

# Standard Automation Interface (SAI)

## APW Products





# Contents

<b>1</b>	<b>SAI for APW Products .....</b>	<b>1-1</b>
1.1.	Device Status Bits.....	1-1
1.2.	RedAlert Alarms .....	1-3
1.3.	Scale Group 2 .....	1-4
1.3.1.	Unit Bits.....	1-5
1.3.2.	Range Bits .....	1-5
1.4.	Status Group 2 – Alarms .....	1-6
1.4.1.	Application-Specific Soft Alarms.....	1-7
1.5.	I/O Status Groups .....	1-8
1.6.	SAI Status Block Command List.....	1-8
1.7.	Cyclic Command List for Floating Point Block .....	1-9
1.8.	Acyclic Command List .....	1-13

# 1 SAI for APW Products

This manual covers all APW scales that currently support the Standard Automation Interface (SAI) protocol. All firmware versions of WMF and SPE support SAI. Please note that firmware version  $\geq 3.0.4$  is required for the SPC to support SAI.

## 1.1. Device Status Bits

The device status is a composite status word that contains individual bits to indicate the state of various scale or device specific binary values. The 16 bits include the following information:

Bit	Device Specific Value	Description	WMF	SPC	SPE
0	Sequence bit 0	<p>Used as sequence toggle bits. When commands are sent by the control system, the device changes the value of the sequence bits as an indication that the command has been seen and acted on. Sequence bits are used during a sequence of commands to ensure that there have been no sequencing errors in the request and the response of data. They are updated on every new command.</p> <p>Binary value starts at zero and increments by one. Once the maximum value (binary = 11, decimal = 3) is reached, the next command causes the sequence bits to revert to zero.</p>	X	X	X
1	Sequence bit 1				
2	Heart Beat	Toggles between 0 and 1 (1 sec.) to ensure that the device is operational and updating data in Words 0, 1 and 2.	X	X	X
3	Data OK	<p>This bit is set to 1 when the device is operational and must be evaluated in conjunction with bit 4 (Smart5 Red) below. METTLER TOLEDO sample programs evaluate both bits simultaneously to indicate that the weight is valid.</p> <p>This bit gets set to 0 when the device is still operational, but the value being reported cannot be guaranteed to be valid.</p> <p>The following conditions cause the Data OK bit to be set to 0:</p> <ul style="list-style-type: none"> <li>• Device is powering up</li> <li>• Device is in setup mode</li> <li>• Device is in test mode</li> <li>• Over capacity condition occurs                             <ul style="list-style-type: none"> <li>○ When the A/D converter is at its limit</li> <li>○ Product dependent over capacity that occurs when the device determines it cannot trust the weight</li> </ul> </li> </ul>	X	X	X

Bit	Device Specific Value	Description	WMF	SPC	SPE
		<ul style="list-style-type: none"> <li>• Under capacity condition occurs               <ul style="list-style-type: none"> <li>○ When the A/D converter is at its limit</li> <li>○ Product dependent under capacity that occurs when the device determines it cannot trust the weight</li> </ul> </li> </ul>			
4	RedAlert Alarm Condition Smart5 Red Level 5	<p>The alarm condition indicates a system error. More information about the specific alarm can be found section 1.2, <b>RedAlert Alarms</b>.</p> <p>1 = Application fault; predictive diagnostics alarm triggered or command cannot be executed as requested. It indicates that the control device must stop operating until the source of the alarm is evaluated and the cause of the alarm corrected.</p>	X	X	X
5	Center of Zero	1 = Gross weight value is at a value of zero +/- one quarter of a weight and measures verification interval denoted as "e".	X	X	X
6	Motion	1 = Weight is unstable. The sensitivity of the motion condition is configured in the device and is additionally influenced by the filter settings.	X	X	X
7	Net Mode	1 = Net weight instead of gross weight is reported.	X	X	X
8	Alternate weight unit	1 = An alternate weight unit, other than the primary unit is in use.	X	X	X
9	Reserved 1	See SAI manual: 30588288			
10	Smart5 Orange Level 4	<p>These bits are used to provide device specific status information e.g. I/O or application status. No devices covered by this manual currently support device specific bits</p>			
11	Smart5 Yellow Level 3				
12	Smart5 Blue Level 2				
13	Selected Scale				
14	Device Specific bit 6				
15	Device Specific bit 7				

