T200S/T500S
Tunable Laser Source

EXFO

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Trademarks

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Units of Measurement

Units of measurement in this publication conform to SI standards and practices.

Patents

The exhaustive list of patents is available at www.EXFO.com/patent.

Document version: 5.0.0.2

Information in this document applies to the T200S/T500S embedded software package version 4.6.x (and system image version 4.x.x) and later versions.

Contents

Contents

Regulatory Information

CAUTION

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

USA Electromagnetic Interference Regulatory Statement

Electronic test and measurement equipment is exempt from FCC part 15, subpart B compliance in the United States of America. However, EXFO Inc. makes reasonable efforts to ensure compliance to the applicable standards.

The limits set by these standards are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the user documentation, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canada Electromagnetic Interference Regulatory Statement

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference.

Cet équipement génère, utilise et peut émettre de l'énergie radio-fréquence et, s'il n'est pas installé et utilisé conformément à la documentation de l'utilisateur, il peut occasionner une interférence néfaste aux communications radio. L'utilisation de cet équipement dans une zone résidentielle est susceptible d'occasionner une interférence néfaste.

Caution: This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

Attention : Cet appareil n'est pas destiné à être utilisé dans des environnements résidentiels et peut ne pas assurer la protection adéquate à la réception radioélectrique dans ce type d'environnements.

This is a class A, group 1 product.

Ceci est un produit de classe A, groupe 1.

➤ Class A equipment: Equipment that is, by virtue of its characteristics, highly unlikely to be used in a residential environment, including a home business shall be classified as class A and shall comply with the class A limits specified in the applicable ICES standard. Characteristics considered in this assessment include price, marketing and advertising methodology, the degree to which the functional design inhibits applications suitable to residential environments, or any combination of features that would effectively preclude the use of such equipment in a residential environment.

Classe A : Matériel qui, en raison de ses caractéristiques, ne sera fort probablement pas utilisé dans un milieu domiciliaire ni par des entreprises établies à domicile. Parmi les caractéristiques considérées dans cette évaluation, il y a le prix, les méthodes de commercialisation et de publicité, la mesure dans laquelle les fonctions de l'appareil font qu'il ne se prête pas à des applications convenant au milieu domiciliaire ou toute combinaison de ces caractéristiques qui aurait pour conséquence d'en prévenir effectivement l'utilisation à domicile. Utilisé également pour indiquer les limites d'émission correspondantes qui s'appliquent à un tel matériel.

➤ Class B equipment: Equipment that cannot be classified as Class A shall comply with the Class B limits specified in the applicable ICES standard.

Classe B : Matériel qui ne peut pas être inclus dans la classe A. Utilisé également pour indiquer les limites d'émission correspondantes qui s'appliquent à un tel matériel.

➤ Group 1 equipment: group 1 contains all equipment which is not classified as group 2 equipment, and includes equipment such as laboratory and scientific equipment, industrial process, measurement and control equipment.

Group 2 equipment: group 2 contains all ISM RF equipment in which radio-frequency energy in the frequency range 9 kHz to 400 GHz is intentionally generated and used or only used locally, in the form of electromagnetic radiation, inductive and/or capacitive coupling, for the treatment of material for inspection/analysis purposes, or for transfer of electromagnetic energy.

Appareils du groupe 1 : le groupe 1 réunit tous les appareils compris dans le domaine d'application de la présente Norme, qui ne sont pas classés comme étant des appareils du groupe 2. Le groupe 1 inclut les appareils scientifiques et de laboratoire, les processus industriels, appareils de mesure ou de contrôle.

Appareils du groupe 2 : le groupe 2 réunit tous les appareils ISM à fréquences radioélectriques dans lesquels de l'énergie à fréquences radioélectriques dans la plage de fréquences comprises entre 9 kHz et 400 GHz est produite et utilisée volontairement ou uniquement utilisée localement sous forme de rayonnement électromagnétique, de couplage inductif et/ou capacitif, pour le traitement de la matière, à des fins d'examen ou d'analyse ou pour le transfert d'énergie électromagnétique.

Supplier's Declaration of Conformity (SDoC)

The SDoC for your product is as follows:

CAN ICES-001 (A) / NMB-001 (A)

Electromagnetic Compatibility Regulatory Statement

Warning: This is a class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures. Your product is suitable for use in industrial electromagnetic environments.

Simplified EU and UK Declaration of Conformity

The full text of the declaration of conformity is available at the following Internet address: *www.exfo.com/en/resources/legal-documentation*.

EU Economic Operator

EXFO Solutions SAS
2, rue Jacqueline Auriol,
Saint-Jacques-de-la-Lande,
35091 Rennes Cedex 9
FRANCE

1 *Introducing the T200S and T500S Laser Sources*

The T200S and T500S are continuously tunable laser sources that cover all major bands of telecom application from the O-band to the U-band (depending on the model).

The embedded software enables you to control the product operations through a graphical user interface or through remote commands and queries.

Technical Specifications

This section describes the T200S/T500S technical specifications and requirements.

Optical Measurement Specifications

To obtain this product's most recent technical specifications, visit the EXFO website at *www.exfo.com*.

Hardware Specifications

Hardware			
Interfaces for External Devices	USB-A 2.0 (x2)		Mouse, keyboard, or USB key for software update
	USB-A 3.0 (x1)		
Remote Interface	Ethernet	RJ45 (x1)	1 Gbit/s. A shielded Ethernet cable is required.
Electrical Interfaces	In (BNC)	Trig in	0-5 V TTL
	Out (BNC)	Trig out	➤ Hardware[a] v. 2.0 and v. 3.0: 0-5 V TTL ➤ Hardware[a] v. 2.1 and v. 3.1 (and above): 0-3.3 V LVTTL
		Power out	0-5 V: 0-10 mW 16 bits DAC
		λ out	0-5 V: λ Min to λ Max 16 bits DAC
	Maximum cable length		10 m (32.8 ft)
Electrical Specifications	Input power		see *Electrical Safety Information* on page 10.
	Fuses (x2)		T4AH250V
	Maximum power consumption		72 W
Physical Specifications	Dimensions (H x W x D)		173 mm x 217 mm x 473 mm (6.8 in x 8.5 in x 18.6 in)
	Weight		9 kg (19.8 lb)

a. The hardware version of your instrument is available in the information window: see *Viewing System Information* on page 103.

T200S/T500S Overview

The T200S/T500S is delivered with the following accessories:

➤ 1 power supply cable,

➤ 1 patchcord,

➤ 1 printed manual *Getting Started with T200S/T500S*,

➤ 1 USB key containing the system package version installed on your T200S/T500S, remote examples (if any) and user documentation.

Front panel

Touch screen

Laser model

Speaker

Standby button

Status LEDs

Optical output

Air intake holes
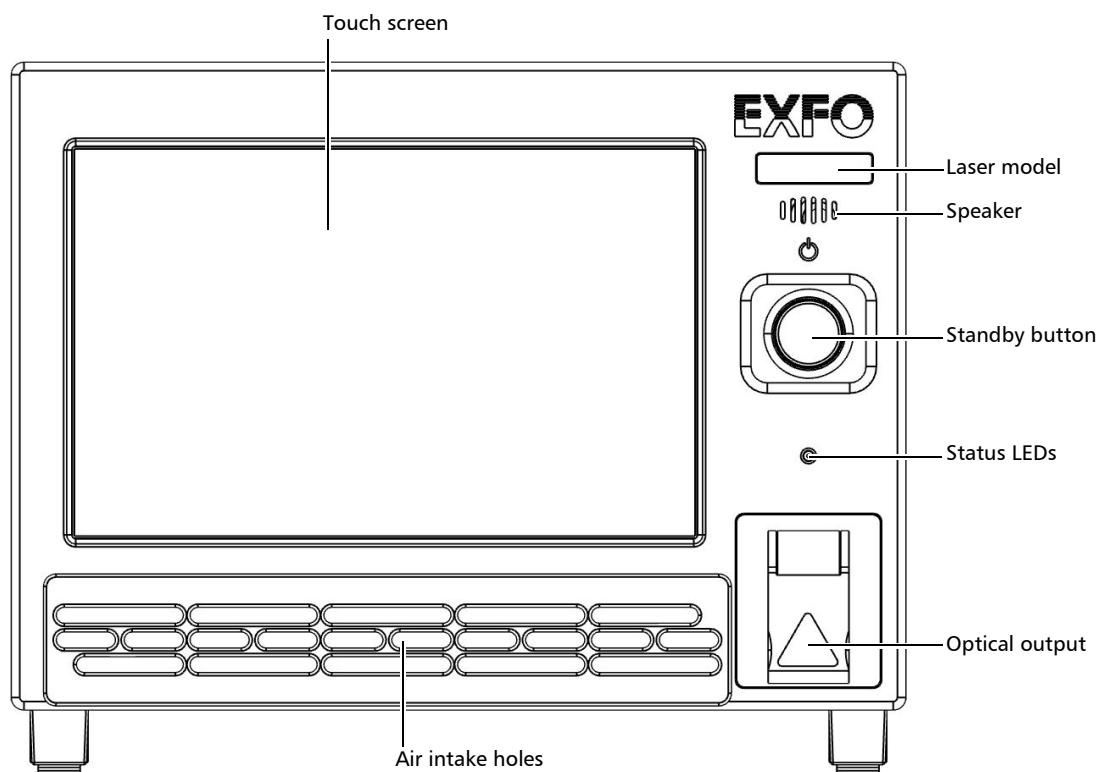
Standby button

The ⏻ button enables you to turn on or off the T200S/T500S (see *Turning on the T200S/T500S and Accessing the GUI* on page 16 and *Turning off the T200S/T500S* on page 20).

Status LEDs

The status led is lit if the laser diode is enabled.

Touch screen

The touch screen enables you to perform all possible operations on the T200S/T500S.

Speaker

The T200S/T500S emits a sound when you enable or disable the laser diode and when you modify the laser parameters.

For more details, see *Adjusting the Volume* on page 22.

Optical output connector

The FC/APC optical output connector is protected by a safety cap.

The laser warning symbol indicate the location of the laser source. For more details, see *Laser Safety Information* on page 8.

Rear panel
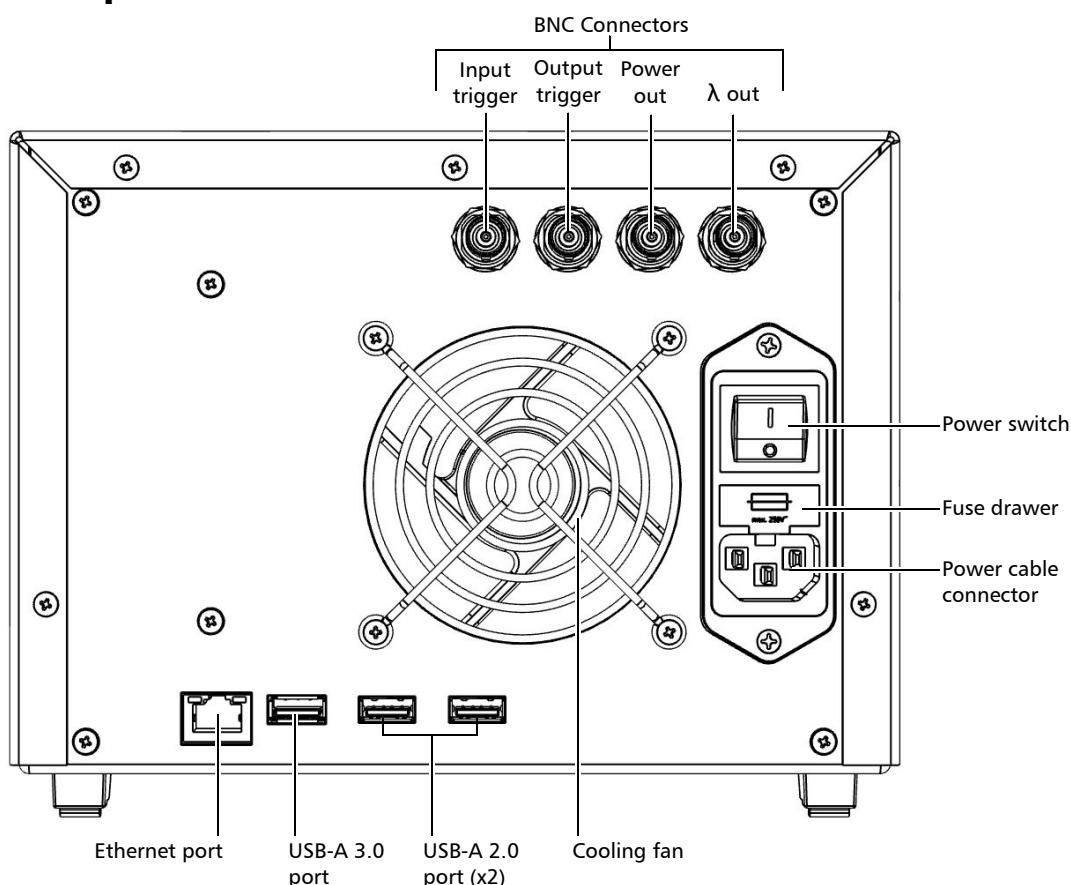
BNC Connectors

The BNC connectors enable you to synchronize T200S/T500S sweeps with external instruments (see *Hardware Specifications* on page 1 for more details on signal levels).

➤ **Trig in**: input BNC connector for starting sweep in synchronization with an external trigger input signal. For more details, see *Triggering the Sweep Sequence* on page 43.

➤ **Trig out**: output BNC connector for outputting a trigger signal during wavelength/frequency emission. For more details, see *Generating an Output Trigger Signal during Emission* on page 35 and *Generating an Output Trigger Signal During Sweep* on page 45.

➤ **Power out**: output BNC connector for power monitoring. For more details, see *Monitoring the Laser Output Power* on page 53.

➤ **λ Out**: output BNC connector for wavelength monitoring. It provides an analog reading related to the wavelength in nm. For more details, see *Monitoring the Wavelength Electrical Level* on page 50.

USB-A Ports

The $SS\rightleftarrows$ label identifies the USB-A 3.0 ports, the $\bullet\mathrel{\leftarrow}\hspace{-0.5em}\mathrel{\rightarrow}$ identifies the USB-A 2.0 ports. These ports enable you to connect USB devices such as:

➤ a keyboard and mouse if needed

➤ a USB key for software update

For more details on USB connections, see *Connecting a Mouse and Keyboard to the T200S/T500S* on page 16.

Ethernet Port

The ⊟ label identifies the Ethernet port, which enables you to:

➤ Connect the T200S/T500S to your network. For more details, see *Connecting the T200S/T500S to your Company Network* on page 24.

➤ Perform remote control operations on the T200S/T500S. For more details, see *Remotely Controlling the T200S/T500S* on page 55.

Cooling Fan

The cooling fan extract warm air from inside (air enters in front of the T200S/T500S). A cover grid protects the fan.

Power Input

The power input part includes the following elements:

➤ **Power switch**

➤ **Power cable connector**
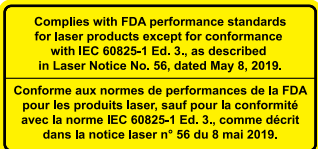
   The product is equipped with a self-regulating power supply.

➤ **Fuse drawer**

   The fuse drawer contains two fuses to protect the product from overcurrent (for fuse type, see *Hardware Specifications* on page 1).

   For details on how to replace the fuses, see *Replacing Fuses* on page 95.

Labels and Markings

Label	Description
SERIAL NUMBER / NUMERO DE SERIE XXXXXXXXXXXX MODEL / MODELE T200S OPTIONS MANUFACTURED / FABRIQUE XXXX-XX Made in / Fabriqué en France	Identification of the product.
Manufactured by: Fabriqué par : **EXFO** 4, rue Louis de Broglie www.EXFO.com 22 300 LANNION Tel.: +33 2 96 48 37 15 France Fax: +33 2 96 48 73 04	Manufacturer identification. Contact information of the manufacturer.
⊏▭⊐	Fuse type. See *Hardware Specifications* on page 1.
⚠	Indicates an injury hazard. It appears on a location that requires special instructions for proper use: see *Electrical Safety Information* on page 10.
(WEEE symbol)	WEEE symbol for recycling. See *Recycling and Disposal* on page 97.
125318 c N us CSA C22.2 No. 61010-1 UL 61010-1	Safety certification label.
CAN ICES-001 (A) / NMB-001 (A)	Canadian certification. See *Regulatory Information* on page v.
UK CA	UK conformity assessment. See *Regulatory Information* on page v.
C E	CE marking. See *Regulatory Information* on page v.
Complies with FDA performance standards for laser products except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019. **Conforme aux normes de performances de la FDA pour les produits laser, sauf pour la conformité avec la norme IEC 60825-1 Ed. 3., comme décrit dans la notice laser n° 56 du 8 mai 2019.**	Laser safety label The product is a class 1M laser product. For more details, see *Laser Safety Information* on page 8.
(EFUP 10 symbol)	EFUP label (RoHS China) See *Chinese Regulation on Restriction of Hazardous Substances (RoHS)* on page 197.
WINDOWS 10 Product Key: XXXXX - XXXXX - XXXXX - XXXXX - XXXXX	Windows license label. The T200S/T500S embeds Windows 10.
⚠ Warranty void if seal broken La rupture du sceau entraîne l'annulation de la garantie	Warranty seal. The T200S/T500S cover must not be open, otherwise the warranty is not valid anymore.

