G4 PROGRAM DESCRIPTION

G4-PCW

Program: G4MI_1.7.121.0

Program for Weighing with pressure compensation

This description is valid for:
G4 Multi Channel Weighing Instrument with application program **1.7.121.0**

See also the following descriptions
G4 Multi Channel Weighing Instrument Program version 1.7.0.0
Technical Manual PM/DT/HE (www.vishaypg.com/doc?35144)
G4 Multi Channel Weighing Instrument Program version 1.7.0.0
Operating instructions, Quick installation PM/DT/HE (www.vishaypg.com/doc?35178)

If these descriptions in any case are contradictory, this description is valid.

Special Program options:
To get the functionality described below the following program option has to be activated.
13: Pressure Correction: Option for pressure compensation.

Function

This special program adds functions for compensation of pressure affecting the weighed vessel.

The program can be used in G4 weighing instrument with graphical display (PM/HE/DT).
The standard 'Flow rate' measurement option is not available in this program.

General

This program is intended for an application in a blast furnace in a steel mill, where the gas pressure inside the blast furnace will effect the weight.
The pressure is measured with a pressure transducer and the signal (1-5 V) is converted to a mV/V signal and inputted on a weighing channel (channel 1) in G4. This channel is calibrated to show the effect on the weight for different pressures inside the furnace.
The other channel (channel 2) on the same weighing module, is used for the weighing of the furnace. The weight on this channel is compensated with the weight change caused by the pressure (channel 1).

The compensation can be turned on or off by a soft key on the front panel.

A set-up parameter defines if the function should add or subtract the pressure weight value to or from the weighed value.

When the compensation is active the compensated weight value can be read on the display (channel 2) or via communication or on an available analog output.

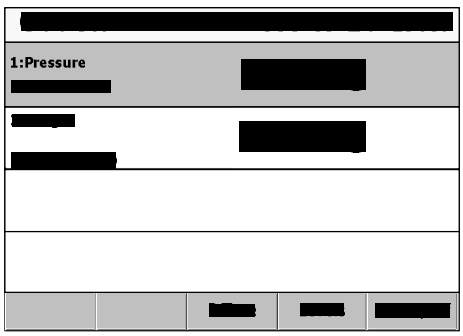
When the compensation is active this is indicated on the different weight displays and also as a bit in the status register for the channel when used by communication.

Operation

The normal displays are modified to have a soft key for turning on/off the pressure compensation, and to have indicators to show wether the compensation is on or off.

Display of one channel.
If compensation is active, the line (info-line 1) is displaying 'Pressure compensation active'

Display of two channels or up to four channels.
If compensation is active and the scale is selected (yellow), there is a (P) after 'Gross' or 'Net' indicator



Pressing the soft key 'Pr. On/Off' or function key F5 will toggle the pressure compensation on or off.

Calibration

When calibrating the wheighing and pressure channels the following procedure is recommended.

First the weighing channel (chn 2) is calibrated in normal way (with a depressurized system) using dead weight or data sheet depending on what is suitable (see standard manual).

Then calibration of the pressure correction channel (chn 1) can be done in the following way.

Apply pressure in up to six steps, and for each step read the signal from the pressure transducer converted to mV/V and the weight value in the weighing channel.
These values are easiest read in the ***Maintenance/Diagnostic/Scales*** menu, where you can read the mV/V signal and gross weight for all channels in one window). The values will later be entered into a 'Table calibration' procedure for the pressure channel (channel 1).

1. Point1. Depressurize system, so that the pressure has no impact on the weight value.
   Read mV/V signal for channel 1 (S1) and gross weight for channel 2 (W1).

2. Point 2. Apply pressure to system to a certain value (P2).
   Read mV/V signal for channel 1 (S2) and gross weight for channel 2 (W2).

3. Point 3. Apply more pressure to system to certain value (P3).
   Read mV/V signal for channel 1 (S3) and gross weight for channel 2 (W3).

   The above procedure can be done from 2 – 6 points.

After the signal and weight values has been gathered, go to the calibrations menu (***Parameter Set-up/Calibration/Scale1***) for channel 1 and start a 'Table' calibration.

Enter 'Table' in the parameter 'Calibration Type' and the number of points in parameter 'No.of calibration points'

Then, we can do the 'Table' calibration of channel 1 by entering the following values into the corresponding set-up parameters.

