



HEIDENHAIN



Product Information

PWM 21 ATS Software

Adjusting and testing package



PWM 21

HEIDENHAIN offers an adjusting and testing package for the diagnosis and adjustment of HEIDENHAIN encoders with absolute and incremental interfaces. This package is made up of the following components:

- **PWM 21:** inspection device for connection to a PC over a USB interface
- **ATS:** adjusting and testing software with integrated local encoder database for automatic encoder identification

We recommend returning the PWM 21 to the HEIDENHAIN calibration service in Traunreut every two years in order to ensure traceable, accurate, and error-free operation as a testing device.

Inspection and testing devices from HEIDENHAIN

HEIDENHAIN encoders provide all of the information needed for commissioning, monitoring, and diagnostics. For the analysis of these encoders, HEIDENHAIN offers the appropriate PWM inspection devices and PWT testing units. The PWM inspection devices, which are universally deployable, feature calibration capability and low measuring tolerances. Testing devices such as the PWT 101 provide fewer functions, have wider tolerances, and cannot be calibrated.

Available functions

The ATS software contains a variety of functions. Their availability depends on the encoder and the encoder interface being used. Using it with the EnDat interface lets you do far more than display the position value, including outputting online diagnostics, reading or writing parameters, shifting the datum, setting write protection and performing other inspection functions. Via the encoder database, the ATS software also supports encoders from other HEIDENHAIN brands such as AMO, NUMERIK JENA, RSF and LEINE LINDE. For an exact overview of these encoders, please contact the appropriate company.

Mounting wizard

The PWM 21, in conjunction with the adjusting and testing software (ATS), is recommended for the mounting of exposed or multi-section linear encoders or modular angle encoders. If supported by the encoder interface, the PWT 101 can be used as well to a limited extent. Please note the information in the encoder documentation regarding mounting and the availability of a mounting wizard.

Important new functions of ATS software V3.6:

- Support of encoders with the EnDat 3 interface
 - Position display, encoder memory, function settings, etc.
 - Bus operation
 - Display of operating status data
 - Wizards: functional safety, mounting wizards
- There are now even more display and analysis capabilities for recording incremental signals (1 V_{PP}, 11 μA_{PP}):
 - Display of path-time diagram
 - Frequency display during recording
 - Analysis of the traversing speed (via the frequency)
 - Depiction of display values via various X-axis settings
- Inspection wizard for functional safety and mounting wizards:

These wizards have been adapted to the current product generations in terms of their functionality and display of results. The report functions for the mounting wizards have been expanded.
- Display of encoder information

Display of basic information about the encoder for an improved overview for the range of functions of the encoder

Software options

The ATS software permits the user to expand the standard performance range of the software by entering a product key. The product key is subject to a charge and valid only for the serial number of the PWM 21.

Available product keys:

Additional functions integrated in **ATS14** for encoders with DRIVE-CLiQ interface:

- Expanded parameter display
- Temperature display: additional display of the temperature within the encoder*
- Datum shift*

ID 1277664-14

The signal limit values can be changed with **ATS20**.

The inspection and settings limits for signal monitoring are preset to the (standard) values documented in the *Interfaces for HEIDENHAIN Encoders* brochure (ID 1078628-xx). Customized and high-precision encoders may have different signal tolerances (e.g., tighter tolerances for the amplitudes of the output signals, on/off ratios, phase angles). The "Customizing" function allows for manual editing (adapting), saving, and loading of signal limit values.

ID 1277664-20

Additional function integrated in **ATS24** for encoders with Fanuc, Mitsubishi, Panasonic, and Yaskawa interfaces:

- Datum shift*

ID 1277664-24

* If supported by the encoder. For more information, please contact HEIDENHAIN.