## 1.2. RedAlert™ Smart5™ Alarms

The critical alarm status bits are sent as part of the default status block when a status block command 0 is sent. If the control system does not place any data in the command word (write), the device will send the data of RedAlert group. The 16 bits include the following information:

Bit	Red Alert	Description	WMF	SPC	SPE
0	Calibration alarm	1 = Weight data can no longer be trusted due to loss of calibration data or an algorithm running in the product to detect weighing irregularities.			
1	Out of A/D range over/under	1 = Weight data can no longer be trusted due to loss of data or mechanical damage of the weigh module.	X	X	X
2	Checksum failure	1 = A checksum analysis of memory does not yield the expected result.			
3	Weight blocked	1 = Weight data does not change appreciably over a defined period of time.			
4	Single sensor communication failure (LC missing)	1 = One or more of the connected sensors are not working properly.			
5	Customer defined overload	1 = Weight is equal to or greater than the maximum load allowed. Although overload is a conditional limit, it can lead to bigger errors such as mechanical breakage or personal injury.			
6	Customer defined underload	1 = Weight is equal or less than the minimum load allowed.			
7	Network failure (all cells)	Applicable only on multi-cell networks. 1 = Failure of the entire network. No cells are responding.			
8	Zero out of range	1 = A control system attempted a zero command, but the device did not accept the command because the weight is outside the specified limits or the weights and measure limits.			
9	Symmetry alarm	Applicable only for products with TraxDSP function which detects significant errors between load cells and their peers. 1 = A symmetry error has been detected.			
10	Temperature errors (LC temperature out of normal temperature)	1 = Sensor is outside of the allowed temperature range. The weight value can be affected, or the components can prematurely fail. This bit goes high when Application Specific Bit 3 or 4 is activated (Section 1.4.1)	X	X	X
11	Weights and measures failure	1 = The product is no longer in compliance with weights and measure regulations.	X	X	X
12	Foreign device detected	1 = A foreign device is attached to the system or any similar algorithm limits.			
13	Test mode	1 = Device is in a mode in which live data is being replaced with special test data.	X	X	X
14	Analog Scale Failure (ACM)	1 = Temperature for at least one loadcell is outside the operation temperature range			
15	Reserved	1 = Checksum error occurred with loadcell parameters block			

## 1.3. Scale Group 2

These status bits are sent as part of the default status block when a status block command 0 is sent. If the control system does not place any data in the command word (write), the device will send this data in scale status group. The 16 bits include the following information:

Bit	Scale Status Group	Description	WMF	SPC	SPE
0	Unit bit 1	Unit bits are used to indicate the weight unit. Refer to section 1.3.1, <b>Unit Bits</b> , for more information.	X	X	X
1	Unit bit 2				
2	Unit bit 3				
3	Unit bit 4				
4	MinWeigh Error	1 = Scale is below acceptable minimum weighing range.			
5	Range bit 1	Range bits are used to indicate weight range or interval based on the values shown. Refer to section 1.3.2, <b>Range Bits</b> , for more information.			
6	Range bit 2				
7	In Set Up	1 = Sensor is in setup mode.	X	X	X
8	Power Up Zero Failure	1 = Scale has not been able to complete its power-up restore / reset of zero. This condition usually indicates that the customer must remove an object from the scale before operating it.	X	X	X
9	Reserved				
10	Selected Scale	For multi-scale devices only: 1 = Scale is selected and therefore in focus or seen on the device display.	X	X	X
11	Open	Unused (always 0)			
12	Open				
13	Legal for Trade Switch Enabled				
14	Open				
15	Open				

1.3.1.

Unit Bits

Unit Bit 4	Unit Bit 3	Unit Bit 2	Unit Bit 1	Value
0	0	0	0	g
0	0	0	1	kg
0	0	1	0	lb
0	0	1	1	t
0	1	0	0	ton
0	1	0	1	mg
0	1	1	0	ug
0	1	1	1	Custom
1	0	0	0	oz
1	0	0	1	dwt
1	0	1	0	ozt
1011-1111				Reserved

1.3.2.

Range Bits

Range bit 2	Range bit 1	Value
0	0	Range/Interval 1
0	1	Range/Interval 2
1	0	Range/Interval 3
1	1	Reserved



## 1.4. Status Group 2 – Alarms

The application alarm status bits are set if the status block command "21" is sent. Otherwise, scale status group 2 information will be displayed.

