

# **STU-60** Diagnostic tool (Spindle Encoder)



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# Spindle Encoder (WMK3010) Manual STU-60

# NOTICE

For general information of the STU-60, download of AMO-Check Software, we are referring to the STU-60 Manual (*Doc.: 1277103*)

### 1. Start the AMO-Check software

Double-click to open the "AMO-Check" application:



The AMO-Check start window opens (top left the current revision level is shown). Minimum requirement to be able to use the spindle encoder with the AMO-Check is version 1.4.

## 2. Function "Diagnose"

All important system information can be read out in the "Diagnose" window. Mounting conditions and the internal signals can be checked in real time.



# NOTICE

Once the spindle encoder is connected with the STU-60, logging will be deactivated.



# 2.1 Device Type

All known encoder information are listed (type, serial number, interface, etc.).

AG AMO-Check 1.	4.1								-	٥	×
Device Type	Signal Adjustment	Incremental Signal Display	Temperature	Data Logger							
	orginal regulation	and emental bights bibpidy	remperature	butu cogger							
					Encoder Type						
					Serial number	219507628					
					Product type	WMK					
					Ext. Producttype	WMK - outside					
					Grating	1000 µm					
					Performance	Spindle Drive					
					Interface	1 Vss					
					Additional Interface	No additional interface					
					Referencemark	Square Pulse (360° el.)					
					Functional Safety	FA - Analogsignals (1 Vss)					
					Electronics	Integrated electronics					
<b>CP</b> 4 <b>C</b>											
avvc			WMK, 1 Vss, 1	.000 µm, SN: 1	219507628			Disconnect			

# 2.2 Signal Adjustment

In this function, the signals read from the encoder are compared with the ideal values set by AMO. Thus, you can determine the optimal mounting and reposition the encoder if necessary.

AC AMO-Check 1.4.1		-	o ×
Device Type Signal Adjustment Incremental	ional Dienlay Temperature Data Longer		
Server Type organization in Internation	igne support i international adda cagger		
	Please move the measuring head or scale to ge	t a good reading,	
	Amplitude SIN		
		Min Current Max	
		+ 38% 43% 45%	
	Amplitude COS		
		Min Current Max	
		+ 50% 56% 57%	
	Phase SIN/COS		
		Min Current Max	
		+ 42% 44% 49%	
	Offset SIN		
		Min Current Max	
		+ 0% 0%	
	Offset COS		
		Min Current Max	
		+ 1% 1% 1%	
	Mesuring head is within tolerance levels.	Reset Min/Max	
	$\checkmark$		
avvo	WMK, 1 Vss, 1000 µm, SN: 219507628	Disconnect	

# **Amplitude Sin/Cos**

Here you can determine the deviation from ideal air gap.

- "+" Air gap too large (Encoder mounted too far away from the scale tape)
- "-" Air gap too small (Encoder mounted too close to the scale tape)

## Phase Sin/Cos and Offset Sin/Cos

These measuring values should be always in the green range. Only in the case of a faulty amplitude, these values will show large deviation from the center point.

# 2.3 Incremental Signal Display

The input signals can be checked by using a virtual oscilloscope. The active compensation, which controls the signal amplitude, is already active here.

0

The measured data shown here do not correspond to the output signals. This function uses internal analog signals, no matter whats the interface type of the encoder (for example TTL). Only the internal analog signals are displayed here.



## 2.4 Temperature

The temperature range in which the spindle encoder is operating for a certain period of time is recorded here.



## 3. Data Logger

## 3.1 Periodic Log Data

All operating states can be recorded and viewed here. The correct linecount (scope of the mechanics) must be specified, otherwise the histogram will show incorrect data.