Encoders	Mounting and the mounting wizard
LIC 21xx, LIC 31xx, LIF 4xx, LIF 1xx, LIDA 4xx, LIDA 2xx, ERM 2xxx	PWT 101 and PWM 21 with the ATS adjustment and inspection software
LIC 41xx, LIP 3xx, LB 3xx, LC 2xx, PP 281, ECA 4xxx, ECM 24xx, ERA 4xxx, ERA 7xxx, ERA 8xxx, ERP 880	Possible with the PWT 101 to a limited extent: For optimal mounting quality, please use the PWM 21 with the ATS adjustment and inspection software
LIP 2xx, LIP 6xxx, ERP 1xxx, ERO 2xxx	PWM 21 and ATS adjusting and testing software required

PWM 21 inspection device

Inspection device	PWM 21
Area of application	<ul style="list-style-type: none"> • Functional testing of absolute and incremental HEIDENHAIN encoders • Mounting wizard for HEIDENHAIN encoders
Encoder input only for HEIDENHAIN encoders	<ul style="list-style-type: none"> • EnDat 3 (ordering designations: E30-R2, E30-R4, E30-RB, E30-R8)* • EnDat 2.2 (EnDat 2.1/EnDat 2.2, without incremental signals; ordering designations: EnDat22, EnDat21) • EnDat 2.1 (EnDat 2.1/EnDat 2.2 with incremental signals; ordering designations: EnDat0x, EnDatHx, EnDatTx) • DRIVE-CLiQ • Fanuc Serial Interface • Mitsubishi high speed interface • Panasonic Serial Interface • Yaskawa Serial Interface • SSI • 1 V_{PP} (3 V_{PP} for servicing purposes only) • 1 V_{PP} with Z1 track • 11 μA_{PP} (25 μA_{PP} for servicing purposes only) • TTL • HTL (via signal adapter, for servicing purposes only)
Encoder output	Monitoring operation for certain interfaces (read about diagnostics under "Range of functions"); a signal adapter is required for galvanic isolation and for EnDat 3 (see "Signal adapters")
Interface	USB 2.0 (High Speed)
Supply voltage	AC 100 V to 240 V (±10%), 50 Hz to 60 Hz (±2 Hz) Voltage supply: DC 24 V (±2.4 V) Power consumption: approx. 20 W
Operating temperature	0 °C to 45 °C
Protection EN 60529	IP20
Dimensions	258 mm × 154 mm × 55 mm

* Depending on the ordering designation, an SA 23xx or SA 1210 signal converter may be needed

Adjusting and testing software

Adjusting and testing software	ATS software V3.6
System requirements and recommendations	<ul style="list-style-type: none"> • PC with dual-core processor > 2 GHz • Main memory > 2 GB • ≈ 500 MB of free memory space • Screen resolution ≥ 1024 × 768 • Operating system: Windows 7, 8, 10 (32-bit or 64-bit), Windows 11
Product key	Management of product keys for optional functions
Languages*	German, English, French, Italian, Spanish, Korean, Chinese (simplified), Chinese (traditional)

* Full availability of the languages depends on the specific version of the ATS V3.6