Bit	Soft Alarm	Description	WMF	SPC	SPE
0	Rate of change	Product, application, or customer defines a weight / time scenario as a method of assurance that the scale is detecting weight			
1	Communication errors	1 = The communication of a device which is connected to a sensor is not working according to specification.			
2	Over and under voltage (s)	1 = A device which supports dynamic measurements of system power has over or under voltage.			
3	Weight drift	1 = A strain gauge sensor has either a broken bridge or is damaged by water or lightning.			
4	Breach	1 = The enclosure of the sensor has been compromised and is therefore vulnerable to environmental influences, e.g. moisture or water. In most cases, a failure will occur if the breach is not corrected or if the sensor is not replaced.			
5	Calibration expired	1 = The maximum number of transactions or a time limit before a preventive service or recalibration has been reached. The alarm will toggle on N+1 weighing transactions.			
6	Application defined 0	Refer to section 1.4.1, <b>Application-Specific Soft Alarms</b> , for more information.			
7	Application defined 1		X	X	X
8	Application defined 2				
9	Application defined 3		X	X	X
10	Application defined 4			X	
11	Application defined 5				
12	Application defined 6		X	X	X
13	Application defined 7			X	
14	Application defined 8				
15	Application defined 9				

### 1.4.1. Application-Specific Soft Alarms

	WMF	SPC	SPE
Application Defined 0	None	None	None
Application Defined 1	Error – System general	Error – System General	Error – System General
Application Defined 2	None	None	None
Application Defined 3	Error – Temperature (weight sensor)	Error – Temperature (weight sensor)	Error - Temperature (weight sensor)
Application Defined 4	None	Error – Temperature (electronic unit)	None
Application Defined 5	None	None	None
Application Defined 6	Warning – Temperature (weight sensor)	Warning – Temperature (weight sensor)	Warning – Temperature (weight sensor)
Application Defined 7	None	Warning – Temperature (electronic unit)	None
Application Defined 8	None	None	None
Application Defined 9	None	None	None

## 1.5. I/O Status Groups

On devices which support physical I/O, the status groups contain a combination of input and output status bits for I/O. Devices which do not support physical I/O, may have variables and logic to virtually represent inputs and outputs within the device. If the device does not support I/O groups, an invalid command response is sent for any supported I/O groups. The input and output status bits reflect the state of the associated inputs and outputs, 1 = on, 0 = off

Bit	Data	WMF	SPC	SPE
0	In 1			
1	In 2	X	X	X
2	In 3			
3	In 4			
4	In 5			
5	In 6			
6	In 7			
7	In 8			
8	Out 1			
9	Out 2			
10	Out 3			
11	Out 4			
12	Out 5			
13	Out 6			
14	Out 7			
15	Out 8			

In 2: 1 = Gross weight is above target weight (limit can be set by cyclic command 220 and read by 20)

## 1.6. SAI Status Block Command List

Value	Description	WMF	SPC	SPE
0	Report default status words	X	X	X
1	Report RedAlert Smart5 alarm, scale group, I/O group	X	X	X
2	Report target / Comparator status			
4	Report Target 1, I/O group 2, custom application group 2			
16	Report comparator mix 1			
21	Report RedAlert Smart5 alarms, alarms & scale group 2	X	X	X
23	Report alarm status, I/O status, customer application status			
100	Report last error code			