iodic Log Data Statu	s based Log Data Status trigger	red Log Data User Data	Import/Export	Configuration			imm/s] [RPM] [%]   imm/	s² [rad/s²]   [sec] [mir	1 [h] [mm] [m] [k	m] [RND]   [°C] [K]
						Histrogram Speed /	<sup>7</sup> Temperature			
umeric Data		1.0 s				≤ 35 °C ■ ≤ 75 °C ■ ≤ 1	10 °C => 110 °C			
Operating Time	'Cnt' 0.0									
Active Time	Cot 0.0	0.8 s								
Milage Asc. Dir	[Cnt] 0.0	_								
ilago Docc. Dir	[Cnt] 0.0									
Beverelene		0.6 s		[	AC Enter el ?					
Reversions					Pitches:					
Liftings	.Cnt. 0	0.4 s			0	•				
Total Stops	[Cnt] 0				OK Cancel					
Tool Changes	[Cnt] 0	0.2 s								
istorgram										
Speed / Temper	ature	0.0 s	x 470/7	< 20057 mm/s	1.55452	1 01077	1 100007 (-	4 4 4 0 0 0 4 mm /s	× 200000 /-	
) Speed			5 17007 mm/s	5 29807 mm/s	5 33467 mm/s	5 81007 mm/s	5 100007 mm/s	2 149334 mm/s	5 200000 mm/s	> 200000 mm/s
Temperature			≤ 17067 mm/s	≤ 29867 mm/s	s ≤ 55467 mm/s	≤ 81067 mm/s	≤ 106667 mm/s	≤ 149334 mm/s	≤ 200000 mm/s	> 200000 mm/s
Dwell time / Spe	ed Range / Time	≤ 35 °C	0 s	0 s	0 s	0 s	0 s	0 s	0 s	0 s
		≤ 75 °C	0 s	0 s	0 s	0 s	0 s	0 s	0 s	0 s
		≤ 110 °C	0 s	0 s	0 s	0 s	0 s	0 s	0 s	0 s
		> 110 °C	0 s	0 s	0 s	0 s	0 s	0 s	0 s	0 s

## Description of the terms "Numeric-Data":

#### **Operating Time:**

Defines the total operating time of the device, i.e. the time in which the measuring device was operated with a valid supply voltage.

#### Active Time:

Defines the total time that the device was supplied and moving in one direction of measurement, either in positive or negative direction.

#### Milage Asc. Dir.:

Defines the milage of the switched-on measuring device in the measuring direction for increasing position values.

#### Milage Desc. Dir.:

Defines the milage of the switched-on measuring device in the measuring direction for falling position values.

#### **Reversions:**

Defines the number of reversals (reversals of direction) of the switched-on measuring device in the measuring direction. The reversal of direction is evaluated independently of the standstill of the device. The value is thus increased by one when the direction of movement changes.

#### Liftings:

Defines the number of strokes of the switched-on measuring device in the measuring direction. The value in liftings is increased by one if the direction of movement after a standstill is the same as the direction of movement before the standstill.

#### **Total Stops:**

Defines the number of stops of the encoder. A stop is a standstill of the measuring device over a definable time interval.

#### **Tool Changes:**

Defines the number of tool changes.



The operating states can be displayed separately in the histogram:

- Speed / Temperature
- Speed
- Temperature
- Dwell time / Speed range / time

### **Speed / Temperature**

![](_page_9_Figure_6.jpeg)

# Speed

riodic Log Data Status	based Log Data Status triggered Log Data	User Data	Import/Export	Configuration			[mm/s] [RPM] [%] mm	/s² [rad/s²] [sec] [m	in] [h] <b>[mm]</b> [m]	[km] [RND] [°C] [K]
Numeric Data										
Operating Time	sec] 31986.0	1000.0 s				Histogram	Speed			
Active Time	sec] 822.0									
Milage Asc. Dir.	nm 572944.1									
Milage Desc. Dir.	nm 425434.4	800.0 s	739 s							
Reversions (	Cntj 9									
Liftings (	Cntj 6	600.0 s	-							
Total Stops	Cnti 9									
Tool Changes	Cntj 6	400.0 s								
Historgram										
Speed / Tempera	ture	200.0 s	_							
Speed										
Temperature										
O Dwell time / Spee	ed Range / Time	0.0 s	≤ 2000 RPM	≤ 3500 RPM	≤ 6500 RPM	≤ 9500 RPM	≤ 12500 RPM	≤ 17500 RPM	≤ 23438 RPM	> 23438 RPM

# Temperature

![](_page_10_Figure_1.jpeg)

# Dwell time / Speed Range / Time

This function records how long the spindle encoder was operated in defined speed range.

![](_page_10_Figure_4.jpeg)

# 3.2 Status based Log Data

In this view, the recorded extreme values can be viewed with a time stamp.

- Min/Max Temperature
- Maximum speed in positive and negative directions
- Maximum acceleration in positive and negative directions
- Number of over- and undervoltage

MO-Check 1.4.1 Device Type Signal Adjustment Inc	remental Signal Display Temperature	Data Logger					-	0
Periodic Log Data Status based Log D	ata Status triggered Log Data Use	r Data Import/Export Conf	iguration		[mm/s] [RPM] [%] mm	/s2 [rad/s2] [sec] [min] [h]	[mm] [m] [km] [RND] [°C]	KI (*F)
		Internal Temperature Max. Value C Min. Value C Max. Speed Ascending Direction Descending Direction	37.9 28.8 [RPM] 270.1 [RPM] -262.4	Timestamp Timestamp Timestamp Timestamp	sec] 30654.0 [sec] 31974.0 [sec] 24010.0 [sec] 23944.0			
		Max. Acceleration Ascending Direction Descending Direction	mm/s² 6543.8 mm/s² -9615.6	Timestamp	[sec] 21308.0 [sec] 20844.0			
		Powersupply Violations Up Undervoltage [Cn	ť; 0	Up Overvoltage	[Cnt] 0			
	WMK, 1 Vss,	1000 µm, SN: 219507628				Disconnect		

### 3.3 Status triggered Log Data

In this view, the recorded alarm-triggered data with time stamps sets can readout.