Conventions

Before using the product described in this guide, you should understand the following conventions:

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in *death or serious injury*. Do not proceed unless you understand and meet the required conditions.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in *minor or moderate injury*. Do not proceed unless you understand and meet the required conditions.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in *component damage*. Do not proceed unless you understand and meet the required conditions.

IMPORTANT

Refers to information about this product you should not overlook.

2   *Safety Information*

WARNING

Do not install or terminate fibers while a light source is active. Never look directly into a live fiber and ensure that your eyes are protected at all times.

WARNING

The use of controls, adjustments and procedures, namely for operation and maintenance, other than those specified herein may result in hazardous radiation exposure or impair the protection provided by this unit.

WARNING

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

WARNING

Use only accessories designed for your unit and approved by EXFO. For a complete list of accessories available for your unit, refer to its technical specifications or contact EXFO.

CAUTION

This product does not contain any user-serviceable components, except if indicated otherwise in this document. Any unauthorized product changes or modifications will invalidate warranty and all applicable regulatory certifications and approvals.

IMPORTANT

Refer to the documentation provided by the manufacturers of any accessories used with your EXFO product. It may contain environmental and/or operating conditions limiting their use.

IMPORTANT

When you see the following symbol on your unit ⚠, make sure that you refer to the instructions provided in your user documentation. Ensure that you understand and meet the required conditions before using your product.

IMPORTANT

When you see the following symbol on your unit ☢, it indicates that the unit is equipped with a laser source, or that it can be used with instruments equipped with a laser source. These instruments include, but are not limited to, modules and external optical units.

IMPORTANT

Other safety instructions relevant for your product are located throughout this documentation, depending on the action to perform. Make sure to read them carefully when they apply to your situation.

Laser Safety Information

Your instrument is in compliance with standard IEC 60825-1: 2014 + A11: 2021 and IEC 60825-1 Ed. 3.

WARNING

Viewing the laser output with telescopic optical instruments (for example, telescopes and binoculars) may pose an eye hazard and thus the user should not direct the beam into an area where such instruments are likely to be used.

ATTENTION

L'observation de la sortie optique avec certains instruments d'optique télescopiques (par exemple, des télescopes et des jumelles) peut présenter un danger pour les yeux; il convient donc que l'utilisateur ne dirige pas le faisceau dans une zone où ce type d'instrument est susceptible d'être utilisé.

Laser radiation may be encountered at the optical output port.

The following label indicates that the product contains a Class 1M source:

⚠ ATTENTION
⚠ CAUTION
LASER 1M

INVISIBLE LASER RADIATION
DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS
DO NOT EXPOSE USERS OF TELESCOPIC OPTICS
CLASS 1M LASER PRODUCT

RAYONNEMENT LASER INVISIBLE
NE PAS OBSERVER DIRECTEMENT À L'AIDE D'INSTRUMENTS D'OPTIQUE
NE PAS EXPOSER LES UTILISATEURS DE DISPOSITIF OPTIQUE
TÉLESCOPIQUE
APPAREIL À LASER DE CLASSE 1M

Wavelength range (overall models): / Plage de longueur d'onde (ensemble des modèles) : 1240-1680 nm
For each model, wavelength range is shorter and depends on model (see specification sheet for details) / Pour chaque modèle, la plage de longueur d'onde est plus courte et dépend du modèle (voir détails dans la fiche technique du produit).

Pout max.: / Psortie max.: ≤ 50 mW

Other Safety Symbols on Your Unit

One or more of the following symbols may also appear on your unit.

Symbol	Meaning
---	Direct current
∿	Alternating current
⏚	The unit is equipped with an earth (ground) terminal.
⏚	The unit is equipped with a protective conductor terminal.
⏚	The unit is equipped with a frame or chassis terminal.
❘ or ⊓	On (Power)
◯ or ⊔	Off (Power)
⏼	On/off (Power)
⏻	Standby (Power)
⊟	Fuse

Electrical Safety Information

This unit uses an international safety standard three-wire power cable. This cable serves as a ground when connected to an appropriate AC power outlet.

WARNING

➤ **If you need to ensure that the unit is completely turned off, disconnect the power cable.**

➤ **Use only the certified power cord that is suitably rated for the country where the unit is used.**

➤ **Replacing detachable MAINS supply cords by inadequately RATED cords may result in overheating of the cord and create a risk of fire.**

The color coding used in the electric cable depends on the cable. New plugs should meet the local safety requirements and include:

➤ adequate load-carrying capacity

➤ ground connection

➤ cable clamp

WARNING

➤ **Use this unit indoors only.**

➤ **Do not remove unit covers during operation.**

➤ **Use only fuses with the required rated current and specified type. For more information, see the section about replacing the fuses in this user documentation.**

➤ **Unless otherwise specified, all interfaces are intended for connection to ES1 circuits only.**

CAUTION

Position the unit so that the air can circulate freely around it.

Equipment Ratings		
Temperature	Operation	+15 ℃ to +35 ℃ (+59 ℉ to +95 ℉)
	Storage	-20 ℃ to +50 ℃ (-4 ℉ to 122 ℉)
Performance guaranteed temperature		+18 ℃ to +28 ℃ (+64.4 ℉ to +82.4 ℉)
Relative humidity		< 80% (non condensing)
Maximum operation altitude		< 2000 m (6562 ft)
Pollution degree		2
Overvoltage category		II
Measurement category		Not rated for measurement categories II, III, or IV
Input power[a]		100–240 V $\sim$; 50/60 Hz; 0.65–0.3 A

a.   Not exceeding ± 10 % of the nominal voltage.

CAUTION

The use of voltages higher than those indicated on the label affixed to your unit may damage the unit.

3 *Getting Started with Your T200S/T500S*

This section explains how to properly install and connect your T200S/T500S.

Unpacking and Installing the T200S/T500S

The T200S/T500S is designed for indoor use only, and is not dedicated to wet locations. It must be operated under proper environment conditions, as explained in the following procedure.

This section explains how to install the T200S/T500S as a bench top instrument.

To install the T200S/T500S into a rack, EXFO provides a specific rack mount shelf (for more details, contact your sales representative). The procedure to install the T200S/T500S into a 19" rack is available in the manual delivered with the rack mount kit.

CAUTION

➤ **Make sure the location where the T200S/T500S will be installed meets the environmental characteristics listed in *Electrical Safety Information* on page 10.**

➤ **Do not install the T200S/T500S near any source of heat or cold.**

➤ **To ensure proper ventilation and cooling, make sure there is sufficient clearance at the front and at the rear of the T200S/T500S in the place where it will be installed.**

To unpack and install the T200S/T500S:

1. Open the package with care and remove the protective foam.

IMPORTANT

When unpacking, handle the device with care and do not damage the original shipping container in case the T200S/T500S needs to be returned to EXFO.

2. Pull out the T200S/T500S vertically from its packaging and keep it horizontal.

3. Set the T200S/T500S on a flat stable surface free of excessive vibration.

4. Allow the flow of air to circulate freely at the front and rear of the T200S/T500S and remove any equipment or paper that could block the air flow. Ventilation holes are located on the front and rear sides of the T200S/T500S.

5. On the rear panel (see *Rear panel* on page 3), make sure the power switch is set to **O**.

6. To tilt the T200S/T500S upward (bench-top use only), deploy the two retractable legs located below it, as illustrated in the following figure.
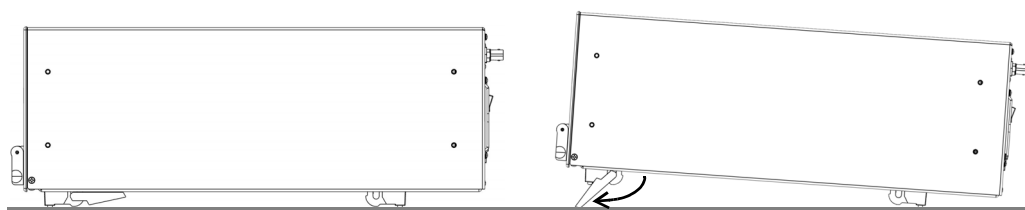
Connecting the T200S/T500S to a Power Source

The T200S/T500S has a chassis connected to ground via the power supply cable. A protective ground connection by way of the grounding conductor in the power cable is essential for safe operation.

> # WARNING
>
> ➤ **Make sure the wall socket on which the T200S/T500S will be plugged is protected by a 16 A max circuit breaker.**
>
> ➤ **Make sure the T200S/T500S power source does not apply more than 265 Volts RMS between the supply conductors and the ground.**
>
> ➤ **To avoid the possibility of injury, make sure the socket outlet in which the power supply cable will be plugged is equipped with a protective ground contact, and that the electrical installation fulfills the local safety requirements.**

To connect the T200S/T500S to a wall socket:

1. On the rear panel, make sure the power switch is set to **O**.

2. On the rear panel, connect the power supply cable provided with the instrument to the mains socket located on the rear panel of the T200S/T500S.

3. Plug the other end of the power supply cable to the proper voltage wall socket outlet (to know the voltage requirement, see *Electrical Safety Information* on page 10).

4. Set the power switch to **I**.

Connecting External Optical Devices to the T200S/T500S

This section explains how to connect external optical components and instruments to the T200S/T500S.

	# CAUTION
	The standard output connector is an FC/APC connector. Never connect another type of connector to the optical output. To connect other types of connectors such as FC/PC, make sure to use the appropriate FC/APC converter.

	# WARNING
	➤ **The use of optical instruments with this product increases eye hazard: see *Laser Safety Information* on page 8.**
	➤ **The laser radiation is not visible to the human eye: always replace the protective cap on the laser output connector after use to avoid involuntary exposure to laser radiation.**

To connect an external optical device:

1. Disable the laser output before connecting or disconnecting a fiber optic cable on the product.

2. Make sure fiber-optic connectors are clean (see *Cleaning the Optical Connector* on page 88). Keeping fiber-optic connectors clean at all times is essential to achieve optimum system performance.

3. On the front panel, lift the protective cap and connect an external optical component or instruments to the T200S/T500S via the FC/APC fiber-optic connector.
To protect the laser output connector, leave a fiber-optic cable connected to the product while making connections to other devices.

Connecting a Mouse and Keyboard to the T200S/T500S

To operate the T200S/T500S GUI, you can use the touchscreen or connect a USB mouse and keyboard to the USB-A 2.0 and USB-A 3.0 ports located on the rear panel of the T200S/T500S (see *T200S/T500S Overview* on page 2).

To connect a mouse and keyboard:

Connect the USB mouse and keyboard to one of the available USB-A ports of the T200S/T500S (you do not need to restart the T200S/T500S).

All operations available using the multi-touch screen are also accessible using the mouse and keyboard (QWERTY keyboard).

Turning on the T200S/T500S and Accessing the GUI

At startup, the T200S/T500S initializes and performs a quick internal reference. You can fully use the T200S/T500S but performances are not guaranteed.

IMPORTANT

For optimum performances or if you start the T200S/T500S for the first time, we strongly recommend you to perform a full reference after at least 1-hour warm-up, so that the required references are initialized and ready for future use (see *Performing Full Referencing* **on page 19).**

Once the T200S/T500S is started, you can perform the user references corresponding to your needs in the Sweep or Tune settings window (see *Performing Internal Tune Referencing* on page 30 and *Performing Internal Sweep Referencing* on page 36).

The touch screen display enables you to access all the T200S/T500S functions.

CAUTION

During the startup routine, the T200S/T500S produces a laser beam. To avoid eye damage, do not look into the laser output or into the end of an optical cable.

To access the T200S/T500S graphical user interface:

1. Make sure the T200S/T500S is properly installed and connected to a power source: see *Unpacking and Installing the T200S/T500S* on page 13 and *Connecting the T200S/T500S to a Power Source* on page 14.

2. On the rear panel, make sure the power switch is set to **I**.

3. On the T200S/T500S front panel, press the ⏻ button (see *Front panel* on page 2).

4. If you start the T200S/T500S for the first time, follow the instructions displayed on screen.

   The startup procedure completes. The laser beam is disabled and the T200S/T500S is ready to be used.
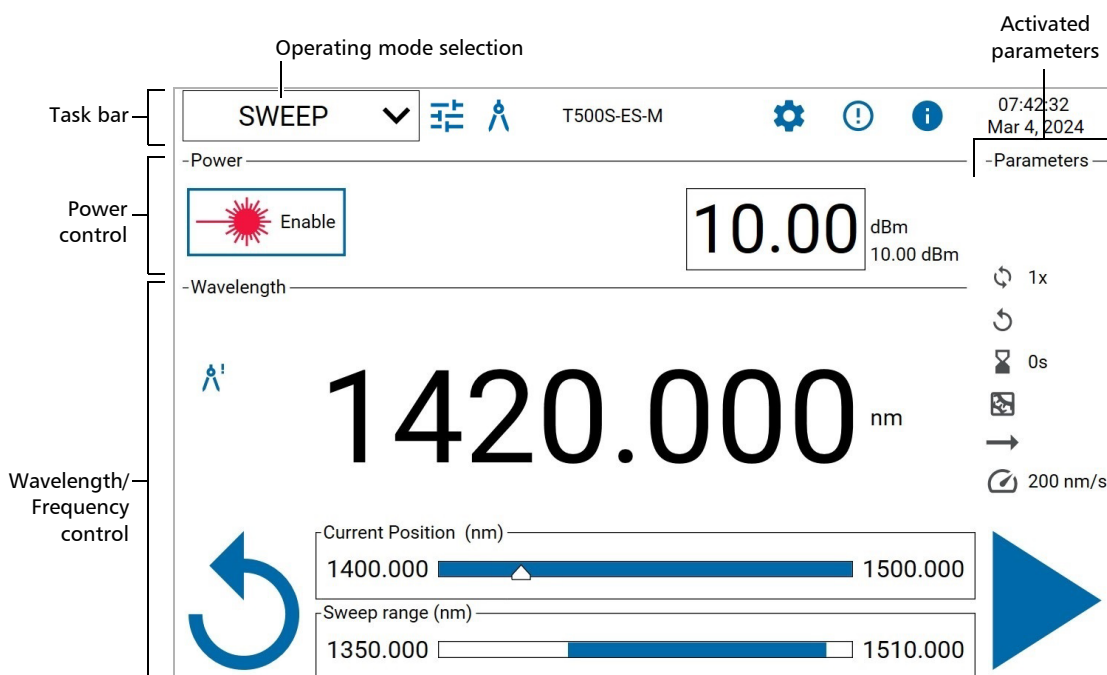
The following table describes the main window.

Area	Available button	Description
Task bar	SWEEP ▼ (SWEEP / TUNE)	Enables you to select the T200S/T500S operating mode. For more details, see *Setting the Emission Wavelength/Frequency* on page 29.
	(operating mode setting icon)	Opens the operating mode setting menu. For more details, see *Setting the Emission Wavelength/Frequency* on page 29.
	(user reference icon)	Opens the user reference menu. For more details, see *Performing Internal Tune Referencing* on page 30 or *Performing Internal Sweep Referencing* on page 36, or *Performing Full Referencing* on page 19.
	(settings gear icon)	Opens the T200S/T500S settings window, which enables you to define the instrument parameters (see *Setting Up Your T200S/T500S* on page 21) and update its operating system (see *Maintenance* on page 87).
	(event log icon)	Opens the event log. For more details, see *Displaying the List of Errors and Warnings* on page 102.
	(information icon)	Opens the T200S/T500S information window. For more details, see *Viewing System Information* on page 103.

Area	Available button	Description
Power control area		Displays the laser power and enables you to modify it (depending on the laser model). For more details, see *Setting the Optical Output Power (T500S models only)* on page 52.
	(laser icon)	Enables/Disables the laser diode. For more details, see *Enabling/Disabling the Laser Output* on page 51.
Wavelength/ Frequency control area		Displays the laser wavelength/frequency and enables you to operate it, depending on the selected operating mode.
	(referencing icon)	Appears if the T200S/T500S needs internal referencing. This button performs a quick wavelength referencing. For more details, see *Performing Internal Tune Referencing* on page 30 or *Performing Internal Sweep Referencing* on page 36.
	(target icon)	Appears in the TUNE window in **High accuracy** operating mode, if the displayed laser wavelength/frequency has not been reached with high accuracy. This button slightly moves the laser to the displayed wavelength/frequency position, with optimum absolute accuracy. For more details, see *Selecting the Tune Operating Mode* on page 31.
	(warning icon)	Appears if a warning occurred. This button displays the last issued warning. For more details, see *Displaying the List of Errors and Warnings* on page 102.
	(stabilizing icon)	Means that the laser is stabilizing.
Parameters area		Displays icons representing the parameters you have selected for the current operating mode.