## 1.7. Cyclic Command List for Floating Point Block

Value	Description	Block	WMF	SPC	SPE
0	Gross weight – rounded	Floating Block	X	X	X
1	Gross weight – rounded	Floating Block	X	X	X
2	Tare weight – rounded	Floating Block	X	X	X
3	Net weight – rounded	Floating Block	X	X	X
5	Gross weight - internal resolution (Displays a maximum of 8 digits)	Floating Block	X	X	X
6	Tare weight - internal resolution (Displays a maximum of 8 digits)	Floating Block	X	X	X
7	Net weight - internal resolution (Displays a maximum of 8 digits)	Floating Block	X	X	X
14	Net weight - alternative weight path (rounded)	Floating Block	X	X	X
20	Read target weight (display unit)	Floating Block	X	X	X
82	Report adjustment and test stability time [s]	Floating Block	≥3.0.2	X	X
83	Report general stability timeout [s] <b>Parameter:</b> 0 – 65535 Seconds	Floating Block	X	X	X
84	Report observation time for zero <b>Parameter:</b> 0.1 – 4.0 Seconds	Floating Block	X	X	X
85	Report stability limit for zero <b>Parameter:</b> 0.1 – 1000 smallest actual scale interval	Floating Block	X	X	X
86	Report observation time for tare <b>Parameter:</b> 0.1 – 4.0 Seconds	Floating Block	X	X	X
87	Report stability limit for tare <b>Parameter:</b> 0.1 – 1000 smallest actual scale interval	Floating Block	X	X	X
88	Report observation time for weighing <b>Parameter:</b> 0.1 – 4.0 Seconds	Floating Block	X	X	X
89	Report stability limit for weighing <b>Parameter:</b> 0.1 – 1000 smallest actual scale interval	Floating Block	X	X	X
90	Report current weighing mode <b>Parameter:</b> 0 = Universal Weighing (Normal Weighing) 2 = Fixed Filter (Sensor Mode)	Floating Block	X	X	X

Value	Description	Block	WMF	SPC	SPE
91	Report current weighing environment condition settings <b>Parameter:</b> 0 = Very Stable 1 = Stable 2 = Standard 3 = Unstable 4 = Very Unstable	Floating Block	X	X	X
92	Report cut-off frequency of the fixed filter <b>Parameter:</b> 0 = Predefined frequency used, changeable over weighing environment 0.001 Hz – 20.0 Hz = Cutoff Frequency	Floating Block	X	X	X
96	Indication scale interval increase relative to the actual scale interval <b>Parameter:</b> 0 = Factor 1 1 = Factor 10 2 = Factor 100 3 = Factor 1000 4 = Factor 2 5 = Factor 5	Floating Block	X	X	X
97	Internal temperature in °C	Floating Block	X	X	X
98	Report cut-off frequency of the alternative weighing path filter	Floating Block	X	X	X
99	Report stability limit for Adjustment and Test [d]	Floating Block	≥3.0.2	X	X
142	Read External Adjustment Weight	Floating Block	X	X	X
143	Report Date and Time (in Unix timestamp)	Floating Block	≥4.1.0	X	
201	Preset tare (display unit) <b>Parameter:</b> Pre-tare weight (float 32) placed in floating point value	Floating Block	X	X	X
220	Write target weight (display unit)	Floating Block	X	X	X
282	Write Adjustment stability time [s]	Floating Block	≥3.0.2	X	X
283	Write general stability timeout [s] <b>Parameter:</b> 0 – 65535 Seconds	Floating Block	X	X	X
284	Write observation time for zero <b>Parameter:</b> 0.1 – 4.0 Seconds	Floating Block	X	X	X
285	Write stability limit for zero <b>Parameter:</b> 0.1 – 1000 smallest actual scale interval	Floating Block	X	X	X
286	Write observation time for tare <b>Parameter:</b> 0.1 – 4.0 Seconds	Floating Block	X	X	X
287	Write stability limit for tare <b>Parameter:</b> 0.1 – 1000 smallest actual scale interval	Floating Block	X	X	X
288	Write observation time for weighing <b>Parameter:</b> 0.1 – 4.0 Seconds	Floating Block	X	X	X

Value	Description	Block	WMF	SPC	SPE
289	Write tolerance for weighing <b>Parameter:</b> 0.1 – 1000 smallest actual scale interval	Floating Block	X	X	X
290	Write weighing mode <b>Parameter:</b> 0 = Universal Weighing (Normal Weighing) 2 = Fixed Filter (Sensor Mode)	Floating Block	X	X	X
291	Write weighing environment <b>Parameter:</b> 0 = Very Stable 1 = Stable 2 = Standard 3 = Unstable 4 = Very Unstable	Floating Block	X	X	X
292	Write filter cut-off frequency <b>Parameter:</b> 0 = Predefined frequency used, changeable over weighing environment 0.001 Hz – 20.0 Hz = Cutoff Frequency	Floating Block	X	X	X
296	Write weight readability <b>Parameter:</b> 0 = 1 digit 1 = 10 digits 2 = 100 digits 3 = 1000 digits 4 = 2 digits 5 = 5 digits	Floating Block	X	X	X
298	Write filter cut-off frequency for alternative weighing path	Floating Block	X	X	X
299	Write adjustment stability digit [d]	Floating Block	≥3.0.2	X	X
342	Write External Adjustment Weight	Floating Block	X	X	X
343	Write Date and Time	Floating Block	≥4.1.0	X	
400	Tare when stable	Floating Block	X	X	X
401	Zero when stable	Floating Block	X	X	X
402	Clear tare	Floating Block	X	X	X
403	Tare immediately	Floating Block	X	X	X
404	Zero immediately	Floating Block	X	X	X
1900	Alarm bit – Test Mode	Floating Block	X	X	X
1901	Motion bit – Test Mode	Floating Block	X	X	X
1902	Net mode bit – Test Mode	Floating Block	X	X	X
1903	Center of zero bit – Test Mode	Floating Block	X	X	X
1904	Alt weight bit – Test Mode	Floating Block	X	X	X
1905	Device bit 1 – Test Mode	Floating Block	X	X	X
1906	Device bit 2 – Test Mode	Floating Block	X	X	X
1907	Device bit 3 – Test Mode	Floating Block	X	X	X
1908	Device bit 4 – Test Mode	Floating Block	X	X	X

