PRODUCT DATA

High Precision Turntable System Type 9640-A-001

High Precision Turntable System Type 9640-A-001 is designed to rotate a device under test (DUT), such as a loudspeaker, a microphone, a hydrophone, a television, or any kind of telecommunication or conferencing device, on a revolving platter.

Used in combination with a personal computer, Type 9640-A-001 becomes part of a system capable of automatically recording the directional characteristics of a variety of DUTs.

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Uses
- Controlling DUT orientation during:
    - Directional response measurements
    - Sound power measurements
    - Directional noise radiation measurements

Features
- Rotation of up to 100 kg load, supported or suspended
- Continuous, relative, or absolute rotation
- Controllable from PC over USB, RS-232 or LAN interface
- Adjustable platter speed, acceleration, and torque
- Connection of DUT power supply and signals through the centre bore of the platter
- Readout of current DUT angle on LCD touchscreen
- Reset to factory settings, and reset to user-defined settings
- Integrated spirit level for alignment of the turntable
- Support of commands for legacy Turntable System Type 9640

Applications

Type 9640-A-001 can be used to measure directivity by means of frequency-response test methods. The DUT can be accurately rotated using the platter, so that it is located at the desired angle relative to a measurement microphone.

The response of the DUT can then be obtained for any direction using proper directivity and polar plot applications.

Controlling the turntable

On the front panel of Type 9640-A-001 there are three pushbuttons that allow you to manually control the platter:
- **Step** – press this to rotate the platter clockwise, or anti-clockwise to the required angle
- **Jog** – press this to continuously rotate the platter, release the button to stop
- **Home** – press this to rotate the platter clockwise, or anti-clockwise, to the 0° mark

Softkeys, which are available on the touchscreen (left side of front panel, see main photo and Fig. 1) enable you to rotate and control the platter through a wide range of measurement scenarios.

Fig. 1   Type 9640-A-001 touchscreen – displays the actual position of the platter. It is also used to set up various turntable parameters via softkeys

Controlling the turntable (contd.)

Type 9640-A-001 offers three modes of remote operation:
* **Turn_Rel** – allows you to perform a relative rotation of the platter (specified in degrees)
* **Turn_Abs** – allows you to perform an absolute rotation of the platter (specified in degrees)
* **Cont** – allows you to rotate the platter at a constant speed (for example, when the polar plot of a single frequency is required)

In addition, dedicated commands for controlling the platter are available, for example, *Set 0°*, *Acc.* and *Max_360*.

As DUTs have different inertia, you can control the acceleration and deceleration in the start and stop phases using the *Acc.* command.

The acceleration of the platter can be adjusted to accommodate different DUT masses, up to 100 kg.

Use the *Set 0°* command to set the 0° mark that will be the reference for a given test.

To prevent cable wrapping, you can use the *MAX_360* command to limit the rotations between 0° and 360°.

Alternatively, you can feed the cables through the hole in the centre of the platter, allowing multiple rotations.

All functions can be controlled via the USB, RS-232 or LAN interface.

Emergency stop

An emergency stop is provided on the front of Type 9640-A-001, but an external emergency stop is also available as an optional accessory.

It can be placed near the operator in situations where the turntable is placed some distance from the operator, for example, in an anechoic chamber.

Compliance with standards

CE ⬀ ⊜ ⊠	The CE marking is the manufacturer's declaration that the product meets the requirements of the applicable EU directives RCM mark indicates compliance with applicable ACMA technical standards – that is, for telecommunications, radio communications, EMC and EME China RoHS mark indicates compliance with administrative measures on the control of pollution caused by electronic information products according to the Ministry of Information Industries of the People's Republic of China WEEE mark indicates compliance with the EU WEEE Directive
Safety	EN/IEC 61010‒1: Safety requirements for electrical equipment for measurement, control and laboratory use. ANSI/UL 61010‒1: Safety requirements for electrical equipment for measurement, control and laboratory use **Note:** Emergency Stop and stall detection compliant with EU-directive 2006/42/EC (machine directive). When rotation is stalled (no movement is detected) you must clear the stall condition to restart motion. When in motion, pressing any of the keys on the front panel will cause the motion to stop
EMC Emission	EN/IEC 61000‒6‒3: Generic emission standard for residential, commercial and light industrial environments. CISPR 32: Radio disturbance characteristics of information technology equipment. Class B Limits. FCC Rules, Part 15: Complies with the limits for a Class B digital device.
EMC Immunity	EN/IEC 61000‒6‒1: Generic standards – Immunity for residential, commercial and light industrial environments. EN/IEC 61326: Electrical equipment for measurement, control and laboratory use – EMC requirements. **Note:** The above is only guaranteed using accessories listed in this Product Data
Temperature	IEC 60068‒2‒1 & IEC 60068‒2‒2: Environmental Testing. Cold and Dry Heat. Operating Temperature: 5 to 50 °C (41 to 122 °F). Storage Temperature: 5 to 50 °C (41 to +122 °F)
Humidity	IEC 60068‒2‒78: Damp Heat: 93% RH (non-condensing at 40 °C (104 °F))
Enclosure	According to IEC 529: IP 23