Performing Full Referencing

For optimum performances or if you start the T200S/T500S for the first time, you must perform a full wavelength reference after at least 60-minutes of warm-up.

The full reference ensures optimum adjustment of the laser source in all operating modes (TUNE and SWEEP): it performs a Sweep reference for all available speeds, a Tune reference and a Quick reference (for more details, see *Performing Internal Tune Referencing* on page 30 and *Performing Internal Sweep Referencing* on page 36).

To perform a Full reference:

1. In the TUNE or SWEEP window, tap the 🖈 button.

> ┌─Tune reference────────
> Last tune reference:
> Nov 19, 2024 - 11:16
>
> Estimated duration: 7 min
>
> [Start tune reference]
>
> ┌─Quick reference── 🖈
> Last quick reference:
> Nov 19, 2024 - 11:17
>
> Estimated duration: 1 min
>
> [Start quick reference]
>
> ┌─Full reference────────
> Last full reference:
> Nov 19, 2024 - 11:17
>
> Estimated duration: 27 min
>
> [Start full reference]

2. In the **Full reference** area, tap the **Start full reference** button.

The referencing process starts, any other operation on the T200S/T500S is disabled.

If you cancel the referencing process in progress, the already completed references are saved.

Once completed, the date and time of the full reference is displayed in the menu.

Turning off the T200S/T500S

The following procedure explains how to properly turn off the T200S/T500S.
To keep the last user configuration in memory so that it is loaded at next startup, see *Handling User Configuration and User References* on page 26.

CAUTION

Never turn the T200S/T500S off by directly setting the power switch to O: the optical core would not be securely parked and could be damaged if the instrument is moved. Follow the procedure below to properly park the optical core at shutdown.

To turn the T200S/T500S off:

1. Make sure that no sweep is in progress.

2. On the T200S/T500S front panel, shortly press the ⏻ button.

   The T200S/T500S stops and the optical core is properly parked.

3. On the rear panel, set the power switch to **O**.

4 *Setting Up Your T200S/T500S*

This section explains how to set general and network parameters:

➤ *Defining the Display Colors and Language* on page 21

➤ *Adjusting the Volume* on page 22

➤ *Setting the Date and Time* on page 23

➤ *Connecting the T200S/T500S to your Company Network* on page 24

➤ *Renaming the Instrument* on page 25

➤ *Handling User Configuration and User References* on page 26

Defining the Display Colors and Language

You can change the theme of the display, modify its brightness and select the wanted display language as explained in the following procedure.

To modify the brightness, theme and language:

1. In the T200S/T500S task bar, tap the ⚙ button to display the **Settings** window and select the **System** tab.

The **Display** area enables you to define the colors and language of the T200S/T500S GUI.
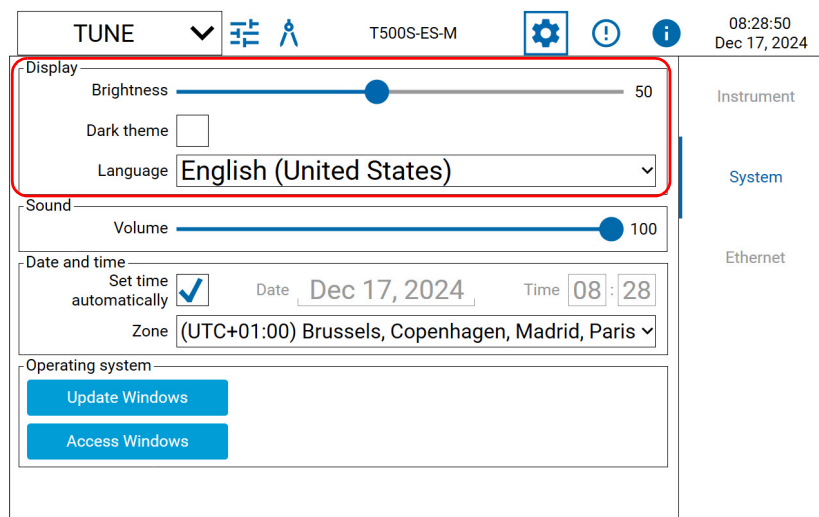
2. To increase or decrease the brightness of the T200S/T500S GUI, slide the **Brightness** cursor.

3. To shift the light colors on screen to darker colors, select the **Dark theme** check box.

4. Select the wanted language in the **Language** list.

5. Tap the ⚙ button to exit the **Settings** window.

Adjusting the Volume

The T200S/T500S emits a sound when you enable or disable the laser diode and when you modify the laser parameters.

The following procedure explains how to adjust the volume of these sounds.

To adjust the volume:

1. In the T200S/T500S task bar, tap the ⚙ button to display the **Settings** window and select the **System** tab.

   The **Sound** area enables you to adjust the volume of the T200S/T500S.
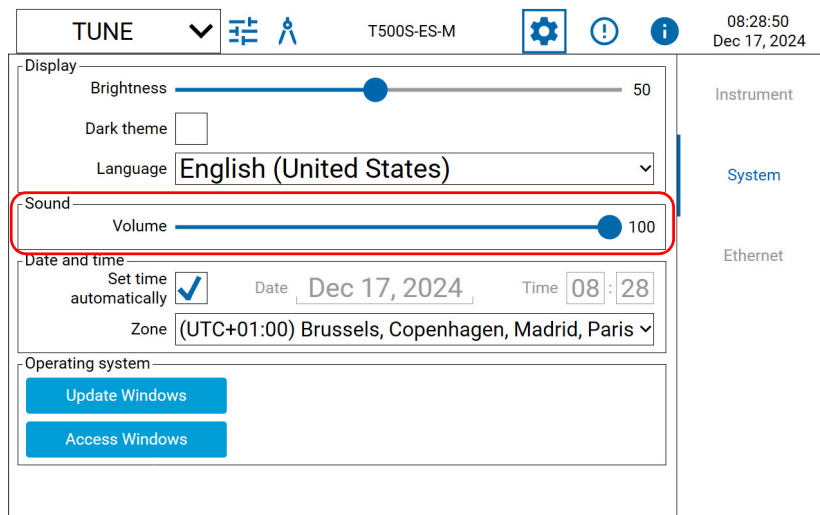
2. To increase or decrease the sound of the T200S/T500S, slide the **Volume** cursor.

3. Tap the ⚙ button to exit the **Settings** window.

Setting the Date and Time

If the T200S/T500S is connected to a network, it can automatically set the date and time depending on your time zone. You can also choose to manually set the date and time.

To set the date and time:

1. In the T200S/T500S task bar, tap the ⚙ button to display the **Settings** window and select the **System** tab.

   The **Date and time** area enables you to set the date and time of the T200S/T500S.
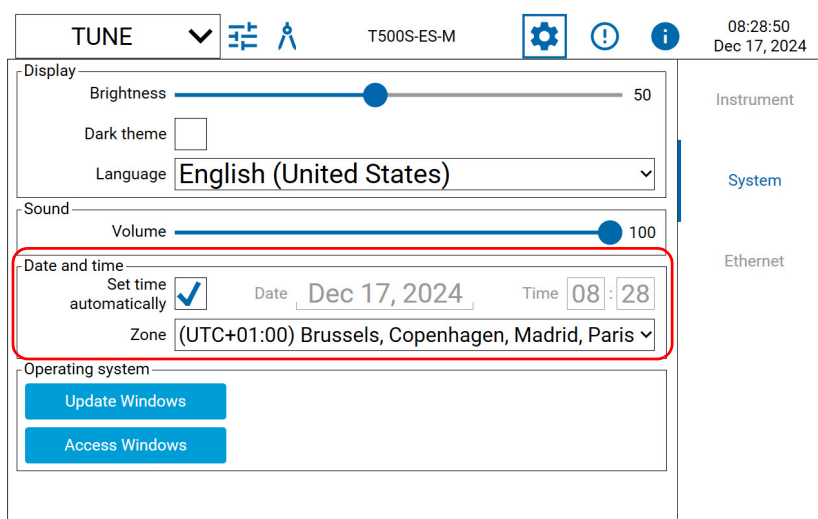
2. To manually set the date and time:

   2a. Clear the **Set time automatically** check box.

   2b. Tap the **Date** and **Time** fields to enter the date and time of your location.

   2c. In the **Zone** list, select the time zone of your location.

3. If your T200S/T500S is connected to a network and you want the date and time to be automatically set by the T200S/T500S:

   3a. Select the **Set time automatically** check box.

   3b. In the **Zone** list, select the time zone of your location.

   The date and time is automatically set.

4. Tap the ⚙ button to exit the **Settings** window.

Connecting the T200S/T500S to your Company Network

The Ethernet port enables you to connect your T200S/T500S to your company network.
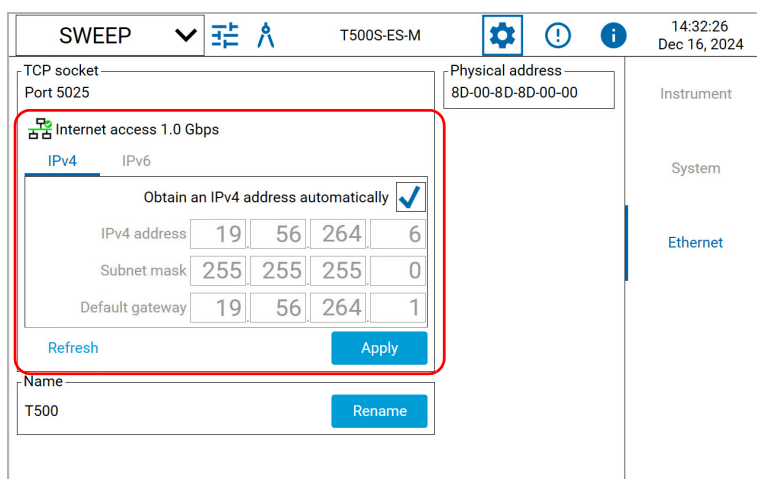
It enables you to install the last operating system security updates (see *Updating the Operating System Version* on page 91) and to perform remote control operations on the T200S/T500S (see *Remotely Controlling the T200S/T500S* on page 55).

The **Ethernet** tab displays the instrument name, TCP port, IP address and physical (MAC) address.

To connect the T200S/T500S to your company network:

1. Connect an RJ45 cable from your company network to the T200S/T500S Ethernet port.

2. In the T200S/T500S task bar, tap the ⚙ button to display the **Settings** window and select the **Ethernet** tab.

The **TCP socket** area enables you to configure the Ethernet connection of the T200S/T500S.

➤ ⛁: indicates that the connection is established and displays the connection speed.

➤ ⛁: indicates that the connection to the network is not established, or that the T200S/T500S is directly connected to a computer (see *Setting the T200S/T500S Ethernet Port* on page 55).

➤ ⛁: indicates that the port is not connected to any external device.

> ## ❗IMPORTANT
>
> **Make sure that the firewall of your computer allows communication on the 5025 port.**

3. Select the tab corresponding to your IP address type: **IPv4** or **IPv6**.

4. To manually set the connection parameters:

    4a. Clear the **Obtain an IP address automatically** check box.

4b. Set the IPv4 or IPv6 (depending on your network configuration) address , subnet mask or prefix length and default gateway to identify your T200S/T500S.

5. To automatically retrieve the connection parameters (IP address, subnet mask and default gateway) from the connected network (DHCP), select the **Obtain an IP(v6) address automatically** check box.

The connection is automatically established. You cannot modify the connection values.

6. Tap **Apply** to validate the set connection parameters.

7. If you want to retrieve the previously applied connection parameters, tap the **Refresh** button.

8. Tap the ⚙ button to exit the **Settings** window.
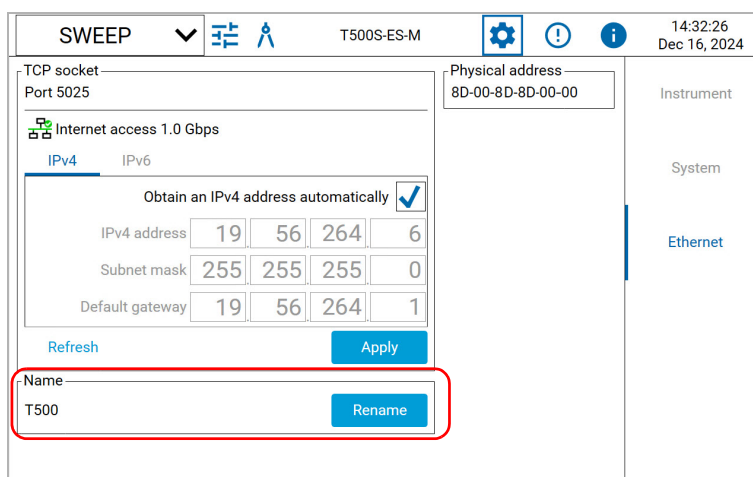
Renaming the Instrument

The default instrument name is "T200-<serial number>". The following procedure explains how to change the instrument name.

To change the instrument name:

1. In the T200S/T500S task bar, tap the ⚙ button to display the **Settings** window and select the **Ethernet** tab.

The **Name** area enables you to rename the T200S/T500S.

2. Tap the **Rename** button.

3. Modify the instrument name (15 characters maximum) and tap **Rename**.

The instrument name will be modified at next startup.

4. Tap the ⚙ button to exit the **Settings** window.

Handling User Configuration and User References

The following procedures explain how to:

➤ Keep the last user configuration in memory (customized laser settings) so that it is loaded at next startup.
The user configuration includes all the parameters set in the Settings, Tune and Sweep windows. It does not includes user references, which are automatically saved, and are loaded at next startup.

➤ Restore the factory settings, which means delete all customized user settings, including user references.

To keep the user configuration in memory before shutdown:

1. In the task bar, tap the ⚙ button to display the **Settings** window and select the **Instrument** tab.

The **Configuration** area enables you to manage your laser configuration.
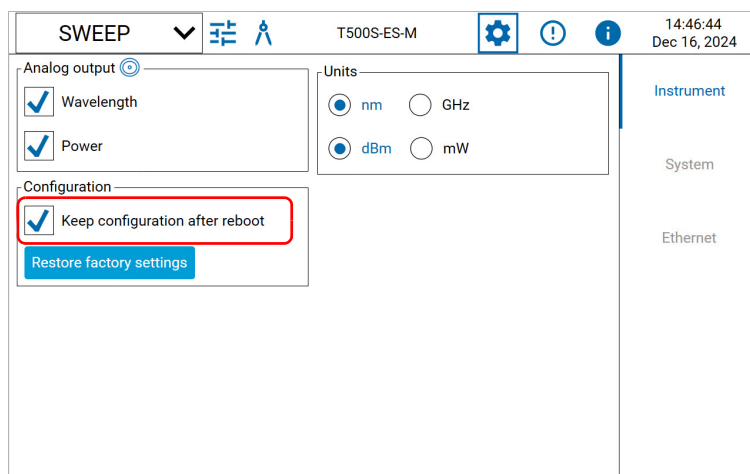
2. Select the **Keep configuration after reboot** check box.

The laser configuration will be kept in memory before shutdown, to be loaded at next startup.
Selecting this check box also modifies the default parameters of your SCPI remote control session: to start your remote control session with the instrument default parameters, clear the **Keep configuration after reboot** check box or send *RST at the beginning of your remote control script.

3. Tap the ⚙ button to exit the **Settings** window.

To restore factory settings:

> # IMPORTANT
>
> **Restoring factory settings deletes all user references (tune reference, sweep references and quick reference). After restoring factory settings, we recommend you to perform a full reference (see *Performing Full Referencing* on page 19).**

1. In the task bar, tap the ⚙ button to display the **Settings** window and select the **Instrument** tab.

   The **Configuration** area enables you to manage your laser configuration.
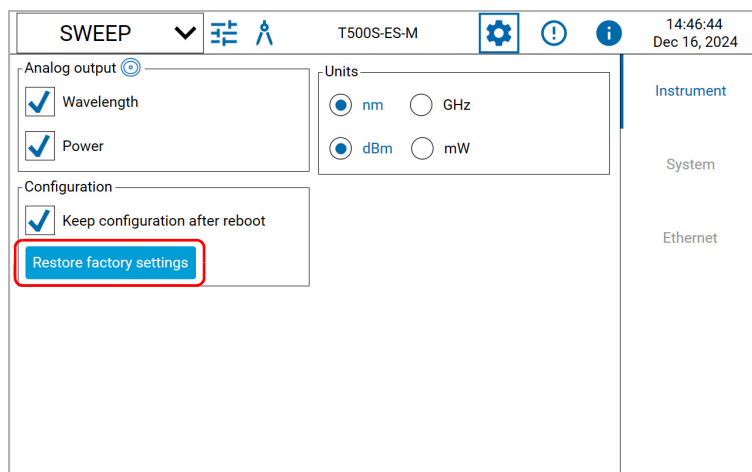
2. Tap the **Restore factory settings** button.

   All user customized settings and references are deleted.