Value	Description	Block	WMF	SPC	SPE
1909	Device bit 5 – Test Mode	Floating Block	X	X	X
1910	Device bit 6 – Test Mode	Floating Block	X	X	X
1911	Device bit 7 – Test Mode	Floating Block	X	X	X
1912	Performance test value	Floating Block	X	X	X
2000	No operation command – used to test command		X	X	X
2004	Abort sequence ... response value means abort in process		X	X	X
2046	Step successful		X	X	X
2047	Command has been received and is being evaluated (in process)		X	X	X

## 1.8. Acyclic Command List

Command	Description	Read/Write	Data Type	EIP Class Code	EIP Instance Values	EIP Attribute #	Profinet slot + subslot	Profinet Index	WMF	SPC	SPE
Gross weight - rounded	Gross weight data in displayed unit	read	Float 32	0x300	0x01	0x01	0, 1	0x2000	X	X	X
Gross weight - rounded	Gross weight data in displayed unit	read	Float 32	0x300	0x01	0x02	0, 1	0x2001	X	X	X
Tare weight - rounded	Tare weight data in displayed unit	read	Float 32	0x300	0x01	0x03	0, 1	0x2002	X	X	X
Net weight - rounded	Net weight data in displayed unit	read	Float 32	0x300	0x01	0x04	0, 1	0x2003	X	X	X
Gross weight - internal resolution	Gross weight data in internal resolution, Displays a maximum of 8 digits (weight after postprocessing in active unit)	read	Float 32	0x300	0x01	0x05	0, 1	0x2004	X	X	X
Tare weight - internal resolution	Tare weight data in internal resolution, Displays a maximum of 8 digits (weight after postprocessing in active unit)	read	Float 32	0x300	0x01	0x06	0, 1	0x2005	X	X	X
Net weight - internal resolution	Net weight data in internal resolution, Displays a maximum of 8 digits (weight after postprocessing in active unit)	read	Float 32	0x300	0x01	0x07	0, 1	0x2006	X	X	X
Tare procedure status bits	Report Tare operation status (used when triggering tare from acyclic interface) <b>Parameter:</b> 0 = tare procedure complete 1 = tare procedure in process	read	Uint 16	0x300	0x01	0x16	0, 1	0x2008	≥V3.0.2	X	X
Zero procedure status bits	Report Zero operation status (used when triggering zero from acyclic interface) <b>Parameter:</b> 0 = zero procedure complete 1 = zero procedure in process	read	Uint 16	0x300	0x01	0x17	0, 1	0x2009	≥V3.0.2	X	X