Available functions

Range of functions of the PWM 21 and ATS software V3.6 (depending on the specific encoder or if supported by the encoder)	EnDat 3	EnDat 2.2	EnDat 2.1	Fanuc	Mitsubishi	SSI	DRIVE-CLiQ	Yaskawa	Panasonic	1V _{PP} ²⁾ 11 μApp ²⁾	TTL	HTL ³⁾
Position display												
Display of absolute positions	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Support for daisy-chain bus	✓	-	-	-	-	-	-	-	-	-	-	-
Display of the incremental position (if available)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Display and resetting of error messages	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Display and resetting of warnings	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Display of the transmission status	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
PWT display of incremental signals	-	-	-	-	-	⊃	-	-	-	✓	⊃	-
Connection dialog; encoder connection via:												
• Encoder ID number	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
• Entry of interface and supply voltage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
• HEIDENHAIN motor ID number	✓	✓	✓	-	-	-	-	-	-	✓	-	-
Diagnostics												
Display of online diagnostics	✓	✓	-	✓	✓	-	✓	✓	✓	-	-	-
Display of online diagnostics in the control loop ¹⁾	✓	✓	-	✓	✓	-	-	-	✓	-	-	-
Monitoring mode permitted with the PWM 21	✓	✓	✓	✓	✓	-	-	-	✓	✓	✓	-
Display of operating status data	✓	-	-	-	-	-	-	-	-	-	-	-
Display of encoder information	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Display of incremental signals in a circular diagram	-	-	✓	-	-	✓	-	-	-	✓	✓	✓
Evaluation of the reference signal	-	-	-	-	-	-	-	-	-	✓	✓	✓
Incremental counter	-	-	✓	-	-	-	-	-	-	✓	✓	✓
Display of supply voltage and supply current	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Homing/limit display	-	-	-	-	-	-	-	-	-	✓	✓	-
Signal recording	-	-	-	-	-	-	-	-	-	✓	-	-
Mounting wizards/inspection wizards												
Mounting wizards	See <i>Mounting wizard</i> ; for more information, see the encoder documentation											
Inspection wizard for encoders with functional safety	✓	✓	✓	-	-	-	✓	-	-	-	-	-
Assistant for tensioning the scale tape	-	✓	✓	✓	✓	-	-	-	-	✓	-	-
Miscellaneous functions												
Comparison of absolute position with incremental position	-	-	✓	-	-	✓	-	-	-	-	-	-
Datum shift ("electric zeroing"), including information display ⁴⁾	✓	✓	✓	(✓)	(✓)	(✓)	(✓)	(✓)	(✓)	-	-	-
Configuration wizard (addresses, characteristic curves of sensors, etc.)	✓	-	-	-	-	-	-	-	-	-	-	-
Display of temperatures	✓	✓ ⁵⁾	-	✓	-	-	✓	-	-	-	-	-
Display of additional position values	✓	✓	-	-	-	-	✓	-	-	-	-	-
Display of additional sensors	✓	✓	-	-	-	-	-	-	-	-	-	-
Display of limit position signals	✓	✓	-	-	-	-	-	-	-	-	-	-
Expanded status display	✓	✓	-	-	-	-	-	-	-	-	-	-
Memory contents												
Display of memory contents	✓	✓	✓	-	-	-	✓	-	-	-	-	-
Modification of memory contents	✓	✓	✓	-	-	-	-	-	-	-	-	-
Storing of memory assignments	✓	✓	✓	-	-	-	✓	-	-	-	-	-
Comparison of current memory contents with saved memory contents	✓	✓	✓	-	-	-	-	-	-	-	-	-
Backing up the encoder memory	✓	✓	✓	✓	✓	-	✓	✓	✓	-	-	-

1) In feed-through mode; preferably in conjunction with a signal adapter (see "Signal adapters" or "Encoder output")

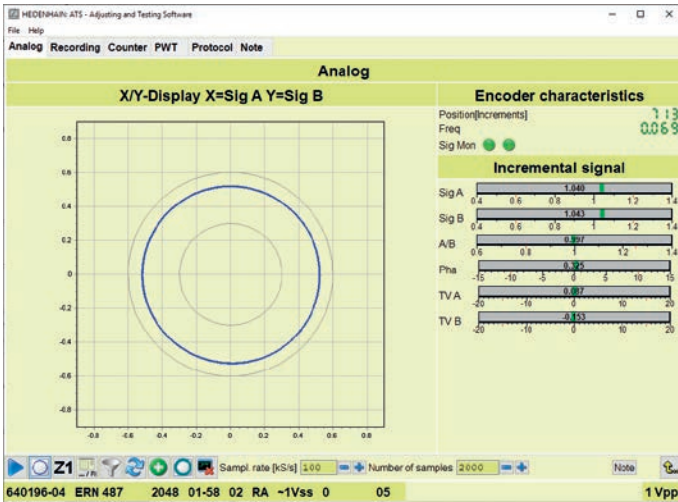
2) 25 μApp/3 V_{PP} for servicing purposes