3. Tap the ⚙ button to exit the **Settings** window.

5 Setting the Emission Wavelength/Frequency

The T200S/T500S provides the following operating modes:

➤ **SWEEP**

This window enables you to perform continuous sweeps over the entire operational wavelength or frequency range.

➤ **TUNE**

This window enables you to tune the laser by entering fix emission wavelength or frequency values.

> # IMPORTANT
> **The entered wavelength/frequency is only applied if the laser is enabled. If the laser diode is turned off, you can still enter the wanted values but the laser cannot sweep. To turn on the laser diode, see *Enabling/Disabling the Laser Output* on page 51.**

Defining the Spectral Unit

You can define the spectral unit you want to use for all operating modes in the **Settings** window, as explained in the following procedure.

To set the spectral unit:

1. In the T200S/T500S task bar, tap the ⚙ button to display the **Settings** window and select the **Instrument** tab.

The **Units** area enables you to configure the spectral (and power) units.
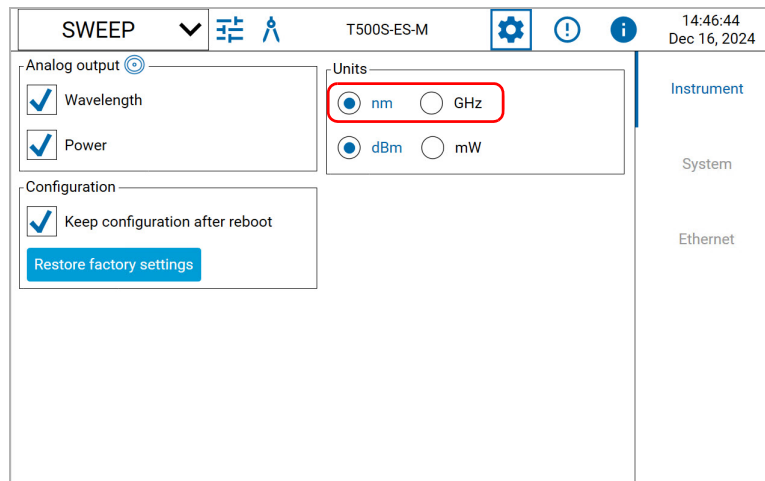
2. Set the spectral unit you want to use by selecting **nm** or **GHz**.

3. Tap the ⚙ button to exit the window.

Tuning the Emission Wavelength or Frequency

The **TUNE** window enables you to tune the laser to a fix wavelength/frequency by using one of the following method:

➤ Typing a precise (absolute) emission wavelength or frequency value: see *Setting the Emission Value (Absolute Tuning)* on page 32.

➤ Increasing or decreasing the emission wavelength/frequency laser position by applying a predefined step relatively from the absolute wavelength/frequency: see *Applying a Predefined Step (Relative Tuning)* on page 33.

Performing Internal Tune Referencing

The tune reference ensures optimum adjustment of the laser source while you tune the emission wavelength/frequency in high accuracy mode.
The following types of user referencing processes are available:

➤ **Tune reference**

The Tune reference ensures optimum adjustment of the laser source while you tune the emission wavelength/frequency in high accuracy mode.

➤ **Quick reference**

The quick reference adjusts the reference offset measured on the T200S/T500S since the last referencing operation (mostly due to environment or temperature deviation).

If the 👤 button appears on screen, it means that the T200S/T500S needs internal quick referencing: the T200S/T500S is fully usable but performances are not guaranteed.

The T200S/T500S automatically performs quick referencing during the startup routine (see *Turning on the T200S/T500S and Accessing the GUI* on page 16).

To perform a Tune reference:

1. In the TUNE window, tap the 👤 button.

2. In the **Tune reference** area, tap the **Start tune reference** button.

The referencing process starts, any other operation on the T200S/T500S is disabled.

Once completed, the date and time of the reference is displayed in the menu.

To perform a Quick reference:

Do one of the following:

➤ In the task bar, tap the 📐 button and tap the **Start quick reference** button.

➤ Tap the 📐 button if it is displayed on screen.

The referencing process starts, any other operation on the T200S/T500S is disabled. Once completed, the date and time of the reference is displayed in the menu.

Selecting the Tune Operating Mode

Two modes are available to tune the laser:

➤ **High accuracy** mode

The **High accuracy** mode provides optimum accuracy when the laser moves to a wavelength/frequency value you have manually typed: when you modify the wavelength/frequency value, the laser moves to the absolute wavelength or frequency position, with optimum absolute accuracy (according to your laser optical specifications).
If you use the ❮ and ❯ buttons to modify the wavelength/frequency, it is not reached with high accuracy.

➤ **Optimized linewidth** mode

The **Optimized linewidth** mode enables you to get the minimum possible linewidth when the laser is fix and stable, and to perform fine tuning. This mode slightly increases the stabilization time, and accuracy may differ from specification.

To select the tune operating mode:

1. In the TUNE window, tap the ┤├ button.

The tune setting menu appears.

2. In the **Tune parameters** area, select the wanted operation mode:

In the **Parameters** area of the TUNE window, the corresponding icon appears:

➤ ◎ icon for **High accuracy** mode**.**

➤ ➡|◀ icon for **Optimized linewidth** mode

The selected mode will be applied at the next tuning operation.

Setting the Emission Value (Absolute Tuning)

The following procedure explains how to manually modify the absolute emission wavelength or frequency.

➤ If you have activated the **High accuracy** mode, the wavelength/frequency is reached with optimum accuracy.

➤ If you have activated the **Optimized linewidth** mode, the wavelength/frequency is reached with optimum accuracy, but it may differ from specification as the wavelength/frequency may slightly drifts to get the best possible linewidth.

To enter the emission wavelength/frequency:

1. In the task bar, select **TUNE** in the drop-down list.

2. Enable the laser output (see *Enabling/Disabling the Laser Output* on page 51).

3. In the **Wavelength/Frequency** control area, tap the wavelength/frequency value.
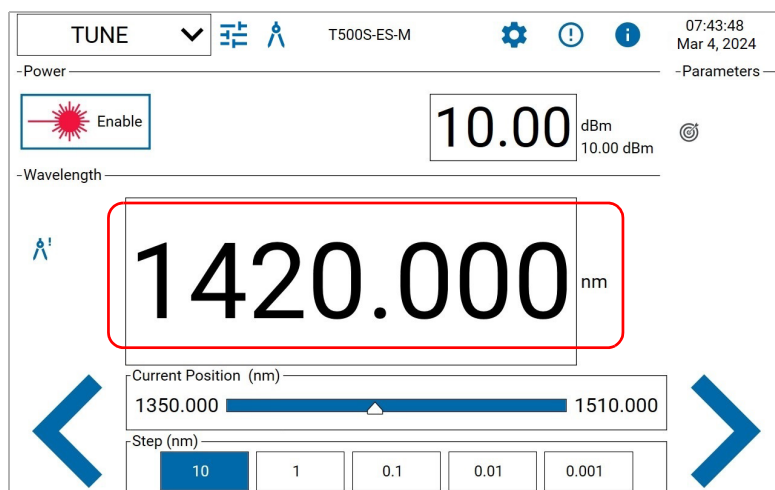
The keypad appears on screen.

4. Type the wanted value and tap **Enter**.

The [icon] icon appears on screen and the emission value is grayed: the laser is stabilizing.

Once stable, the icon disappears and the emission value appears in black.

Applying a Predefined Step (Relative Tuning)
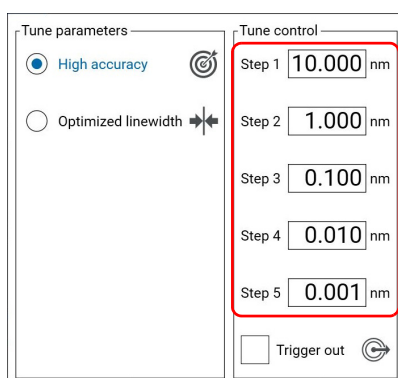
This section explains how to configure the step values and then manually increase or decrease the emission wavelength/frequency step by step: this moves the laser relatively from the absolute wavelength/frequency position (see *Setting the Emission Value (Absolute Tuning)* on page 32), which means that the high accuracy specification cannot be met.

➤ In **High accuracy** mode, you can define the wanted step values.
Tuning the laser using steps (reached relatively from the absolute wavelength/frequency position) cancels high accuracy: in this case, the button appears on screen to indicate that the displayed wavelength/frequency has not been reached with high accuracy.

➤ In **Optimized linewidth** mode, the steps are set to 0.005 nm and 0.001 nm (or 0.5 GHz and 0.1 GHz) and cannot be modified.

To define the tuning steps (High accuracy mode only):

1. In the **TUNE** window, tap the button.

   The tune setting menu appears.

2. Make sure the **Tune parameters** setting is set to **High accuracy**.

3. In the **Tune control** area, tap a step value and type the wanted value by using the keypad.

4. Define the wanted step value for each of the five available steps.

5. Tap anywhere on the screen outside the menu to exit the setting menu.
   The defined steps are displayed in the **Step** area of the TUNE window.
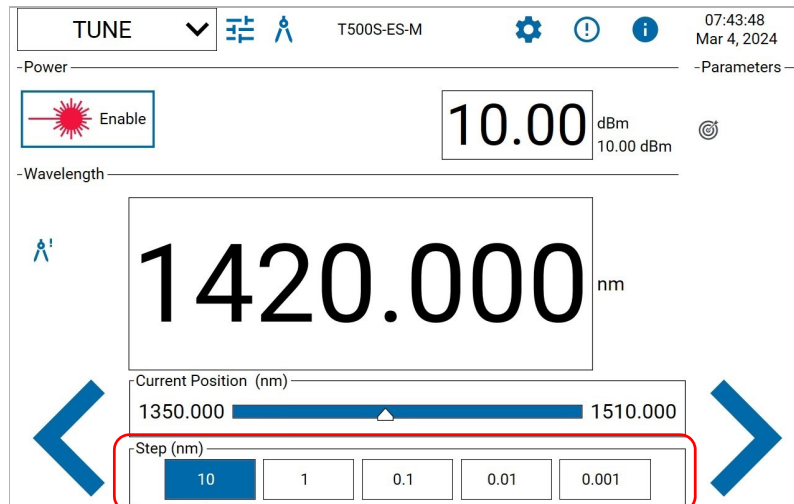
To apply the defined steps to the emission wavelength/frequency:

1. In the TUNE window, in the **Step** area, select the step value that you want to use as increment or decrement step.

2. Decrement or increment the wavelength/frequency step by step by taping the ◄ and ► buttons.

   The wavelength/frequency is increased or decreased by the selected step value, without high accuracy (relatively from the absolute wavelength/frequency position).

3. To rapidly tune the laser to a wavelength/frequency, tap and hold the right or left arrow button until it reaches the wanted value.

To position the laser with high accuracy to the displayed wavelength/frequency (High accuracy mode only):

Do one of the following:

➤ Tap the ◎ button if it is displayed on screen (if not, the displayed value has already been reached with high accuracy).

➤ In the **Wavelength/Frequency** control area, type the wanted wavelength/frequency value as explained in *Setting the Emission Value (Absolute Tuning)* on page 32.

Generating an Output Trigger Signal during Emission

In TUNE mode, the T200S/T500S can generate a trigger signal once the laser has stabilized on the selected position (for more details on signal levels, see *Technical Specifications* on page 1).

To activate the output trigger:

1. Make sure that the instrument to which you want to output the signal meets the electrical requirements detailed for the Trig out connector in *Hardware Specifications* on page 1.

2. Physically connect the external instrument to the **Trig out** connector with a BNC cable.

3. In the TUNE window, tap the ⊟ button.

   The tune setting menu appears.
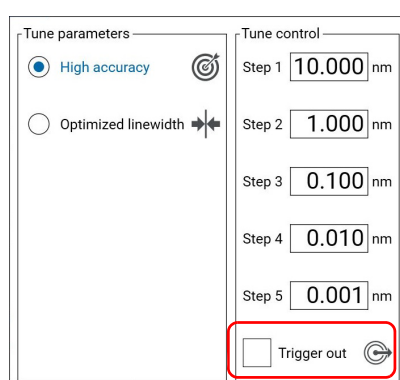
4. In the **Tune Control** area, select the **Trigger Out** check box.

   The ⊙→ icon appears in the **Parameters** area of the TUNE window to indicate that the trigger is activated.

   The trigger signal is high when the laser is in a stable wavelength/frequency position. If you modify the laser position, the trigger signal is disabled (low) until the laser reaches the new position.

Performing a Sweep Sequence

The **SWEEP** window enables you to make the laser perform a continuous sweep over a defined wavelength or frequency range: starting from the start wavelength, the laser continuously sweep until it has reached the stop wavelength, according to the parameters (speed, pause, cycles) you have set.

You can start the sweep manually or with a trigger signal.

Performing Internal Sweep Referencing

The sweep referencing ensures optimum performance of the laser source during sweep at the selected speed. The following types of user referencing processes are available:

➤ **Sweep reference**

The sweep reference enables you to fully reference the T200S/T500S for the speed(s) you want to use for the sweep.

This reference is particularly required if you want to generate accurate pulse trigger out of the T200S/T500S (see *Generating an Output Trigger Signal During Sweep* on page 45).
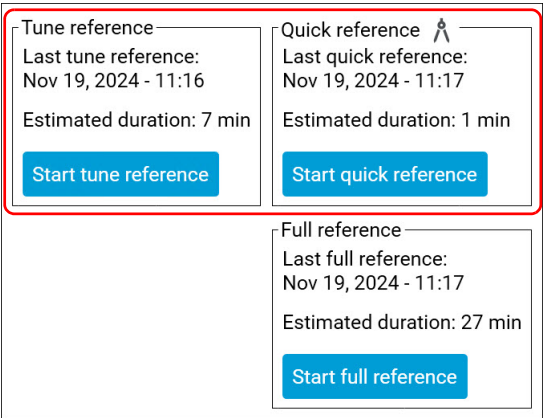
➤ **Quick reference**

The quick reference adjusts the reference offset measured on the T200S/T500S since the last referencing operation (mostly due to environment or temperature deviation).

If the button appears on screen, it means that the T200S/T500S needs internal quick referencing: the T200S/T500S is fully usable but performances are not guaranteed.

The T200S/T500S automatically performs quick referencing during the startup routine (see *Turning on the T200S/T500S and Accessing the GUI* on page 16).

To perform a Sweep reference:

1. In the SWEEP window, tap the button.

2. In the **Sweep reference** area, select the speed(s) you want to fully reference.

3. Tap the **Start sweep reference** button.

The referencing process starts, any other operation on the T200S/T500S is disabled.

If you have selected multiple references and cancel the referencing process in progress, the already completed references are saved.

The date and time of the completed reference(s) are displayed in the menu.

To perform a Quick reference:

Do one of the following:

➤ In the task bar, tap the 🔧 button and tap the **Start quick reference** button.

➤ Tap the 🔧 button if it is displayed on screen.

The referencing process starts, any other operation on the T200S/T500S is disabled. Once completed, the date and time of the reference is displayed in the menu.

Configuring the Continuous Sweep

The SWEEP settings menu enables you to define all parameters requested for the sweep sequence.