LOAD
Max 100 kg (220 lb) on centre, 25 kg (55 lb) on periphery, when platter is lined up perfectly in horizontal plane. Same loads apply with turntable hung upside down
Securing DUTs
The platter has tapped holes that will accept M6 screws
Note: Applying excessive torque to the platter can cause damage, hence the applied torque should always be below 140 Nm (103 lb-ft)

CONTROL INTERFACES
User interface
· **Control:** Using Step, Jog and Home pushbuttons
· **Set up:** Using touchscreen
USB interface
· **Connector:** USB 2.0, Type B, female
· **Speed:** 1.5 Mbits/s
· **Protocol:** USB 2.0
Note: Firmware update is supported via USB interface, see user manual
RS-232 interface
· **Connector:** Standard female 9-pin, DB9, RS-232 serial connector
· **Speed:** 9600 bits per second
· **Protocol:** Serial communication using DCE signals
LAN interface
· **Connector:** RJ-45 Auto-MDIX. Shielded cable of 'CAT 6' type (or better) to be used
· **Speed:** 10 Mbps
· **Protocol:** TCP/IP
Note: REST API over HTTP is supported. This will enable applications created by the user to control the turntable as well as remote control from a smart device. See user manual for more information
Emergency stop
· **Turntable:** Button on front panel
· **External:** Remote emergency stop, see Optional Accessories below

MOTION SETTING
Torque: 5 Nm to 20 Nm (3.7 lb-ft to 14.7 lb-ft). Electronically limited
Torque Accuracy: ±15%
Angle Accuracy: 0.5°
Angle Resolution: 0.1°
Speed of Rotation: 22.7 to 720 secs per revolution. Electronically limited

COMMANDS
Set 0 Deg: Sets the reference angle
Acc.: Sets the acceleration
Turn_rel: Sets the relative rotation in degrees
Turn_abs: Sets the absolute rotation in degrees
Max_360 On/Off: Turns max. 360° on or off – 'On' prevents cables from tangling
Note: A full set of commands and their detailed functional descriptions are available in the user manual

ACOUSTIC NOISE LEVEL
Typical idle noise level: <0.0 dB SPL(A)
Note: The SPL is measured 1 m above the centre of the platter in the frequency range from 20 Hz to 20 kHz
Typical noise level during operation: <50.0 dB SPL(A)
Note: The SPL is measured 1 m above the centre of the platter in the frequency range from 20 Hz to 20 kHz

POWER REQUIREMENTS
External DC power input
· **DC Input:** 12 – 30 V DC
· **Connector:** $\varnothing$ 2.5 mm $\times$ $\varnothing$ 5.5 mm $\times$ 11 mm ($\varnothing$ 0.9″ $\times$ $\varnothing$ 0.2″ $\times$ 0.4″) barrel connector
· **Power Consumption DC Input:** <2.4 W (idle) and <72 W (max)
· **Internal E-fuse:** Automatic reset
Power supply
Via Mains Adaptor ZG-0498 (included), 90 – 264 V AC, 47 – 64 Hz

DIMENSIONS
Height (without feet): 100 mm (3.9″)
Width: 437 mm (17.2″)
Depth: 437 mm (17.2″)
Platter diameter: 400 mm (15.7″)
Platter centre bore: 50 mm (1.9″)

WEIGHT
12 kg (26.5 lb)

Ordering information

Type 9640-A-001	High Precision Turntable System
Includes the following:	
AO-0728-D-020	Cable, USB 2.0, USB-A (M) to USB-B (M) black, 2 m (6.6 ft) max. 70 °C (158 °F)
DF-7070	Foot for turntable (1 piece)
ZG-0489	Power supply

OPTIONAL ACCESSORIES

AO-0728-D-020	Cable, USB 2.0, USB-A (M) to USB-B (M) black, 2 m (6.6 ft) max. 70 °C (158 °F)
AO-1442-D-yyy*	Cable RS-232 null modem, sub-D 9-pin (F) to sub-D 9-pin (F) + adaptor 9-pin (M) to 25-pin (F), max. 70 °C (158 °F)
AO-1450-D-yyy*	Cable, Cat.6 S/FTP up to 250 MHz, RJ-45 (M) to RJ-45 (M), green PVC, 70 °C (158 °F)
UA-4158	Remote emergency stop for Type 9640-A-001 with extension cable 15 m (49.21 ft)
UA-0051	Adjustable rod for mounting HATS on turntable
UL-0250	Adaptor, USB 2.0 (M) to RS-232 serial sub-D 9-pin (M) with extension cable USB-A (M) to (F)
UL-0265	10-port network switch with PoE and PTPv2 support

* yyy = length in decimetres
  Please specify cable length when ordering