3) Via signal adapter, for servicing purposes

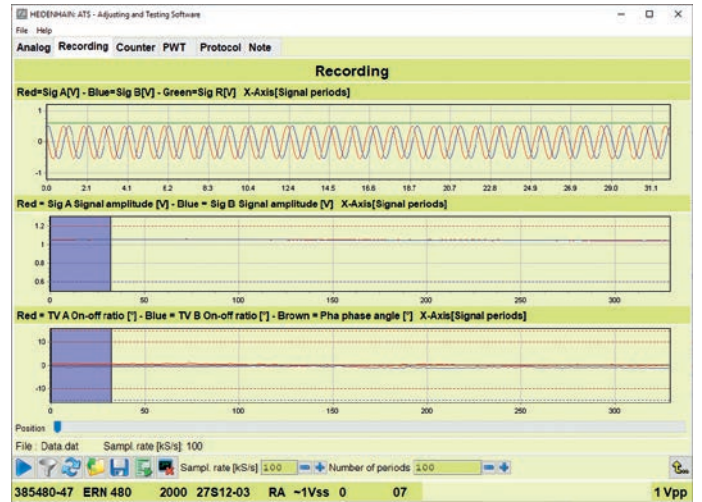
4) License key is required and is available only for certain encoders (with the exception of EnDat)

5) Including conversion for PT 1000 sensors when EnDat memory parameters are appropriately set

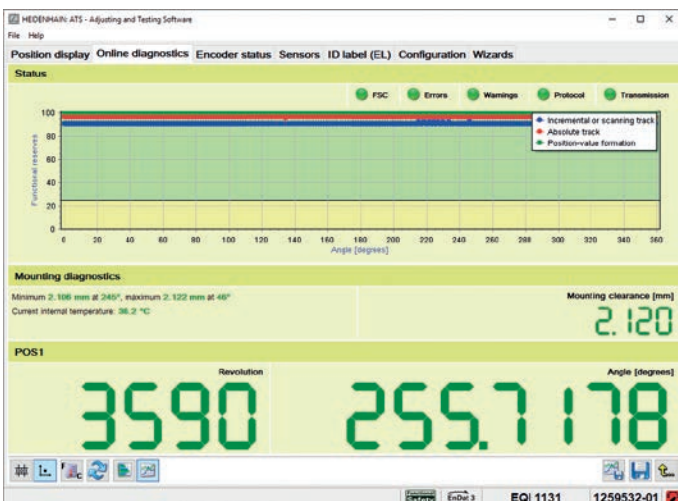
(✓) See ATS software operating instructions



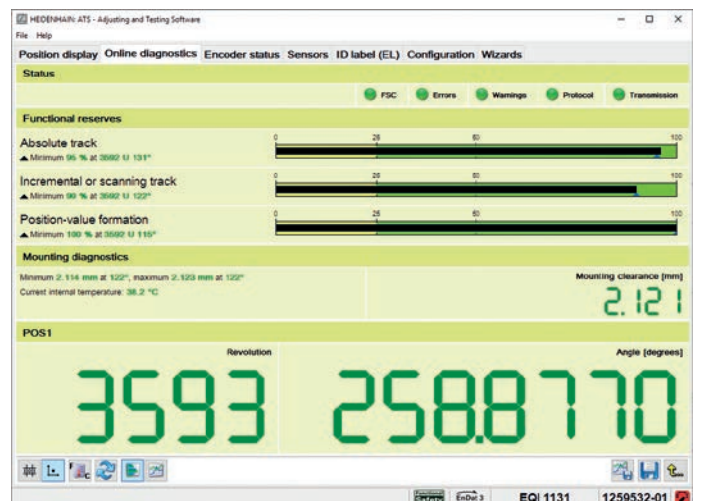
Incremental signal function: analog view