The following figure illustrates the SWEEP parameters in a one-way sweep (3 cycles):
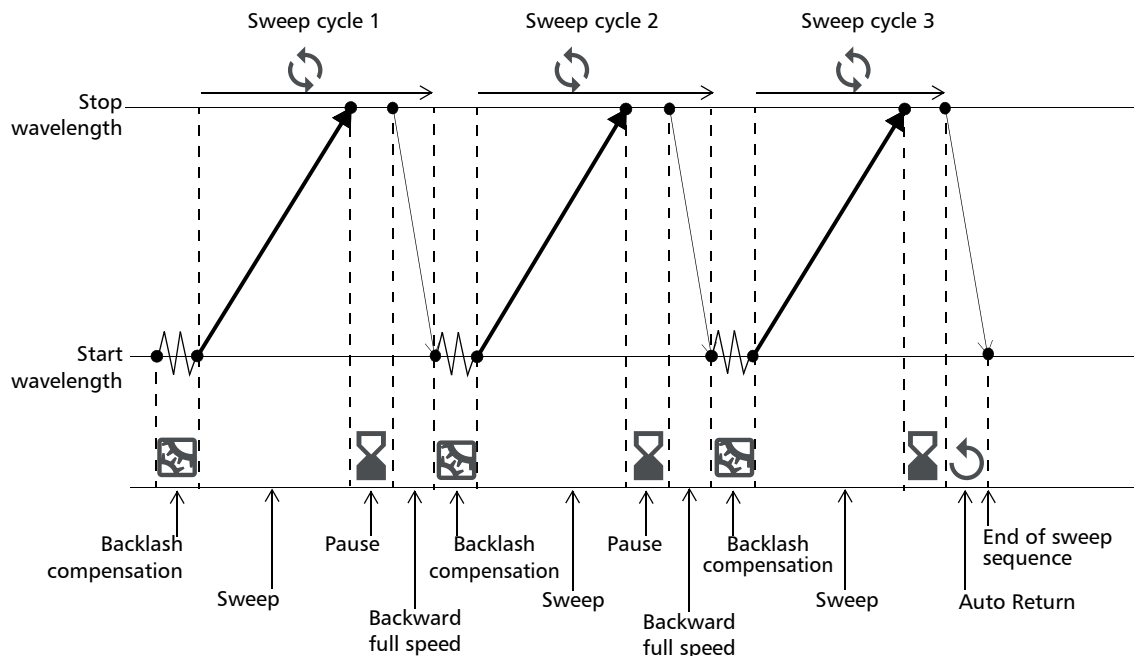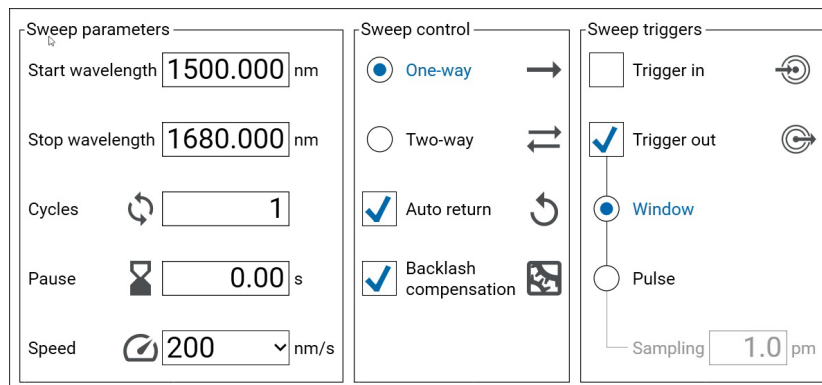
The following figure illustrates the SWEEP parameters in a two-way sweep (3 cycles):
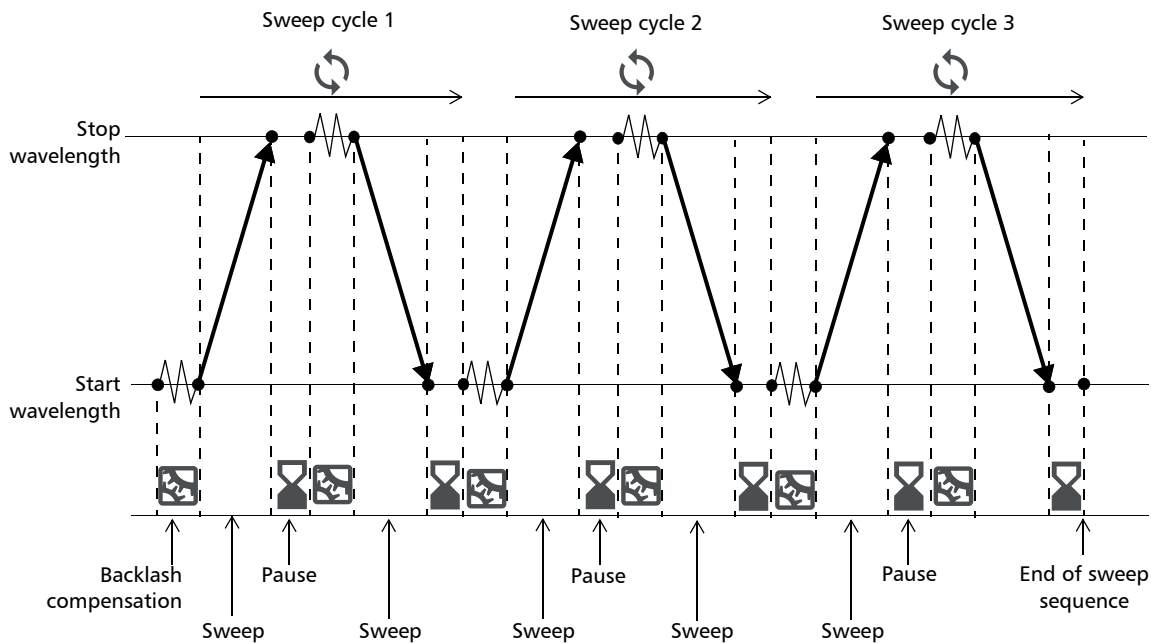
To configure the sweep sequence:

1. In the task bar, select SWEEP in the drop-down list.

2. In the SWEEP window, tap the ⚏ button.

   The Sweep settings menu appears.

3. In the **Sweep parameters** area, configure the sweep as explained in the following table:

Parameter	Description
Start/**Stop wavelength/frequency**	Sweeping range of the laser during sweep. At start of the sweep, the laser is automatically positioned at the start value and moves to the stop value. On T500S models only: to perform a backward sweep you can invert the start and stop values.
Cycles	Number of sweeps you want the laser to perform. ➤ On a **One-way** sweep, a cycle is composed of one sweep from the start to the stop value. On T500S model, a cycle is composed of one forward or backward sweep. ➤ On a **Two-way** sweep (on T500S models only), a cycle is composed of two sweeps: the forward and the backward sweep. If you enter 0, the laser sweeps indefinitely until you tap the Stop button.
Pause	Duration of the pause time at the end of each sweep.

Parameter	Description
Speed	Maximum speed at which the laser sweeps the defined wavelength/frequency range.
	The entire wavelength/frequency range is not swept at the speed you select here: the laser first accelerates to reach the selected speed, and decelerates before reaching the stop wavelength/frequency. If the span is too short for the selected speed, maximum speed will not be reached. For example, the laser needs approximately 5 nm to reach 200 nm/s.
	If **Pulse** trigger out is selected: The T200S/T500S outputs triggers at constant sweep speed, so you cannot sweep the full wavelength/frequency range as a small range is needed at both ends for acceleration/deceleration. This range depends on the selected speed.

4. In the **Sweep control** area, configure the sweep control as explained in the following table:

Parameter	Description
One-way	The T200S/T500S sweeps from the start to the stop specified wavelength/frequency at the specified sweep speed and returns to the initial wavelength at maximum speed.
Two-way	T500S models only. This parameter is not compatible with the **Pulse** output trigger.
	The T500S sweeps from the start to the stop specified wavelength/frequency and then goes back from the stop to the start wavelength/frequency at the specified sweep speed.
Auto return	Only applies on **One-way** sweeps.
	➤ ✓ : the laser automatically goes back to the start wavelength/frequency at maximum speed when the laser reaches the stop wavelength/frequency at the end of the sweep sequence. If you tap the **Stop** button during the sweep sequence, the auto return does not apply: the laser stays at its actual position.
	➤ ☐ : the laser stays at the same position when it reaches the stop wavelength/frequency at the end of the sweep sequence.
Backlash compensation	➤ ✓ : the mechanical backlash is always eliminated before the start of a sweep.
	➤ ☐ : no control on the mechanical backlash is performed.

5. In the **Sweep triggers** area, configure the sweep triggers as explained in the following table:

Parameter	Description
Trigger in	➤ ☑ : the sweep is controlled by an input trigger. For more details, see *Triggering the Sweep Sequence* on page 43. ➤ ☐ : the laser sweep is controlled manually.
Trigger out	➤ ☑ : the T200S/T500S generates an output trigger signal when it sweeps: **Window** trigger or **Pulse** trigger (only available on T200S/T500S with "Pulse trigger" option). For more details on output triggers, see *Generating an Output Trigger Signal During Sweep* on page 45. ➤ ☐ : the T200S/T500S does not generate output trigger signal when it sweeps.

The selected parameters appear in the **Parameters** area of the SWEEP window.

Manually Controlling the Sweep Sequence

The following procedures explain how to manually control the sweep: you can arm, start and stop a sweep sequence.

When you start a sweep sequence, the laser first moves to the start wavelength/frequency before sweeping. Arming the laser before starting the sweep enables you to set the laser to the start position, to make sure the laser sweeps the defined wavelength/frequency range as soon as you start the sweep.

To perform a manual sweep sequence:

1. In the SWEEP window, tap the ⯐ button.

The Sweep settings menu appears.

2. In the **Sweep Control** area, clear the **Trigger In** check box.

3. Tap anywhere outside the menu to exit.

4. Enable the laser output (see *Enabling/Disabling the Laser Output* on page 51).

5. If you want to arm the laser to the start position before sweeping, tap the ↺ button.

The laser moves to the start position and is ready to perform a sweep sequence.

6. Tap the ▶ button to start the sweep sequence.

➤ If the laser was previously armed to the start position, it directly starts the sweep sequence from the start wavelength/frequency according to the parameters you have defined in the Sweep settings menu.

➤ If the laser was not armed, the laser first moves to the start wavelength/frequency before starting the sweep sequence.

The laser automatically stops sweeping when the cycle sequence is finished, and if the **Auto return** parameter is selected, the laser moves to the start position.

To stop the sweep sequence in progress:

➤ To stop the sweep sequence in progress or to disarm the laser, tap the ▮ button.

The laser stops the sequence and stays at the current wavelength/frequency position. If the **Auto return** parameter is selected, the laser does not move to the start position.

Triggering the Sweep Sequence

The following procedure explains how to control the sweep by using an input trigger: the laser starts sweeping when it receives a rising edge trigger signal. When it reaches the stop, it waits for a trigger to sweep again (for more details on signal levels, see *Technical Specifications* on page 1).

The following figure illustrates a triggered one-way sweep:
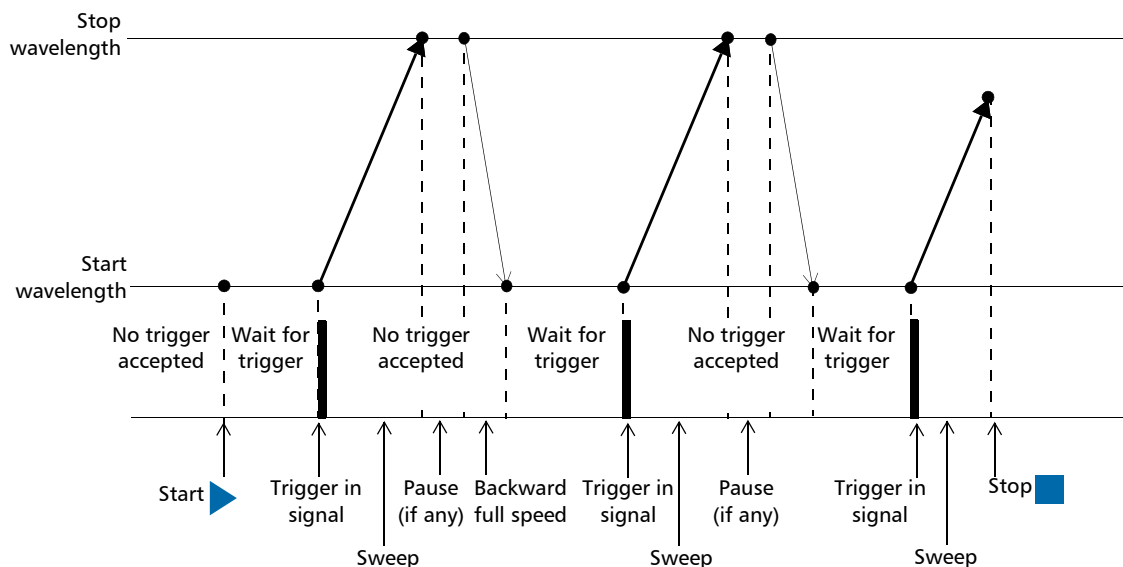
The following figure illustrates a triggered two-way sweep:
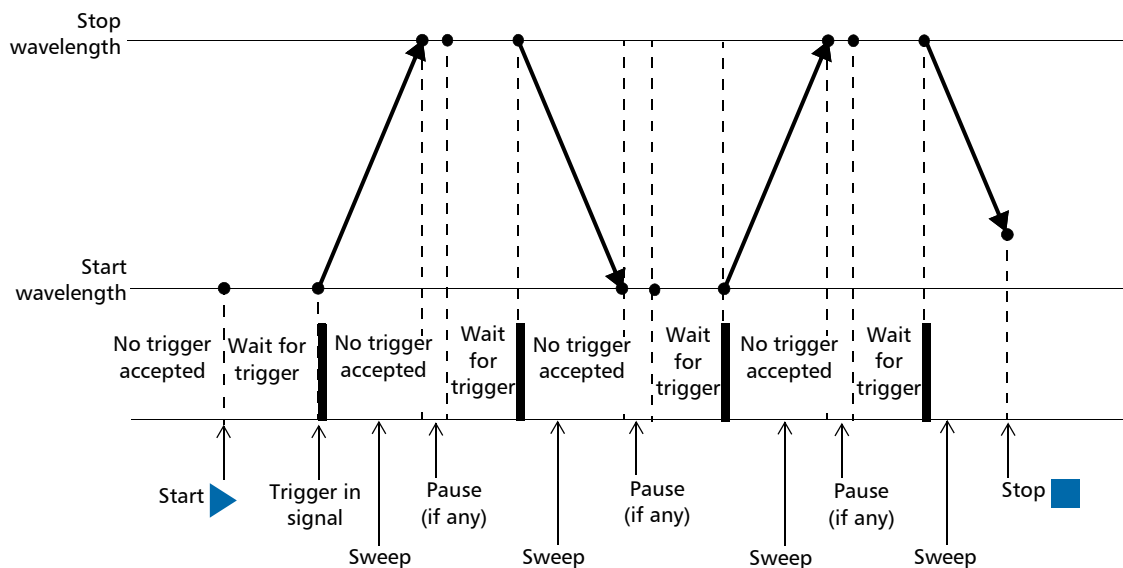
To perform a sweep sequence with a trigger signal:

1. Connect the external trigger generator to the Trigger In BNC connector located on the T200S/T500S rear panel (see *Rear panel* on page 3).

2. In the SWEEP window, tap the ⊞ button.

   The Sweep settings menu appears.

3. In the **Sweep Control** area, select **Trigger In**.

   The ⊙ icon appears in the **Parameters** area of the SWEEP window.

4. Tap anywhere outside the menu to exit.

5. Enable the laser output (see *Enabling/Disabling the Laser Output* on page 51).

6. If you want to arm the laser to the start position before sweeping, tap the ↻ button.

   The laser moves to the start position and is ready to perform a sweep.

7. Tap the ▶ button to start the triggered sweep cycle.

   ➤ If the laser was not armed, the laser first moves to the start wavelength/frequency before waiting for a trigger signal.

   ➤ If the laser was previously armed to the start position, it directly waits for a trigger.

   When it receives a rising edge, the laser starts sweeping from the start wavelength/frequency according to the parameters you have defined in the Sweep settings menu.
   Then the behavior depends on the selected parameters:

   ➤ One-way sweep with more than one cycle: when the laser reaches the stop wavelength/frequency, it pauses during the time set in the **Pause** parameter, moves back to the start position and waits for the next trigger to start the following sweep. When it has completed the number of cycles, the sweep stops and if the **Auto return** parameter is selected, the laser moves to the start position.

   ➤ Two-way sweep (T500S model only) with more than one cycle: when the laser reaches the stop wavelength/frequency, it pauses during the time set in the **Pause** parameter and waits for the next trigger to start the second sweep. At the end of the second sweep, it waits again for a trigger to start a new cycle.
   When it has completed the number of cycles, the scan stops.

To stop the sweep sequence in progress:

➤ To stop the sweep sequence in progress or to disarm the laser, tap the ▮ button.

The laser stops the sequence and stays at the current wavelength/frequency position. If the **Auto return** parameter is selected, the laser does not move to the start position.

Triggers are not taken into account anymore.

Generating an Output Trigger Signal During Sweep

In SWEEP mode, the T200S/T500S can generate a trigger signal at the **Trig out** output when the laser is sweeping (for more details on signal levels, see *Technical Specifications* on page 1).

Two types of output trigger are available:

➤ **Window** trigger: the trigger signal is output continuously during the time of the sweep.

The Window trigger signal is active during the entire sweep move: it is raised just before the first move of the sweep engine (approx. 2 μs before), which accelerates to sweep the given wavelength/frequency range, and the signal becomes inactive approximately 10 ms after the last move of deceleration (stabilization).