Command	Description	Read/Write	Data Type	EIP Class Code	EIP Instance Values	EIP Attribute #	Profinet slot + subplot	Profinet Index	WMF	SPC	SPE
Tare when stable	Tare when weight value is within stability limit for the observation time	write	Uint 8	0x300	0x01	0x09	0, 1	0x2010	X	X	X
Tare immediately	Motion not checked; tare executed	write	Uint 8	0x300	0x01	0x10	0, 1	0x2011	X	X	X
Clear tare	Motion not checked; clear tare executed	write	Uint 8	0x300	0x01	0x11	0, 1	0x2012	X	X	X
Zero when stable	Zero when weight value is within stability limit for the observation time	write	Uint 8	0x300	0x01	0x14	0, 1	0x2013	X	X	X
Zero immediately	Motion not checked, zero executed	write	Uint 8	0x300	0x01	0x15	0, 1	0x2014	X	X	X
Preset tare (display unit)	Write tare register (Preset Tare) <b>Parameter:</b> Pre-tare weight	Read/write	Float 32	0x300	0x01	0x08	0, 1	0x2020	X	X	X
Model type part 1	Identification (main ID)	read	String 160	0x303	0x01	0x01	0, 1	0x2050	X	X	X
Software OS version	Software OS Version	read	String 160	0x303	0x01	0x04	0, 1	0x2053	X	X	X
Fieldbus stack version	Fieldbus Stack Version	read	String 160	0x303	0x01	0x05	0, 1	0x2054	X	X	X
Software application version	Software Apps Version	read	String 160	0x303	0x01	0x06	0, 1	0x2055	X	X	X
SAI version	SAI specification version number	read	String 160	0x303	0x01	0x07	0, 1	0x2056	X	X	X
Serial number	Device main serial number	read	String 160	0x303	0x01	0x08	0, 1	0x2057	≥V3.0.2	X	X
Get initial zero information	Receive initial zero operation status and the switch on range limit status. Load on the weight receptor must be within the switch on range limits for successful initialization.	read	Struct 16	0x303	0x01	0x11	0, 1	0x205A	≥V4.1.0	X	
Start adjustment with internal weight	Start Internal Adjustment – Relative calibration deviation (%)	write	Uint 8	0x410	0x01	0x01	0, 1	0x4001	X		X

Command	Description	Read/Write	Data Type	EIP Class Code	EIP Instance Values	EIP Attribute #	Profinet slot + subplot	Profinet Index	WMF	SPC	SPE
Start adjustment with external weight	Start External Adjustment – Relative calibration deviation (%)	write	Uint 8	0x410	0x01	0x02	0, 1	0x4002	X	X	X
Start customer standard calibration	Start User Standard Adjustment - defines the exact weight value of the built-in weights.	write	Uint 8	0x410	0x01	0x03	0, 1	0x4003	X	X	X
Cancel adjustment / test (Abort Test Function / Adjustment)	Abort Test Function / Adjustment	write	Uint 8	0x410	0x01	0x04	0, 1	0x4004	X	X	X
Start test with internal weight	Start Sensitivity Test Function with internal weight. Absolute Deviation related to nominal load, in definition unit (g).	write	Uint 8	0x410	0x01	0x05	0, 1	0x4005	X		X
Start test with external weight	Start Test Function with external weight. External weight defined with the 'External Test Weight' Command. Absolute Deviation related to nominal load, in definition unit (g).	write	Uint 8	0x410	0x01	0x06	0, 1	0x4006	X	X	X
Adjustment and test status Information	Adjustment / Test status	read	Uint 16	0x410	0x01	0x07	0, 1	0x4007	X	X	X
Test deviation	Adjustment / Test value: If 'Test' is executed, absolute deviation related to nominal load, in definition unit (g) If 'Adjustment' is executed, relative deviation (%)	read	Float 32	0x410	0x01	0x08	0, 1	0x4008	X	X	X
External adjustment weight	Set external adjustment weight and start adjustment. <b>Parameter:</b> Weight in unit selected according to Scale Status Group 2	Read/write	Float 32	0x410	0x01	0x09	0, 1	0x4009	X	X	X
Requested weight	Get currently requested external calibration weight during ongoing adjustment or calibration procedure	read	Float 32	0x410	0x01	0x11	0, 1	0x4011	X	X	X