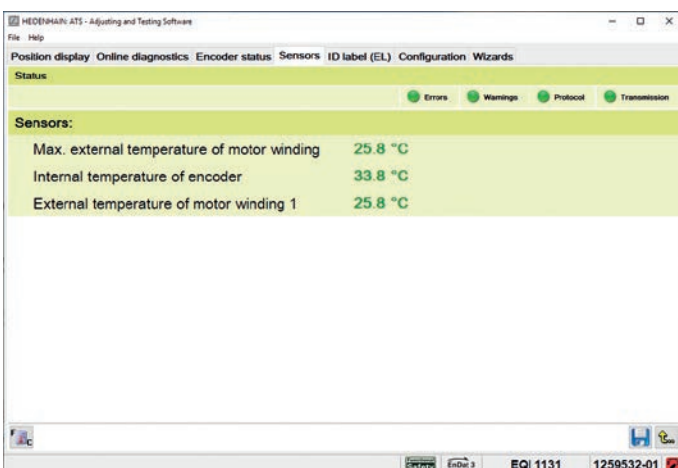
Recorded data loaded from a file



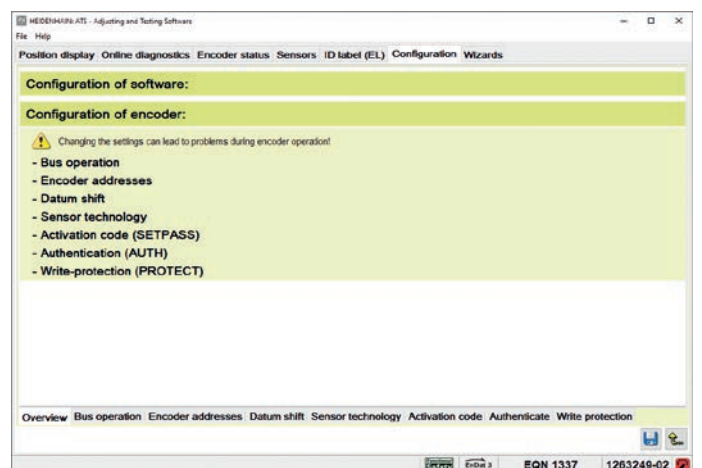
Result of the online diagnostics in the X/Y display



Result of the online diagnostics: bar graph



Sensors view



Configuration view

Operating modes and signal adapters

Encoder diagnostics

The encoder is connected directly to the testing or inspection device. This makes a comprehensive analysis of encoder functions possible.

Monitoring mode

The PWM inspection device is inserted within the closed control loop (via suitable testing adapters as needed). This enables real-time diagnosis of the machine or equipment during operation. The available functions depend on the interface.

Overview		PWM 21	
Interface	Output signals (selection)	Encoder diagnostics	Monitoring mode
EnDat 3	Position value Valuation numbers	Yes Yes	No ¹⁾ No ¹⁾
EnDat 2.1 (with incremental signals)	Position value Incremental signals	Yes Yes	No Yes
EnDat 2.2 (without incremental signals)	Position value Valuation numbers	Yes Yes	Yes Yes ²⁾
DRIVE-CLiQ	Position value Valuation numbers	Yes Yes	No No
Fanuc	Position value Valuation numbers	Yes Yes	Yes Yes
Mitsubishi	Position value Valuation numbers	Yes Yes ³⁾	Yes Yes ^{2) 3)}
Panasonic	Position value Valuation numbers	Yes Yes	Yes Yes ²⁾
Yaskawa	Position value Valuation numbers	Yes Yes ⁴⁾	No ⁵⁾ No ⁵⁾
SSI	Position value Incremental signals	Yes Yes	No Yes
1 V_{pp}	Incremental signals	Yes	Yes
11 μA_{pp}	Incremental signals	Yes	Yes
TTL	Incremental signals Scanning signals	Yes Yes ⁶⁾	Yes No
HTL	Incremental signals	Yes ⁷⁾	No
Commutation	Block commutation Sinusoidal commutation	Yes ⁷⁾ Yes	No Yes

¹⁾ Is supported starting with ATS V3.8

²⁾ Information must be requested by the control and transmitted

³⁾ Not available for encoders with the ordering designation Mitsu01

⁴⁾ Not available for the EIB 3391Y

⁵⁾ This function is currently not available

⁶⁾ If supported by the encoder (PWT function)

⁷⁾ Via corresponding signal adapters

Signal adapters are available for the PWM 21 in order to expand the range of functions:

HTL signal adapter

Connection of encoders with HTL interface for servicing purposes.

SA 1210

Connection of encoders with the E30-R2 ordering designation (the SA 1210 cannot be used in conjunction with the PWM 20).

