PENKO Engineering B.V.

Your Partner for Fully Engineered Factory Solutions

How to…
Calibrate a SGM750 with Modbus RTU

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an ETC Company

Table of Contents

Calibrating the SGM750 with Modbus RTU

It is possible to calibrate the SGM750 with Modbus RTU. There is no direct command to do this, therefore we need to use the “Register functions”. The “Register functions” are also explained in the PENKO Modbus protocol.

Used addresses:

Tag Name	Address	Data Type	Scan Rate	Scaling
Enable Reg Func	001007	Boolean	100	None
Reg Func Active	101104	Boolean	100	None
Ext 71 read	301141	Long	100	None
Ext 72 read	301143	Long	100	None
Ext 73 read	301145	Long	100	None
Ext 74 read	301147	Long	100	None
Ext 75 write	401149	Long	100	None
Ext 76 write	401151	Long	100	None
Ext 77 write	401153	Long	100	None
Ext 78 write	401155	Long	100	None

Calibrate Zero point

Step 1: Set “Enable Reg Func” high to activate the Register functions.

Step 2: Check if “Reg Func Active” is high. If “Reg Func Active” is high, then the “Register functions” are enabled.

Step 3: Set value “1” (value 1 is the code to calibrate the zero point) in “Ext 75 write”. This will immediately calibrate the zero point.

When the zero calibration is done correctly you will read value “1” in “Ext 71 read”.

When the zero calibration was faulty, you will read a fault code in “Ext 71 read”. The fault codes are listed below:

WER_ERROR	2100	Weigher errors:
WER_NOT_STABLE	2101	Weigher not stable
WER_ABOVE_MAXLOAD	2102	Parameter above max load
WER_BELOW_ZERO	2103	Parameter below zero
WER_NOT_IN_ZERO_RANGE	2104	Not in zero range
WER_ARITHMIC_OVERFLOW	2105	Arrhythmic overflow occurred
WER_ADC_OVERFLOW	2106	A/D reads all 1's
WER_ADC_UNDERFLOW	2107	A/D reads all 0's
WER_GAIN_NEGATIVE	2108	Gain ref. < zero ref.
WER_GAIN_OVERFLOW	2109	Gain limit
WER_SAVE	2110	Save errors:
WER_SAVE_FLASH_EXHAUSTED	2111	Flash ROM exhausted
WER_SAVE_CREATE_HEADER	2112	Error on header creation

WER_SAVE_DATA_WRITE	2113	Error on data write
WER_SAVE_HEADER_VALIDATE	2114	Header validation failed
WER_SAVE_DEACTIVATE	2115	Deactivate old data fail
WER_LOAD	2116	Load errors
WER_LOAD_NOT_FOUND	2117	Item not found in store
WER_LOAD_DATA_ERROR	2118	Error in stored data
WER_BAD_CALIBRATION	2119	No calibration available
WER_NOT_ENABLED	2120	Action not enabled
WER_MCAL_NOT_FOUND	2121	Multi-point not found
WER_MCAL_OVERFLOW	2122	Calibration table full
WER_TARE_ACTIVE	2123	Not allowed, tare active
WER_NOT_ALLOWED	2124	Action is not allowed
WER_ADC_NOPOWER	2125	ADC has no power

Step 4: Set the value “0”in “Ext 75 write”. You will read the value “0” back in “Ext 71 read”. The SGM750 is now ready to receive a new fuction code.

Step 5: To leave the “Register functions”, set “Enable Reg Func” low to deactivate the “Register functions”.

Step 6: Check if “Reg Func Active” is low. If the “Reg Func Active” is low, the “Register functions” are successfully deactivated.

Calibrate Gain point

Step 1: Set “Enable Reg Func” high to activate the Register functions.

Step 2: Check if “Reg Func Active” is high. If “Reg Func Active” is high, then the “Register functions” are enabled.

Step 3: place a known weight on the scale.

Step 4: Set the known gain weight in “Ext 76 write”.

Step 5: Set value “2” (value 2 is the code to calibrate the gain point) in “Ext 75 write”. This will immediately calibrate the gain point.

Note: it is important to set the desired gain weight in “Ext 76 write” before the value “2” is set in “Ext 75 write”. “Ext 75 write” is the trigger to execute the “Register funtions” (in this case calibrate gain point).

When the gain calibration is done correctly you will read value “2” in “Ext 71 read” and the set gain weight in “Ext 71 read”.

When the gain calibration was faulty, you will read a fault code in “Ext 71 read”. The fault codes are listed below:

WER_ERROR	2100	Weigher errors:
WER_NOT_STABLE	2101	Weigher not stable
WER_ABOVE_MAXLOAD	2102	Parameter above max load
WER_BELOW_ZERO	2103	Parameter below zero
WER_NOT_IN_ZERO_RANGE	2104	Not in zero range
WER_ARITHMIC_OVERFLOW	2105	Arrhythmic overflow occurred
WER_ADC_OVERFLOW	2106	A/D reads all 1's
WER_ADC_UNDERFLOW	2107	A/D reads all 0's
WER_GAIN_NEGATIVE	2108	Gain ref. < zero ref.
WER_GAIN_OVERFLOW	2109	Gain limit
WER_SAVE	2110	Save errors:
WER_SAVE_FLASH_EXHAUSTED	2111	Flash ROM exhausted
WER_SAVE_CREATE_HEADER	2112	Error on header creation
WER_SAVE_DATA_WRITE	2113	Error on data write
WER_SAVE_HEADER_VALIDATE	2114	Header validation failed
WER_SAVE_DEACTIVATE	2115	Deactivate old data fail
WER_LOAD	2116	Load errors
WER_LOAD_NOT_FOUND	2117	Item not found in store
WER_LOAD_DATA_ERROR	2118	Error in stored data
WER_BAD_CALIBRATION	2119	No calibration available
WER_NOT_ENABLED	2120	Action not enabled
WER_MCAL_NOT_FOUND	2121	Multi-point not found
WER_MCAL_OVERFLOW	2122	Calibration table full

WER_TARE_ACTIVE	2123	Not allowed, tare active
WER_NOT_ALLOWED	2124	Action is not allowed
WER_ADC_NOPOWER	2125	ADC has no power

Step 6: Set the value “0”in “Ext 75 write”. You will read the value “0” back in “Ext 71 read”. The SGM750 is now ready to receive a new fuction code.

Step 7: To leave the “Register functions”, set “Enable Reg Func” low to deactivate the “Register functions”.

Step 8: Check if “Reg Func Active” is low. If the “Reg Func Active” is low, the “Register functions” are successfully deactivated.

About PENKO

Our design expertise include systems for manufacturing plants, bulk weighing, check weighing, force measuring and process control. For over 35 years, PENKO Engineering B.V. has been at the forefront of development and production of high-accuracy, high-speed weighing systems and our solutions continue to help cut costs, increase ROI and drive profits for some of the largest global brands, such as Cargill, Sara Lee, Heinz, Kraft Foods and Unilever to name but a few.

Whether you are looking for a simple stand-alone weighing system or a high-speed weighing and dosing controller for a complex automated production line, PENKO has a comprehensive range of standard solutions you can rely on.

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