AC AMO Check 141							-	~
AWOTCHECK 13.1						_	J	^
Device Type Signal Adjustment Incremental Signal Display Tem	perature Data Logger							
Periodic Log Data Status based Log Data Status triggered Log Data	ta User Data Import/Export	Configuration		[mm/s] [RPM] [%] mm/s <sup>2</sup>	[rad/s²] [sec] [min] [h] [mm] [m	[km] [RND] [°C]	DKI D	9F]
				<< >>>				
	Entrycount		Alarmtime					
	Entry Number	# 1	Timestamp	[sec] 31974.0				
	Movement	[1	Mileage					
	Speed [RPM	1] 0.0	Ascending Direction	mm] 572944.1				
	Acceleration mm/s	s² 0.0	Descending Direction	mm 425434.4				
	Temperature		Counters					
	Internal	PC 28.8	Reversions	[Cnt] 9				
	Signal Amplitude							
	Sine [V	V] -0.14	Liftings	[Cnt] 6				
	Cosine [V	V] 0.32	Total Stops	[Cnt] 9				
	Power-Supply							
	Up Voltage [V	V] 5.4	Tool Changes	[Cnt] 6				
	Alarm Source							
	Invalid Sin/Cos Am	nolitude						
ало мик,	, 1 Vss, 1000 µm, SN: 21950	17628			Disconnect			

# 3.4 User Data

User-specific data/texts can be entered, which are converted to binary.

AMO-Check 1.4.1 Device Type Signal Adjustment Increme	ental Signal Display Temperature Data Logger																-	σ	>
Periodic Log Data Status based Log Data	Status triggered Log Data Uter Data Impert/	Export         Cont           1         0           2         0           3         0           4         0           5         0           6         0	Figuration	3 0 0 0 0 0 0	4 0 0 0 0 0 0 0	5 0 0 0 0 0 0 0	6 0 0 0 0 0 0	7 0 0 0 0 0 0 0 0	[mm/s] [R 8 0 0 0 0 0 0 0 0 0 0	M] [%]	mm/s² [r	rad/s*]   <mark>[</mark> ;	sec] [min	a (b) [[	[mm] [m]	[km] [R	4D] [°C]	] [K]	[ºF]
		7 0 8 0	0	0	0	0	0	0	0										
			Read		Wr	ite		Clear '	View										
avvo	WMK, 1 Vss, 1000 µm, SN:	219507628										Disc	onnect						

# 3.5 Import/Export

- Configuration: Can be exported and imported
  Log Data: Can be exported or deleted
  User Data: Can be exported, imported or deleted

-Check 1.4.1	nental Signal Display Temperature Data Logger			-	3
riodic Log Data Status based Log Data	Status triggered Log Data User Data Import/Export	Configuration Configuration Export Import		[MM3] [W3] [%] [%] [%] [%] [%] [%] [%] [%] [%] [%	] [ºF]
		Log Data Export	Delete		
		User Data Export Import	Delete		
	WMK, 1 Vss, 1000 µm, SN: 2195	07628		Disconnect	

# 3.6 Configuration

The desired limit ranges can be defined and saved with a password.

Standstill Detection       Speed Histogram         Speed Upperlimit       [RPM] 1.0         Total and Tool-Change Stop Detection       Range 1         Duration Lowerlimit       [sec] 0.3         Duration Upperlimit       [sec] 10.0         Range 4       [RPM] 9500.0         Range 8       [RPM] 23437.5         Password Protection       Range 4         Configuration Password       Repeat         Configuration Password       Configuration Password	Image 1       Sec. 10.0         Image 1       Sec. 60.0         Image 2       Sec. 60.0         Image 3       Sec. 600.0         Image 4       Sec. 600.0         Image 5       Range 4         Image 6       Sec. 600.0         Image 7       Sec. 600.0         Image 8       Sec. 600.0         Image 9       Sec. 75.0         Image 1       Sec. 75.0
User Data Password Log Data Password Read Configuration From Encoder To Encoder	Range 4 °C' > 110.0

#### AMO Automatisierung Messtechnik Optik GmbH

![](_page_15_Picture_2.jpeg)

#### For complete and further addresses see www.amo-gmbh.com

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