AGRETO electronics GmbH.
- The warranty period begins with the first accounting to an end customer and ends 5 years from this date of invoice.
- Prerequisite for warranty service are the presentation of the original invoice and compliance with all elements of this instruction manual.
- Excluded from warranty are wear, normal wear and tear, damage due to misuse, negligence or accident.
- When processing a warranty claim transport costs incurred will be charged to the buyer.

12 Disposal

Dispose the product in the definitive shutdown or parts of environmentally friendly (metal to the respective metal scrap, plastic to plastic waste, etc. - Do not dispose as household waste!)

Detailed information can be found in Directive 2002/96/EC