Command	Description	Read/Write	Data Type	EIP Class Code	EIP Instance Values	EIP Attribute #	Profinet slot + subplot	Profinet Index	WMF	SPC	SPE
External test weight	Set external calibration test weight unless default shall be used. <b>Parameter:</b> Weight in unit selected according to Scale Status Group 2	write	Float 32	0x410	0x01	0x12	0, 1	0x4012	X	X	X
Start test Function with internal weight	Start Test Function with internal weight - Relative calibration deviation (%)	Write	Uint 8	0x410	0x01	0x24	0, 1	0x4024	≥V4.1.0		
Internal temperature	Query the load cell temperature value (°C)	read	Float 32	0x413	0x01	0x19	0, 1	0x4169	X	X	X
Weighing mode	Weighing filter mode <b>Parameter:</b> 0 = Universal weighing (Normal Weighing) 2 = Fixed Filter (Sensor Mode)	read/write	Float 32	0x415	0x01	0x06	0, 1	0x4256	X	X	X
Weighing environment	Current environment condition settings <b>Parameter:</b> 0 = Very stable 1 = Stable 2 = Standard 3 = Unstable 4 = Very unstable	read/write	Float 32	0x415	0x01	0x07	0, 1	0x4257	X	X	X
Cut-off frequency	Cut-Off frequency of the fixed filter <b>Parameter:</b> 0 = Pre-defined frequency used, changeable over weighing environment 0.001 Hz – 20.0 Hz = Cut-off frequency	read/write	Float 32	0x415	0x01	0x08	0, 1	0x4258	X	X	X
Fast weight filter frequency	Cut-off frequency of alternate weight path filter	read/write	Float 32	0x415	0x01	0x0B	0, 1	0x425B	X	X	X
Disable weight display	1 = weight display disabled 0 = weight display enabled	read/write	Binary	0x416	0x01	0x02	0, 1	0x4302	X	X	X

Command	Description	Read/Write	Data Type	EIP Class Code	EIP Instance Values	EIP Attribute #	Profinet slot + subplot	Profinet Index	WMF	SPC	SPE
Factory reset	Reset all settings to factory defaults.	write	Uint 16	0x416	0x01	0x0A	0, 1	0x430A	≥V3.0.4	X	X
Readability	Increases the indication scale interval (i) up to factor 1000 relative to the actual scale interval (d). The default indication scale interval equals the actual scale interval (factor 1).  <b>Parameter:</b> 0 = Factor 1 1 = Factor 10 2 = Factor 100 3 = Factor 1000 4 = Factor 2 5 = Factor 5	read/write	Float 32	0x416	0x01	0x0B	0, 1	0x430B	X	X	X
Gets and sets the date and time	Set or query the balance system date and time in a single action. (in unix timestamp)	Read/write	Uint 32	0x416	0x01	0x11	0, 1	0x4311	≥V4.1.0	X	
General timeout	Timeout for issued command <b>Parameter:</b> 0 – 65535 Seconds	read/write	Float 32	0x417	0x01	0x01	0, 1	0x4351	X	X	X
Observation time for zero	Report observation time for zero <b>Parameter:</b> 0.1 – 4.0 Seconds	read/write	Float 32	0x417	0x01	0x03	0, 1	0x4353	X	X	X
Tolerance for zero	Report stability limit for zero <b>Parameter:</b> 0.1 – 1000 smallest actual scale interval	read/write	Float 32	0x417	0x01	0x04	0, 1	0x4354	X	X	X
Observation time for tare	Report observation time for tare <b>Parameter:</b> 0.1 – 4.0 Seconds	read/write	Float 32	0x417	0x01	0x05	0, 1	0x4355	X	X	X
Tolerance for tare	Report stability limit for tare <b>Parameter:</b> 0.1 – 1000 smallest actual scale interval	read/write	Float 32	0x417	0x01	0x06	0, 1	0x4356	X	X	X

Command	Description	Read/Write	Data Type	EIP Class Code	EIP Instance Values	EIP Attribute #	Profinet slot + subplot	Profinet Index	WMF	SPC	SPE
Observation time for weighing	Report observation time for weighing <b>Parameter:</b> 0.1 – 4.0 Seconds	read/write	Float 32	0x417	0x01	0x07	0, 1	0x4357	X	X	X
Tolerance for weighing	Report stability limit for weighing <b>Parameter:</b> 0.1 – 1000 smallest actual scale interval	read/write	Float 32	0x417	0x01	0x08	0, 1	0x4358	X	X	X
d, increment	Smallest actual scale interval	read	Float 32	0x417	0x01	0x16	0, 1	0x4366	X	X	X
Nmax (Maximal capacity)	Scale/Sensor capacity	read	Float 32	0x417	0x01	0x17	0, 1	0x4367	X	X	X
Automatic zero tracking	Query status of auto zero tracking respectively enable / disable it. <b>Parameter:</b> 0 = Disabled 1 = Enabled	read/write	Uint 8	0x417	0x01	0x1E	0, 1	0x436E	X	X	X
Zeroing at start-up	Enable / Disable zeroing mode at startup <b>Parameter:</b> 0 = Disabled 1 = Enabled	read/write	Uint 8	0x417	0x01	0x1F	0, 1	0x436F	X	X	X
Report/Write Adjustment Observation Time	Time in seconds in which the weight value must remain within tolerance to be regarded as stable during an adjustment. <b>Parameter:</b> 0.1-4.0 seconds	Read/Write	Float 32	0x417	0x01	0x27	0,1	0x4377	≥V3.0.2	X	X
Report/Write Adjustment Stability limit	Tolerance for the fluctuation of the weight value to still be regarded as stable during an adjustment Reported in digits (smallest actual scale interval) <b>Parameter:</b> 0.1-1000 d	Read/Write	Float 32	0x417	0x01	0x28	0,1	0x4378	≥V3.0.2	X	X