➤ The following figure illustrates the **Window** trigger out signal on a one-way sweep:
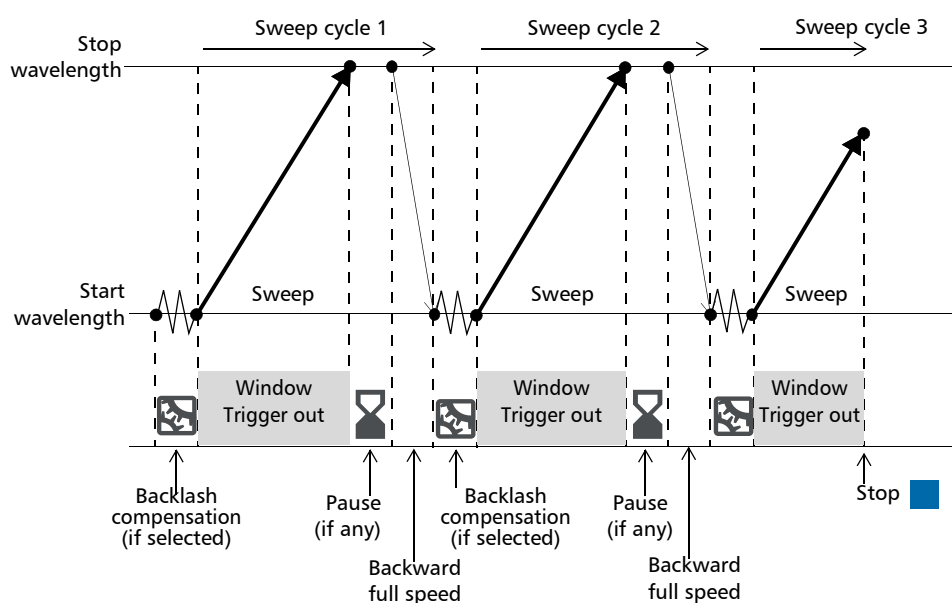
➤ The following figure illustrates the **Window** trigger out signal on a two-way sweep:
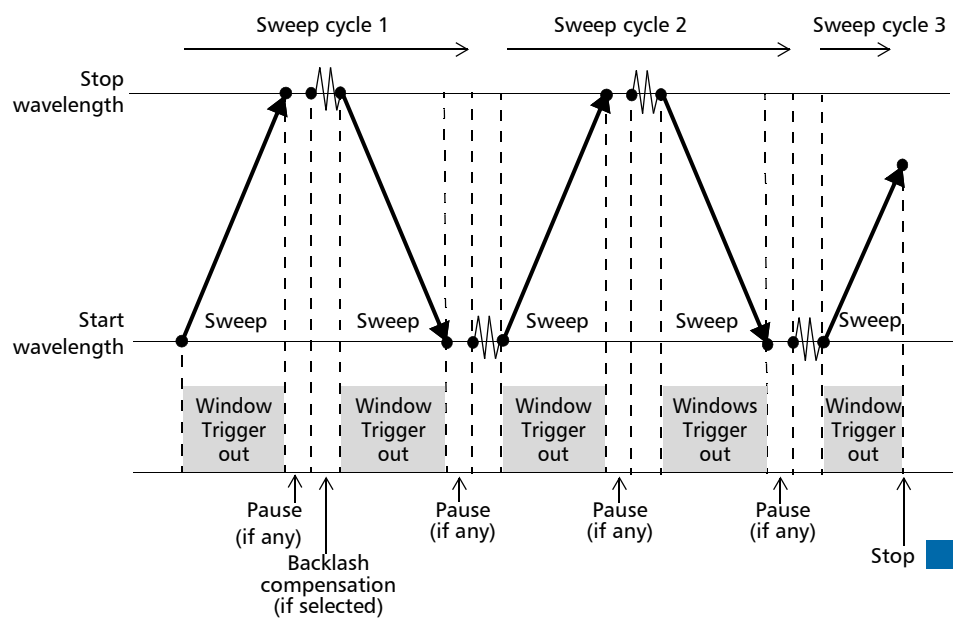
➤ **Pulse** trigger (only available on T200S/T500S with "Pulse trigger" option):
Pulse trigger is only available on a single cycle one-way sweep.
Pulse triggers are generated at a regular wavelength interval during the time of the sweep, according to the selected sampling resolution and sweep speed.

The T200S/T500S outputs triggers at constant sweep speed, so you cannot sweep the full wavelength/frequency range as a small range is needed at both ends for acceleration/deceleration. This range depends on the selected speed.

After each laser sweep, a wavelength array is generated corresponding to the exact wavelength of the pulse triggers generated during the sweep. This array may differ slightly from the original sweep parameters.
You can retrieve this wavelength array by using the following remote query:
[SOURce]:WAVelength:SWEep:SYNChronization:DATA? on page 182.

IMPORTANT

To meet the performances of the Pulse trigger functionality, make sure that a full reference has been performed after at least 1 hour of warm-up. If not, perform a full reference as explained in *Performing Full Referencing* on page 19.

The following figure illustrates the **Pulse** trigger out signal (single sweep on one-way only):
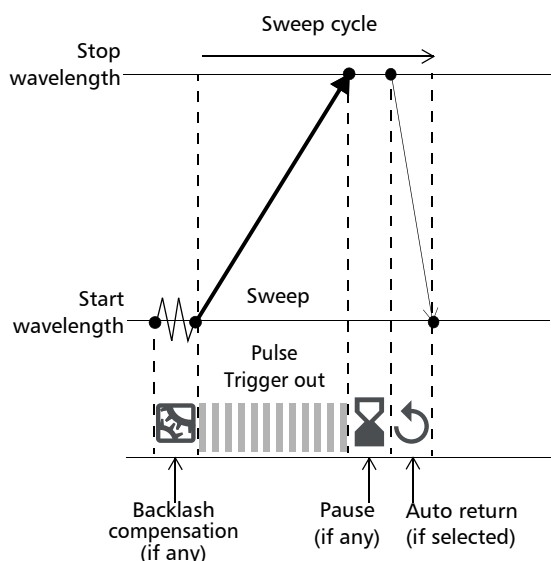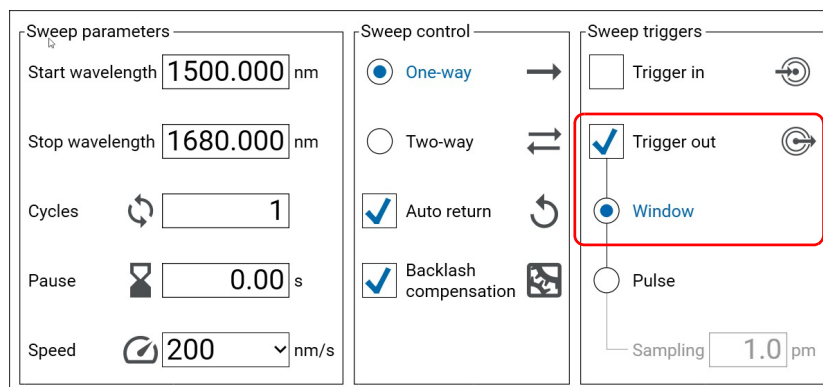
To activate the Window trigger:

1. Make sure that the instrument to which you want to output the signal meets the electrical requirements detailed for the Trig out connector in *Hardware Specifications* on page 1.

2. Physically connect the external instrument to the **Trig out** connector with a BNC cable.

3. In the SWEEP window, tap the ⊟ button.

   The Sweep setting menu appears.

4. In the **Sweep Control** area, select the **Trigger Out** check box and select **Window**.

   The ⊙→ icon appears in the **Parameters** area of the SWEEP window to indicate that the trigger is activated.
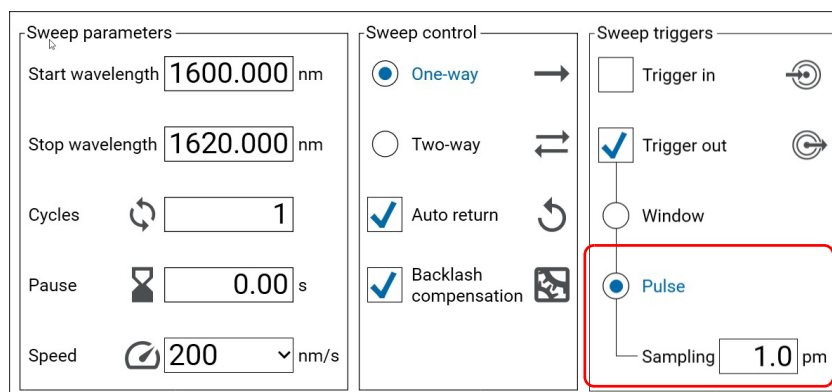
   The trigger signal is high when the laser is sweeping the defined wavelength/frequency range.
   When the laser pauses or moves back to the start position, the trigger signal is disabled (low).

To activate the Pulse trigger: (only available on T200S/T500S with "Pulse trigger" option)

1. Make sure that the instrument to which you want to output the signal meets the electrical requirements detailed for the Trig out connector in *Hardware Specifications* on page 1.

2. Physically connect the external instrument to the **Trig out** connector with a BNC cable.

3. Perform a sweep wavelength reference for the sweep speed you want to use, as explained in *Performing a Sweep Sequence* on page 36.

4. In the SWEEP window, tap the ⬛ button.

   The Sweep setting menu appears.

Sweep parameters		Sweep control	Sweep triggers
Start wavelength	1600.000 nm	⬤ One-way ➡	☐ Trigger in
Stop wavelength	1620.000 nm	◯ Two-way ⇄	☑ Trigger out
Cycles	1	☑ Auto return	◯ Window
Pause	0.00 s	☑ Backlash compensation	⬤ Pulse
Speed	200 nm/s		Sampling 1.0 pm

5. In the **Sweep Control** area, select the **Trigger Out** check box and select **Pulse**.

6. Select the wavelength **Start**/**Stop** and **Speed** values: as triggers are output at constant speed, make sure that the margin needed for acceleration/deceleration at both ends of the laser range is wide enough (as indicated in the displayed warning message).

7. Select the wanted **Sampling** value: if you select a sampling lower than 1 pm, the span is limited to the value indicated in the displayed warning message (the limitation depends on the laser model).

   The ⊙➡ icon appears in the **Parameters** area of the SWEEP window to indicate that the trigger is activated.

   Pulse triggers are generated at a regular wavelength interval during the time of the sweep, according to the selected sampling resolution and sweep speed.
   When the laser pauses or moves back to the start position, the trigger signal is disabled (low).

8. If you have generated pulse triggers during the sweep, retrieve the corresponding wavelength array by using the following remote query:
   [SOURce]:WAVelength:SWEep:SYNChronization:DATA? on page 182.

Monitoring the Wavelength Electrical Level

The **λ out** BNC connector enables you to output the laser wavelength as an analog signal to be displayed on an external instrument (for more details on signal levels, see *Hardware Specifications* on page 1).

To monitor the laser wavelength:

1. Make sure that the instrument to which you want to output the signal meets the electrical requirements detailed for **λ out** BNC connector in *Hardware Specifications* on page 1.

2. Connect the external instrument to the **λ out** BNC connector located on the rear panel of the T200S/T500S.

3. In the task bar, tap the ⚙ button to display the **Settings** window and select the **Instrument** tab.

The **Analog Output** area enables you to select the BNC connector.
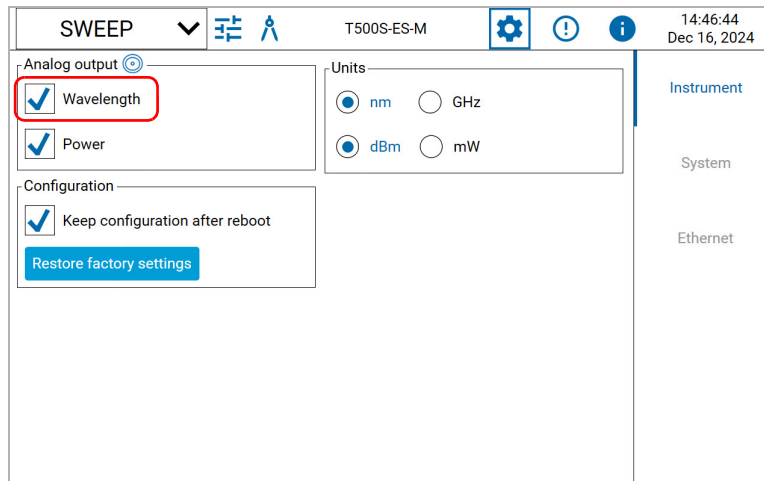
4. Select the **Wavelength** check box.

The laser wavelength is now output as analog signal that you can read on the connected instrument.

To calculate the output wavelength, use the following formula:

$$\lambda_{min} + \left(\frac{\text{Voltage}}{5}\right) \times (\lambda_{max} - \lambda_{min})$$

➤ λmin is the minimum wavelength of the laser being used.

➤ λmax is the maximum wavelength of the laser being used.

➤ Voltage is the voltage measured at **λ out**.

5. Tap the ⚙ button to exit the **Settings** window.

6 *Modifying the Optical Power*

In all operating mode, the T200S/500S screen displays the optical output power of the laser.

The optical power of T200S models is set to 10 dBm and cannot be modified.

You can set the output power of T500S models; as explained in *Setting the Optical Output Power (T500S models only)* on page 52.
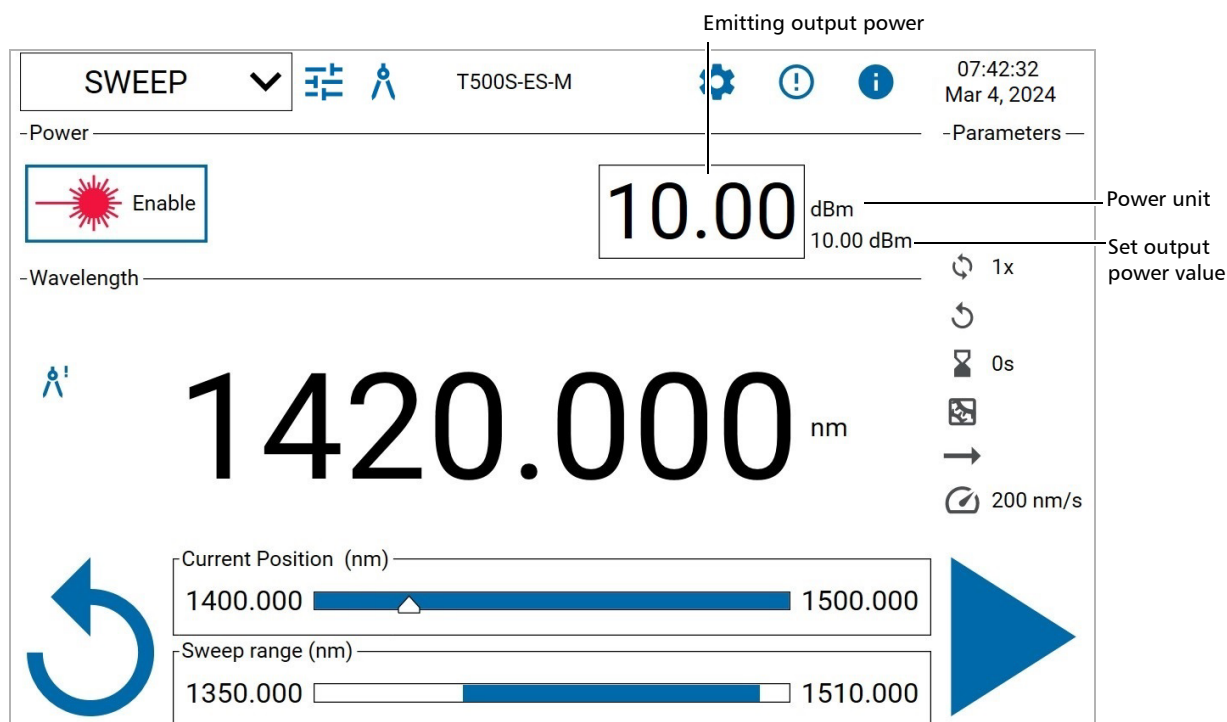
Enabling/Disabling the Laser Output

If the laser diode is turned off, you cannot move the laser or enter the wanted power value. The entered wavelength/frequency is only applied if the laser is enabled.

To enable the laser output:

Touch the ☀ **Enable** button.

The T200S/500S beeps, the laser status led is lit and the laser button becomes red.

To disable the laser output:

Touch the ☀ **Enable** button.

The T200S/500S beeps and the laser is disabled. You cannot disable the laser during a sweep.

Defining the Power Unit

You define the power unit you want to use for all operating modes in the **Settings** window, as explained in the following procedure.

To set the power unit:

1. In the T200S/500S task bar, tap the ⚙ button to display the **Settings** window and select the **Instrument** tab.

The **Units** area enables you to configure the power (and spectral) units.
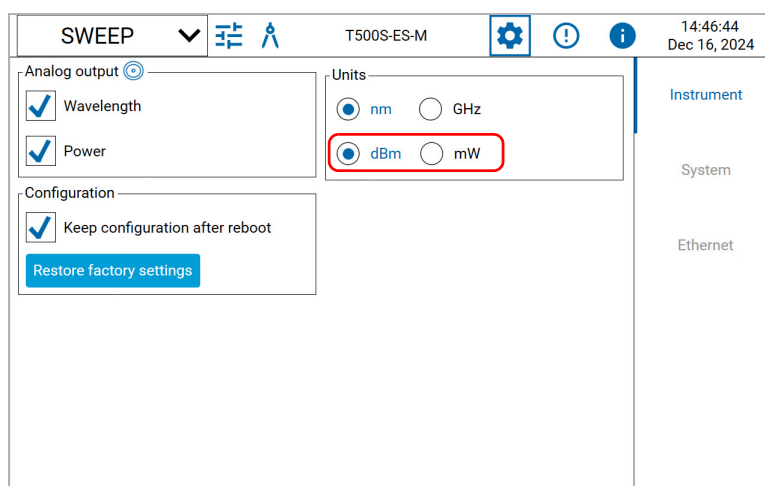
2. Set the power unit you want to use by selecting **mW** or **dBm**.