SA 100

Monitoring mode (with galvanic isolation of the RS-485 and 1 V_{PP} signals); designed for U_{P, max} = 5.5 V.

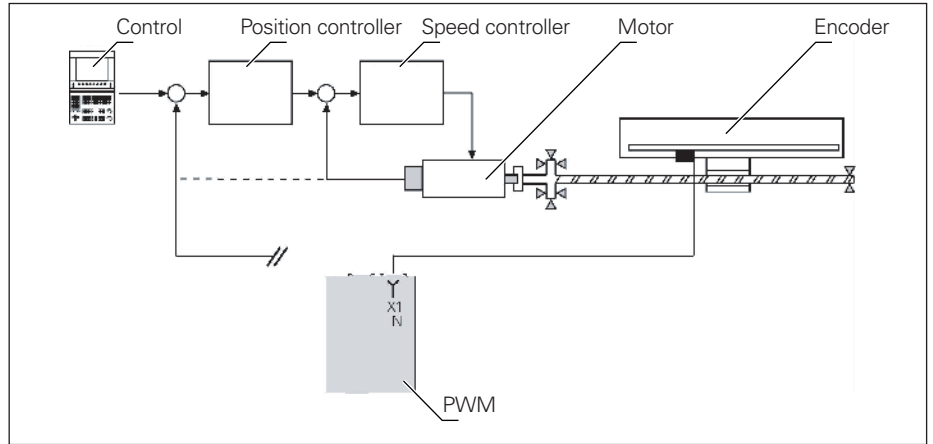
SA 110

Monitoring mode (with galvanic isolation of the RS-485 signals); designed for U_{P, max} = 5.5 V.

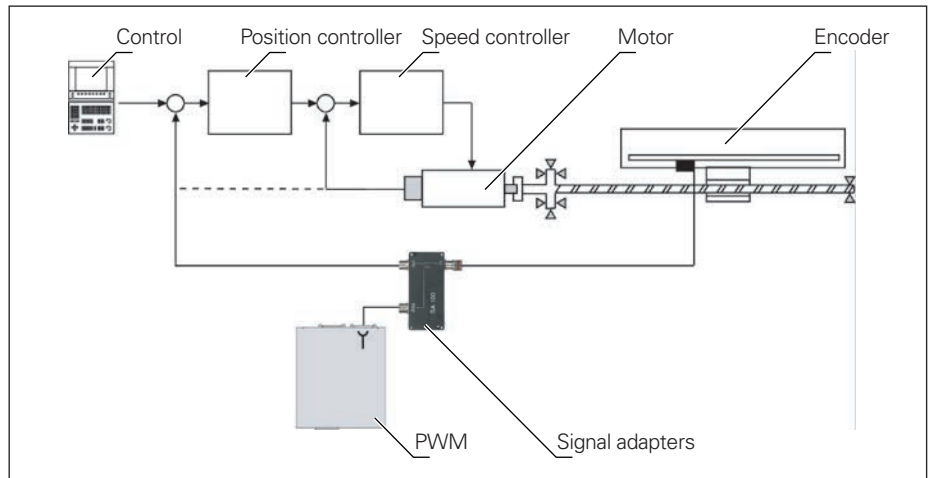
SA 23xx*

- Monitoring mode (with galvanic isolation of the RS-485 and 1 V_{PP} signals); U_{P, max} = 14 V
- Encoders with the ordering designation E30-R2
- Connectability of an external power supply, specifically if multiple encoders are connected in bus mode and the power cannot be made available via the PWM 21
- Connection of EnDat 3 encoders to the PWM 20

* Inquire about the availability at HEIDENHAIN (planned for the end of 2023)



Encoder diagnostics




Monitoring mode with signal adapter (potential segregation)


HEIDENHAIN

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This Product Information document supersedes all previous editions, which thereby become invalid. The basis for ordering from HEIDENHAIN is always the Product Information document edition valid when the order is placed.



More information:

Information on correct and intended operation is provided in the following documents:

- Brochure: *Interfaces of HEIDENHAIN Encoders* 1078628-xx
- Brochure: *Cables and Connectors* 1206103-xx