Command	Description	Read/Write	Data Type	EIP Class Code	EIP Instance Values	EIP Attribute #	Profinet slot + subplot	Profinet Index	WMF	SPC	SPE
Smallest Actual Scale Interval	Smallest actual scale interval in definition unit	Read	Float 32	0x417	0x01	0x29	0.1	0x4379	≥V4.1.0	X	
Trigger Initial Zero	Set new initial zero, where a device restart is not feasible. For status refer to "get initial zero information"	Write	Uint 8	0x417	0x01	0x2A	0.1	0x437A	≥V4.1.0	X	
USTB Observation Time Value Range	Provides the value range of the USTB Time parameter (seconds)	Read	Struct 64	0x417	0x01	0x2B	0, 1	0x437B	≥V4.1.0	X	
Active Stability Criteria	Returns the active stability criteria. Stability criteria is the interval the weight values must be located (stability limit) during the observation time for the weight value to be described as stable, or no-motion.	Read	Struct 256	0x417	0x01	0x2C	0, 1	0x437C	≥V4.1.0	X	
Report Target weight	Report Target Weight	read	Float 32	0x419	0x01	0x10	0, 1	0x4460	X	X	X
Read float32	Test floating point variable – always reads 123.45 – no write permitted	read	Float 32	0x30F	0x01	0x01	0, 1	0x5000	X	X	X
Write float32	Test floating point variable – no usage in device except for test	write	Float 32	0x30F	0x01	0x02	0, 0	0x5001	X	X	X
Read uint16	Test integer variable – always reads 9876	read	Uint 16	0x30F	0x01	0x03	0, 1	0x5002	X	X	X
Write uint16	Test integer variable – no usage in device except for test	write	Uint 16	0x30F	0x01	0x04	0, 1	0x5003	X	X	X
Read string	Test string variable – always read "ABCD"	read	String 160	0x30F	0x01	0x05	0, 1	0x5004	X	X	X
Write string	Test string variable – always read "ABCD"	write	String 160	0x30F	0x01	0x06	0, 1	0x5005	X	X	X
Read uint32	Test long integer variable – always reads 98765	read	Uint 32	0x30F	0x01	0x07	0, 1	0x5006	X	X	X
Write uint32	Test long integer variable – no usage in device except for test	write	Uint 32	0x30F	0x01	0x08	0, 1	0x5007	X	X	X

Command	Description	Read/Write	Data Type	EIP Class Code	EIP Instance Values	EIP Attribute #	Profinet slot + subslot	Profinet Index	WMF	SPC	SPE
Read uint8	Test byte variable – always reads 56h	read	Uint 8	0x30F	0x01	0x09	0, 1	0x5008	X	X	X
Write uint8	Test byte variable – no usage in device except for test	write	Uint 8	0x30F	0x01	0x10	0, 1	0x5009	X	X	X

## METTLER TOLEDO Service

### To protect your product's future:

Congratulations on choosing the quality and precision of METTLER TOLEDO. Proper use according to these instructions and regular calibration and maintenance by our factory-trained service team ensure dependable and accurate operation, protecting your investment. Contact us about a service agreement tailored to your needs and budget.

We invite you to register your product at [www.mt.com/productregistration](http://www.mt.com/productregistration) so we can contact you about enhancements, updates and important notifications concerning your product.

[www.mt.com](http://www.mt.com)

For more information

**Mettler-Toledo, LLC**  
1900 Polaris Parkway  
Columbus, OH 43240

© 2022 Mettler-Toledo, LLC  
30587512 Rev. 02, 12/2024



30587512