Transd. signal P1 = S1 mV/V	Value Cal. P1 = 0 kg
Transd. signal P2 = S2 mV/V	Value Cal. P2 = Absolute value of (W2 – W1) kg
Transd. signal P3 = S3 mV/V	Value Cal. P3 = Absolute value of (W3– W1) kg
Transd. signal P4 = S4 mV/V	Value Cal. P4 = Absolute value of (W4 – W1) kg
Transd. signal P5 = S5 mV/V	Value Cal. P5 = Absolute value of (W5 – W1) kg
Transd. signal P6 = S6 mV/V	Value Cal. P6 = Absolute value of (W6 – W1) kg

Channel 1 should after this calibration show the weight (Wt_comp) that should be added or subtracted to the weight of channel 2, corresponding to the pressure in the system.
A set-up parameter (***Parameter Set-up/General/Pressure Correction Mode***) is set to 'Add' to compensate for lifting (adding the weight) or 'Subtract' to compensate for pressing (subtracting the weight).
The weight value on the weighing channel (channel 2) will when compensation is active be Wt = Wt_load cell + or - Wt_comp.

Parameters

The menu system is reached with the ‘Info’ button (or key F11 on a connected USB keyboard.

Added or changed menus and parameters.

Menu ‘General’
This menu has been extended with one new parameter.

Pressure Correction Mode

Choices: Add Subtract <Add>	**Defines** if the pressure compensation value (from channel 1) should be added or subtracted to the weight value (channel 2).

Default value of parameter ’Info line 1 mode’ has changed to ‘Not in use’ to allow for Pressure compensation active indicator.

Menu ‘Hardware Config’
Default value of parameter ‘Slot 1 Module Type’ has changed to HSWF2. This module type must be used when 1-5 V converter is used.

Menu ‘Program options’
This menu shows all available program options for this special program. In this program the option for flow measurement ’01: Flow rate’ is removed and the option for pressure compensation ’13: Pressure Correction’ is added.

Program options must be activated with an option code to be functional. The option code can be purchased from your instrument supplier.

13: Pressure Correction

< – >	The option code necessary to activate the ‘Pressure Compensation functions’. The code always consists of 10 digits. To temporarily use the option, enter the string ‘Demo’ (irrespective of upper/lower case). This will allow to use the option for 14 days e.g. for try out. Enter a ‘–’ to turn off the program option. The program option can be used for several short periods but after a total use of 14 days it will be permanently turned off until a valid code is entered.

Error detection

When a voltage converter is used (for the pressure transducer) it is recommended to use a level function to detect errors on pressure transducer signal. If a cable breaks or a short circuit occurs, the input signal to the converter will drop to close to 0 V resulting in a negative weight value on the pressure channel (channel 1). To detect such an error, use a level function on channel 1 and set the supervised level to a relevant negative number.

Communications

Changed Modbus Register.

Channel X: Status
Status for a channel.
Bits set to 1 in this register have the following meaning:
Bit 8 has been added in this program.

Bit no	Function	Comment
0	Net weight > INT size	The net weight in ‘scaled integer’ format does not fit in one register. (See description of data representation.)
1	Gross weight > INT size	The gross weight in ‘scaled integer’ format does not fit in one register. (See description of data representation.)
2	Flow rate > INT size	The flow rate in ‘scaled integer’ format does not fit in one register. (See description of data representation.)
3	Good zero (disp. weight)	
4	Good zero Gross	
5	Good zero Net	
6	Net Mode	'1' = Net mode ‘0' = Gross mode
7	Motion	Unstable weight
8	**Pressure compensation active**	Bit set when compensation is active
9		
10		
11	Flow rate display	Flow rate is shown in the display.
12	Net weight > 6 digits	The net weight value is out of precision and should normally not be used.
13	Gross weight > 6 digits	The gross weight value is out of precision and should normally not be used.
14		
15		

Document no. 35022
PG4MI_1_7_121_0_E1R2

Vishay Nobel AB
Box 423, SE-691 27 Karlskoga, Sweden
Phone +46 586 63000 · Fax +46 586 63099
pw.eur@vishaypg.com
www.weighingsolutions.com