3. Touch the ⚙ button to exit the window.

Setting the Optical Output Power (T500S models only)

On T500S models, you can modify the optical output power from the touchscreen if the laser is stable at a fix position.

You cannot modify the power if the laser is initializing, referencing, or executing a scan.

To modify the output power:

1. On the T500S screen, tap the power value.

The keypad appears on screen.

2. Type the wanted value and tap **Enter**.

The entered value is displayed on the right of the measured value.

➤ If the laser is enabled, the specified power is immediately applied.

➤ If the laser is disabled, the power will be applied when the laser is set to Enable.

During the laser stabilization at the entered value, the 〰 icon appears on screen.

If the wanted value is not reached, the ⚠ icon is displayed on screen.

Monitoring the Laser Output Power

The **Power out** BNC connector enables you to monitor the laser output power (for more details on signal levels, see *Hardware Specifications* on page 1).

To monitor the laser output power:

1. Make sure that the instrument to which you want to output the signal meets the electrical requirements detailed for **Power out** BNC connector in *Technical Specifications* on page 1.

2. Connect the external instrument to the **Power out** BNC connector located on the rear panel of the T200S/500S.

3. In the task bar, tap the ⚙ button to display the **Settings** window and select the **Instrument** tab.

   The **Analog output** area enables you to select the BNC connector.
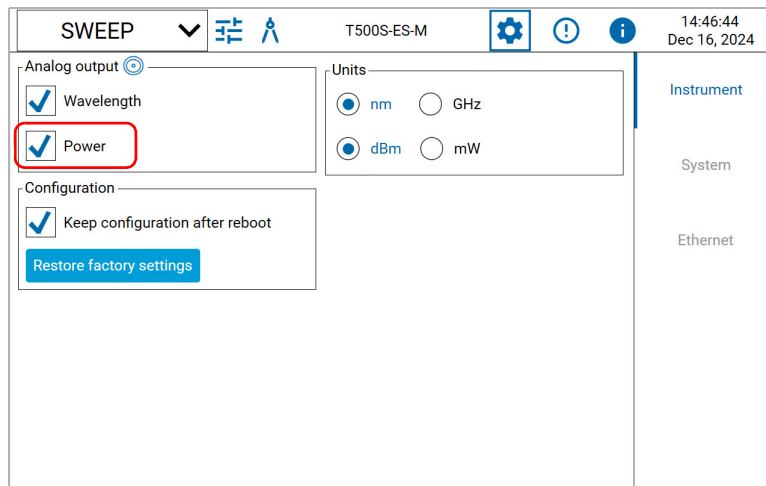
4. Select the **Power** check box.

   The laser optical power is now output as analog signal that you can read on the connected instrument.

5. Touch the ⚙ button to exit the **Settings** window.

7 *Remotely Controlling the T200S/T500S*

You can remotely control the T200S/T500S by using the Ethernet port located on the rear panel (see *Rear panel* on page 3). Maximum transfer rates are available in *Technical Specifications* on page 1.

Your unit offers a set of commands permitting remote control of the T200S/T500S. You can find all the commands and queries supported by the T200S/T500S in *SCPI Command Reference* on page 109.

This section:

➤ Explains how to connect the T200S/T500S to an external device such as a PC for remote control: see *Setting the T200S/T500S Ethernet Port* on page 55 and *Entering/Exiting the Remote Mode* on page 56.

➤ Gives details on communication principles: see *Communication Principle* on page 57.

➤ Gives examples on how to use the SCPI commands and queries: see *Writing Remote Control Code: Examples* on page 65.

Setting the T200S/T500S Ethernet Port

You can remotely control the T200S/T500S from a computer connected to the T200S/T500S directly or through your company's network.

If you do not know how to configure this port or if the connection does not work, contact your company network administrator.

To directly control the T200S/T500S from a computer:

1. In the T200S/T500S task bar, tap the ⚙ button to display the **Settings** window and select the **Ethernet** tab.

The **TCP socket** area enables you to configure the Ethernet connection of the T200S/T500S.

2. Connect an RJ45 cable from your computer to the T200S/T500S Ethernet port.

3. In the **Settings** window, in the **IPv4** or **IPv6** tab, select the **Obtain an IP address automatically** check box.

4. Tap **Apply** to validate the connection parameters.

5. Wait for the IP address to refresh (the auto-IP process can take a few minutes) Once completed, the IP address should start with 169.

6. On your computer, use the Ethernet parameters defined in the T200S/T500S **Settings** window to set the communication with your T200S/T500S in your application.

To remotely control the T200S/T500S through your company network:

1. In the T200S/T500S task bar, tap the ⚙ button to display the **Settings** window and select the **Ethernet** tab.

The **TCP socket** area enables you to configure the Ethernet connection of the T200S/T500S.

IMPORTANT

Make sure that the firewall of your computer allows communication on the 5025 port.

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2. Connect an RJ45 cable from your company network to the T200S/T500S Ethernet port.

3. In the **Settings** window, set the IP address, subnet mask and gateway to identify your T200S/T500S (see *Connecting the T200S/T500S to your Company Network* on page 24).

4. Tap **Apply** to validate the connection parameters.

5. On your computer, use the Ethernet parameters defined in the T200S/T500S Settings window to set the communication with your T200S/T500S in your application.

Entering/Exiting the Remote Mode

The T200S/T500S enters the remote mode when it receives a command from an external controller. When the remote mode is activated, you cannot use the GUI to control the T200S/T500S.

In remote mode, the T200S/T500S GUI displays the **Local** mode button on the main screen.

To enter the remote mode:

1. Use an RJ45 cable to connect the external controller to the T200S/T500S:

2. Make sure the port is properly configured for remote control: see *Setting the T200S/T500S Ethernet Port* on page 55.

3. Send a command from the remote controller. All available commands are described in *SCPI Command Reference* on page 109.

When the T200S/T500S receives a command from an external controller, it enters the remote mode: the GUI is deactivated and the **Local** button appears on the main screen.

To exit the remote mode:

To get back to the local control of the T200S/T500S, tap the **Local** button.

The GUI is now available and you can use it.
The GUI will be back to remote mode if another remote command is received by the T200S/T500S.

Communication Principle

EXFO supplies commands that follow the guidelines determined by the SCPI consortium for your T200S/T500S.

The present section gives you information to help you use the provided commands, to remotely control your instrument.

Standard Status Reporting

Each device has four status registers with a structure complying with the IEEE 488.2 standard. These registers allow the controller to monitor events and get useful information on the status of the devices it controls.

➤ Standard Event Status Register (ESR)

➤ Standard Event Status Enable Register (ESE)

➤ Status Byte Register (STB)

➤ Service Request Enable Register (SRE)

The following diagram is a useful aid in understanding the general commands and how a service request (SRQ) is generated.

Using a service request, a device notifies the controller that an event requiring special attention occurred. The controller will then find which device generated a SRQ (its RQS bit is set) and the causes of it.
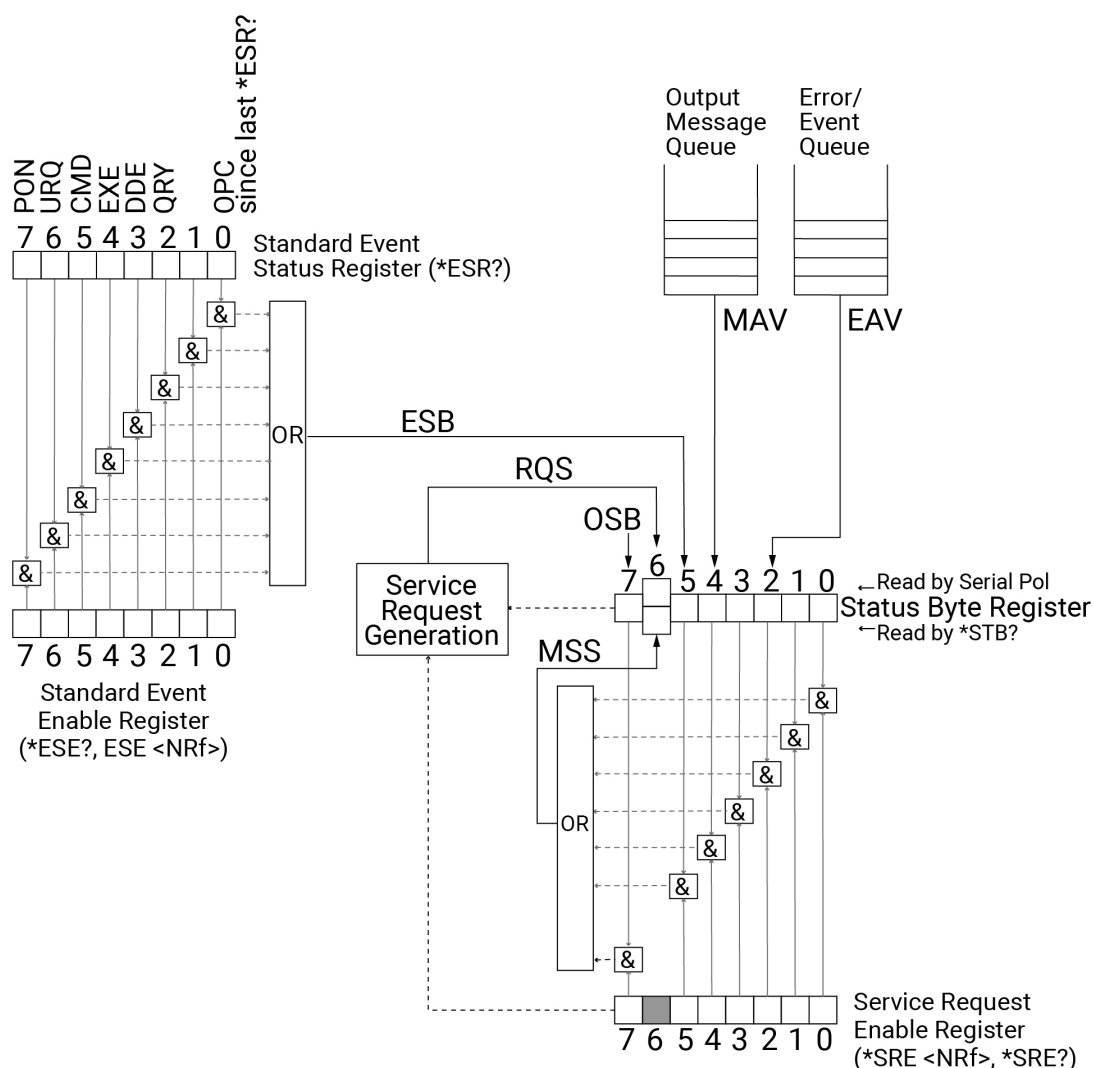
Standard Event Status Enable Register (ESE) and Standard Event Status Register (ESR)

The following table shows the content of the Standard Event Status Enable Register (ESE) and Standard Event Status Register (ESR):

Bit	Weight	Meaning
7 - PON	128	Power ON Enable
6 - URQ	64	User ReQuest Enable
5 - CMD	32	CoMmanD Error Enable
4 - EXE	16	Execution Error Enable
3 - DDE	8	Device Dependent Error Enable
2 - QRY	4	QueRy Error Enable
1 - N.U.	2	Not used
0 - OPC	1	Operation Complete Enable

Service Request Enable Register (SRE)

The following table shows the content of the Service Request Enable Register (SRE):

Bit	Weight	Meaning
7 - N.U.	128	Not used
6 - N.U.	64	Not used
5 - ESB	32	Event Summary Bit Enable
4 - MAV	16	Message AVailable Enable
3 - N.U	8	Not used
2 - EAV	4	Error/event AVailable Enable
1 - N.U.	2	Not used
0 - N.U.	1	Not used

Status Byte Register (STB)

The following table shows the content of the Status Byte Register (STB):

Bit	Weight	Meaning
7 - OSB	128	Not used
6 - RQS/MSS	64	ReQuest Service (read by serial polling)/ MaSter Summary bit (read by *STB?).
5 - ESB	32	Event Status Byte Enable
4 - MAV	16	Message AVailable Enable
3 - N.U	8	Not used
2 - EAV	4	Error/event AVailable Enable
1 - N.U.	2	Not used
0 - N.U.	1	Not used

Operational / Questionable Status Reporting

Operational Status Condition Register

The following table shows the content of the Operational Status Condition Register:

Bit	Weight	Meaning
15	32768	Always zero.
14	16384	PROGram running: a user-defined programming is currently in the run state.
13	8192	INSTrument Summary Bit: one of n multiple logical instruments is reporting OPERational status. Not used.
12	4096	Shutting Down: the instrument is performing a shutdown.
11	2048	WARMing Up: the instrument is warming up. Not used (deprecated).
10	1024	Not used.
9	512	INITializing: the instrument is currently performing initialization.
8	256	REFerencing: not used.
7	128	CORRecting: the instrument is currently performing a correction.
6	64	Waiting for ARM: the instrument is in a "wait for arm" state of the trigger model.
5	32	Waiting for TRIG: the instrument is in a "wait for trigger" state of the trigger model.
4	16	MEASuring: the instrument is actively measuring.
3	8	SWEeping: a sweep is in progress.
2	4	RANGing: the instrument is currently changing its range.
1	2	SETTling: the instrument is waiting for signals it controls to stabilize enough to begin measurements.
0 (LSB)	1	CALibrating: the instrument is currently performing a reference.

Questionable Status Condition Register

The following table shows the content of the Questionable Status Condition Register:

Bit	Weight	Meaning
15	32768	Always zero.
14	16384	Command warning: a non-fatal warning related to the interpretation of a command or query. Not used.
13	8192	INSTrument Summary Bit: one of n multiple logical instruments is reporting QUEStionable status. Not used.
12	4096	Hardware alarm: the instrument has detected a malfunction and enters in hardware protection condition: the instrument enters in a wait-for-shutdown state and does not accept any command.
11	2048	Not used.
10	1024	OPERational: the instrument has detected a malfunction. You can still use the instrument, but it is probably out of specifications.
9	512	Position: the high accuracy tuning of the wavelength/frequency of the laser is of questionable quality.
8	256	CALibration: the calibration accuracy of the signal is of questionable quality. Indicates that a user reference shall be performed to keep the instrument operating within specifications (see *CALibration[:ALL]* on page 122).
7	128	MODulation: the modulation accuracy of the signal is of questionable quality. Not used.
6	64	PHASe: the phase accuracy of the signal is of questionable quality. Not used.
5	32	FREQuency: the frequency or wavelength accuracy of the signal is of questionable quality. Indicates that the instrument has detected a spectrum-affecting condition such as a mode-hop.
4	16	TEMPerature: the temperature accuracy of the signal is of questionable quality. Not used.
3	8	POWer: the power accuracy of the signal is of questionable quality. Indicates that the instrument is unable to emit at the requested output power. When performing a sweep operation, the monitoring of the questionable power condition starts when the ARM layer is triggered. If a questionable power condition is detected, the instrument sets the POWer bit and it will stay high until the operation is completed. This questionable POWer status of a sweep is cleared only when performing another operation.
2	4	TIME: the time accuracy of the signal is of questionable quality. Not used.
1	2	CURRent: the current accuracy of the signal is of questionable quality. Not used.
0 (LSB)	1	VOLTage: the voltage accuracy of the signal is of questionable quality. Not used.

SCPI Command Structure and Syntax

The information presented in this section provides an overview of SCPI programming. If you need detailed information, refer to:

➤ The International Institute of Electrical and Electronics Engineers. IEEE Standard 488.2-1992, IEEE Standard Codes, Formats, Protocols and Common Commands For Use with ANSI/IEEE Std. 488.1-1987. New York, 1992.

➤ Standard Commands for Programmable Instruments (SCPI). Volume 1: Syntax and Style. Vers. 1999.0 May, U.S.A, 1999.

Syntax of Messages

The provided commands follow the guidelines determined by the Standard Commands for Programmable Instruments (SCPI) consortium. A program message consists of one or more commands (and/or queries) with their appropriate parameters.

For example, a program message could contain a command used to activate or deactivate the output synchro signal (Trig out). The corresponding command syntax would be:
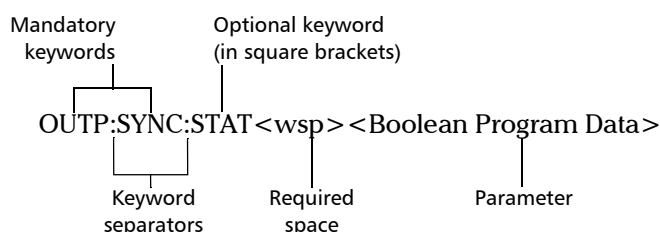
When sending a message containing the previous command, you would actually type: OUTP:SYNC:STAT ON.

The following table shows elements that are commonly used in the commands or queries syntax.

Item	Meaning
[ ]	Enclose optional keywords or parameters. *Do not include square brackets in your program message.*
\<wsp\>	Indicates that a space is required ("wsp" stands for "white space"). Corresponds to ASCII character codes (0 to 9 and 11 to 32, in decimal). *Do not include "\<wsp\>" in your program message; simply type a space.*
\< \>	Text appearing between angled brackets specifies the command parameter to be sent or the response you will receive from an instrument. *Do not include angled brackets in your program message.*
|	Indicates that one, and only one, value must be selected from the available choices. Example: If the list is 0|1, you can only select 0 *or* 1. *Do not include the pipe character in your program message.*
{ }	Indicates that the enclosed parameters can appear 0 to n times when the command is used. *Do not include braces in your program message.*
:	Mandatory to separate keywords. Can be omitted at the beginning of a program message. For example, you can use either :SYST:ERR or SYST:ERR.

Item	Meaning
;	➤ Mandatory to separate the different commands of a program message when more than one command is sent at a time. If an error occurs in a command of a program message, the program does not stop: all the commands of the program message are still executed. ➤ Also used to separate responses when multiple queries were sent in a single program message.
,	➤ Mandatory to separate parameters in a command or a query. ➤ Also used to separate the various responses from a query.

There are also several conventions regarding command syntax:

➤ Spelling errors cancel the command or query.

➤ The unit of received numerical values is always the base unit.

➤ Numerical values are entered in decimal format.
Result format for float is +1.12345678E-123.

➤ If a transmitted value has a higher precision than expected, the value is rounded off to the nearest accepted value.

➤ Commands and queries are not case-sensitive. You can type your program messages using either lower-case or upper-case letters.

➤ The command or query can be written using only the three- or four-letter shortcuts, only full words, or a combination of both.

The example below shows the long and the short forms of a same query.

:SYSTem:ERRor? ——— Long form

:SYST:ERR? ⌉
:syst:err? ⌋ ——— Short form (small words represented by the capital letters of the long form)

➤ A message must end with the following characters: LF (\n)

➤ The T200S/T500S uses the ISO-8859-1:1998 (Latin-1, West Europe) character set. Make sure to configure your remote client with the same character set and to use supported characters while giving names to files or to other items.

Command Types

The T200S/T500S uses the following types of commands and queries:

➤ Sequential: these commands are executed one after the other, in sequential order. A sequential command always finishes before the next command is implemented.

➤ Overlapped: these commands allow execution of overlapping commands while execution of the overlapped commands is still in progress.

➤ Overlapping: these commands can be executed during execution of an overlapped command.

Unit Multipliers

The following table illustrates the possible unit multipliers:

Name	Value	Mnemonic
Exa	1E18	EX
Peta	1E15	PE
Tera	1E12	T
Giga	1E9	G
Mega	1E6	MA
Kilo	1E3	K
Milli	1E-3	M
Micro	1E-6	U
Nano	1E-9	N
Pico	1E-12	P
Femto	1E-15	F
Atto	1E-18	A

Error Messages

System and device-specific errors are managed by your unit. The generic format for error messages is illustrated in the following figure.
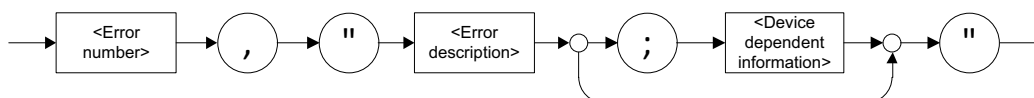
As shown in the above figure, the message contains three parts:

➤ error number

➤ error description

➤ device-dependent information

Error messages ending in a negative number are SCPI-based errors.

IMPORTANT

If an error occurs in a command of a program message (several commands separated by ";"), the program does not stop: all the commands of the program message are executed. As a consequence, several errors may be present in the error queue. You need to check the error bit to make sure that the error queue is empty.

Writing Remote Control Code: Examples

Your unit offers a set of commands enabling remote control of the T200S/T500S. You can find all the commands and queries supported by the T200S/T500S in *SCPI Command Reference* on page 109.

This section gives examples on how to use the available SCPI commands and queries by detailing use cases:

➤ *Initializing the Instrument* on page 65

➤ *Performing Internal Wavelength Referencing* on page 66

➤ *Enabling the Laser Output* on page 67

➤ *Activating the Analog Monitoring Signal* on page 68

➤ *Modifying the Optical Output Power* on page 69

➤ *Tuning the Emission Wavelength/Frequency* on page 70

➤ *Configuring a Sweep Program* on page 74

➤ *Performing Non-triggered Sweeps* on page 76

➤ *Performing Triggered Sweeps* on page 79

➤ *Activating Pulse Trigger Generation During Sweep* on page 85

Initializing the Instrument

Step	Command		Description
Start instrument			Wait for instrument initialization completion
1	STAT:OPER:COND?	*p. 185*	Query the operation status, validate condition: continue with step #2 if the initialization completed, the instrument is back to idle (condition = 0).
2	SYST:ERR:NEXT?	*p. 189*	Loop query the error message queue to check for errors during the initialization process.
3	STAT:QUES:COND?	*p. 186*	Query the questionable status to make sure the instrument is functional (OPERational bit = 0).

Depending on the instrument configuration (see *Handling User Configuration and User References* on page 26), after initialization the unit starts to *RST settings (default) or starts with the settings of the previous control session.

To recover from an OPERational questionable status, you must first retrieve the diagnostic log for analysis by EXFO support team, and then restart the instrument (local restart).

The ABORt command has no effect on the initialization process but you can still shutdown the unit by using the ⏻ button on the front panel.

Performing Internal Wavelength Referencing

Step	Command		Description
1	STAT:OPER:COND?	*p. 185*	(Optional) Query the operation status to make sure the instrument is idle (condition = 0).
2	WAV:SWE:SPEed:LIST?	*p. 177*	Only if you want to perform a sweep reference: query the list of available speeds.
	CAL:SWE:SPE:LIST 1.0e-7	*p. 131*	Only if you want to perform a sweep reference: select the sweep speed(s) on which you want to perform a sweep reference.
3	CAL:ALL	*p. 122*	Perform a full wavelength referencing of the instrument.
	or: CAL:FIX	*p. 124*	Perform a tune reference.
	or: CAL:SWE	*p. 127*	Perform a sweep reference for the speeds you have selected on step 2.
	or: CAL:QUIC	*p. 132*	Perform a quick reference.
4	STAT:OPER:COND?	*p. 185*	Loop query the operation status, wait for operation completion (condition = 0).
5	SYST:ERR:NEXT?	*p. 189*	Loop query the error message queue to check for errors during the referencing process.
6	STAT:QUES:COND?	*p. 186*	(Optional) Query the questionable status to make sure the instrument is functional (OPERational bit = 0).
7	CAL:ALL:DATA:DATE? or: CAL:FIX:DATA:DATE? or: CAL:SWE:DATA:DATE? 1.0e-7 or: CAL:QUIC:DATA:DATE?	*p. 125* *p. 128* *p. 132*	(Optional) Query the date of the latest wavelength referencing: Full reference or Tune reference or Sweep reference (of the speed selected as parameter) or Quick reference.
8	CAL:ALL:DATA:TIME? or: CAL:FIX:DATA:TIME? or: CAL:SWE:DATA:TIME? 1.0e-7 or: CAL:QUIC:DATA:TIME?	*p. 127* *p. 130* *p. 134*	(Optional) Query the time of the latest wavelength referencing: Full reference or Tune reference or Sweep reference (of the speed selected as parameter) or Quick reference.
9	UNIT:TEMP CEL	*p. 194*	(Optional) Select the default unit for temperature commands.

Step	Command		Description
10	CAL:ALL:DATA:TEMP? or: CAL:FIX:DATA:TEMP? or: CAL:SWE:DATA:TEMP? 1.0e-7 or: CAL:QUIC:DATA:TEMP?	*p. 129* *p. 129* *p. 133*	(Optional) Query the internal temperature associated with the latest wavelength referencing: Full reference or Tune reference or Sweep reference (of the speed selected as parameter) or Quick reference.

After wavelength referencing, the instrument automatically returns the output emission to its previous spectrum position and power level.

Enabling the Laser Output

Step	Command		Description
1	STAT:OPER:COND?	*p. 185*	(Optional) Query the operation status to make sure the instrument is idle (condition = 0).
2	OUTP:STAT ON	*p. 140*	Activate the laser emission output.
3	STAT:OPER:COND?	*p. 185*	Loop query the operation status, wait for operation completion (condition = 0).
4	SYST:ERR:NEXT?	*p. 189*	Loop query the error message queue to check for errors during the activation process.
5	STAT:QUES:COND?	*p. 186*	➤ (Optional) Query the questionable status to validate if power setpoint is reachable (POWer bit = 0). ➤ (Optional) Query the questionable status to make sure the instrument is functional (OPERational bit = 0).
6	UNIT:POW DBM	*p. 193*	(Optional) Select the default unit for power commands.
7	MEAS:SCAL:POW:DC?	*p. 138*	(Optional) Query the actual emission power.

Activating the Analog Monitoring Signal

Step	Command		Description
1	STAT:OPER:COND?	*p. 185*	(Optional) Query the operation status to make sure the instrument is idle (condition = 0).
2	OUTP:MON1:STAT ON	*p. 141*	Activate the wavelength analog output.
	or		
	OUTP:MON2:STAT ON	*p. 141*	Activate the power analog output.
3	STAT:OPER:COND?	*p. 185*	Loop query the operation status, wait for operation completion (condition = 0).
4	SYST:ERR:NEXT?	*p. 189*	Loop query the error message queue to check for errors during the activation process.
5	STAT:QUES:COND?	*p. 186*	(Optional) Query the questionable status to make sure the instrument is functional (OPERational bit = 0).

Modifying the Optical Output Power

Step	Command		Description
1	STAT:OPER:COND?	*p. 185*	(Optional) Query the operation status to make sure the instrument is idle (condition = 0).
2	SOUR:POW:LEV:IMM:AMPL 13.5 DBM	*p. 158*	Set the setpoint for the output power. On T200S, this command is supported but only accepts a setpoint of 10 dBm (or 10 mW).
3	STAT:OPER:COND?	*p. 185*	Loop query the operation status, wait for operation completion (condition = 0).
4	SYST:ERR:NEXT?	*p. 189*	Loop query the error message queue to check for errors during the activation process.
5	STAT:QUES:COND?	*p. 186*	➤ (Optional) Query the questionable status to make sure the instrument is functional (OPERational bit = 0). ➤ (Optional) Query the questionable status to validate if the power setpoint is reachable (POWer bit = 0)
6	UNIT:POW DBM	*p. 193*	(Optional) Select the default unit for power commands.
7	MEAS:SCAL:POW:DC?	*p. 138*	(Optional) Query the actual emission power.

Tuning the Emission Wavelength/Frequency

Tuning the emission wavelength/frequency in High accuracy mode

Step	Command		Description
1	Refresh session calibration		(Optional) See *Performing Internal Wavelength Referencing* on page 66.
2	STAT:OPER:COND?	*p. 185*	(Optional) Query the operation status to make sure the instrument is idle (condition = 0).
3	SOUR:FIX:SYNC:STAT ON	*p. 147*	(Optional) Activate the output synchronization signal for tuning operations (on the Trig out BNC connector).
4	SOUR:OPT:OLIN:STAT OFF	*p. 157*	Select high accuracy tuning (disable the Optimized linewidth mode).
5	SOUR:WAV:CW? MIN	*p. 172*	(Optional) Query the minimum possible position of the tuning wavelength range.
	or		
	SOUR:FREQ:CW? MIN	*p. 149*	(Optional) Query the minimum possible position of the tuning frequency range.
6	SOUR:WAV:CW? MAX	*p. 172*	(Optional) Query the maximum possible position of the tuning wavelength range.
	or		
	SOUR:FREQ:CW? MAX	*p. 149*	(Optional) Query the maximum possible position of the tuning frequency range.
7	SOUR:WAV:CW 1570 NM	*p. 171*	Tune the emission wavelength to an absolute wavelength position.
	or		
	SOUR:FREQ:CW 197.5 THZ	*p. 148*	Tune the emission frequency to an absolute frequency position.
8	STAT:OPER:COND?	*p. 185*	Loop query the operation status, wait for operation completion (condition = 0).
9	SYST:ERR:NEXT?	*p. 189*	Loop query the error message queue to check for errors during the tuning process.

Step	Command		Description
10	STAT:QUES:COND?	*p. 186*	➤ (Optional) Query the questionable status to make sure the instrument is functional (OPERational bit = 0).
			➤ (Optional) Query the questionable status to verify if a mode-hop affecting the quality of the tune has occurred (FREQuency bit = 0).
			➤ (Optional) Query the questionable status to validate if the power setpoint is reachable at the tuned position (POWer bit = 0).
			➤ (Optional) Query the questionable status to verify the quality of the session calibration, to make sure an internal wavelength referencing is not required (CALibration bit = 0). Depending on the duration of the measurement at the tuned position and on the environmental conditions, it may be useful to poll the questionable status to check this particular bit.

Tuning the emission wavelength/frequency in Optimized linewidth mode

For best results, you can perform the spectrum tune in optimized linewidth in conjunction with a wavemeter. You can use the wavemeter feedback to fine tune the spectrum position by performing additional stepped spectrum tune(s).

Step	Command		Description
1	STAT:OPER:COND?	*p. 185*	(Optional) Query the operation status to make sure the instrument is idle (condition = 0).
2	SOUR:FIX:SYNC:STAT ON	*p. 147*	(Optional) Activate the output synchronization signal for tuning operations (on the Trig out BNC connector).
3	SOUR:OPT:OLIN:STAT ON	*p. 157*	Select Optimized linewidth tuning (disable the High accuracy mode).
4	SOUR:WAV:CW? MIN	*p. 172*	(Optional) Query the minimum possible position of the tuning wavelength range.
	or		
	SOUR:FREQ:CW? MIN	*p. 149*	(Optional) Query the minimum possible position of the tuning frequency range.
5	SOUR:WAV:CW? MAX	*p. 172*	(Optional) Query the maximum possible position of the tuning wavelength range.
	or		
	SOUR:FREQ:CW? MAX	*p. 149*	(Optional) Query the maximum possible position of the tuning frequency range.
6	SOUR:WAV:CW 1570 NM	*p. 171*	Tune the emission wavelength to an absolute wavelength position.
	or		
	SOUR:FREQ:CW 197.5 THZ	*p. 148*	Tune the emission frequency to an absolute frequency position.
7	STAT:OPER:COND?	*p. 185*	Loop query the operation status, wait for operation completion (condition = 0).
8	SYST:ERR:NEXT?	*p. 189*	Loop query the error message queue to check for errors during the tuning process.
9	STAT:QUES:COND?	*p. 186*	➤ (Optional) Query the questionable status to make sure the instrument is functional (OPERational bit = 0). ➤ (Optional) Query the questionable status to verify if a mode-hop affecting the quality of the tune has occurred (FREQuency bit = 0). ➤ (Optional) Query the questionable status to validate if the power setpoint is reachable at the tuned position (POWer bit = 0). ➤ (Optional) Query the questionable status to verify the quality of the session calibration, to make sure an internal wavelength referencing is not required (CALibration bit = 0). Depending on the duration of the measurement at the tuned position and on the environmental conditions, it may be useful to poll the questionable status to check this particular bit.

Tuning the emission wavelength/frequency by applying steps

The stepped/incremental mode offers a more direct control of the position, as backlash compensation is not applied when performing this kind of tune.

Step	Command		Description
1	STAT:OPER:COND?	*p. 185*	(Optional) Query the operation status to make sure the instrument is idle (condition = 0).
2	SOUR:FIX:SYNC:STAT ON	*p. 147*	(Optional) Activate the output synchronization signal for tuning operations (on the Trig out BNC connector).
3	SOUR:WAV:CW:STEP? MIN	*p. 174*	(Optional) Query the minimum possible wavelength step for a relative position tuning.
	or		
	SOUR:FREQ:CW:STEP? MIN	*p. 151*	(Optional) Query the minimum possible frequency step for a relative position tuning.
4	SOUR:WAV:CW:STEP? MAX	*p. 174*	(Optional) Query the maximum possible wavelength step for a relative position tuning.
	or		
	SOUR:FREQ:CW:STEP? MAX	*p. 151*	(Optional) Query the maximum possible frequency step for a relative position tuning.
5	SOUR:WAV:CW:STEP 0.1 NM	*p. 173*	(Optional) Select the wavelength step for relative position tuning.
	or		
	SOUR:FREQ:CW:STEP 0.1 THZ	*p. 150*	(Optional) Select the frequency step for relative position tuning.
6	SOUR:WAV:CW UP	*p. 171*	Tune the emission wavelength one step up (or step down).
	or		
	SOUR:FREQ:CW UP	*p. 148*	Tune the emission frequency one step up (or step down).
7	STAT:OPER:COND?	*p. 185*	Loop query the operation status, wait for operation completion (condition = 0).
8	SYST:ERR:NEXT?	*p. 189*	Loop query the error message queue to check for errors during the tuning process.
9	STAT:QUES:COND?	*p. 186*	➤ (Optional) Query the questionable status to make sure the instrument is functional (OPERational bit = 0). ➤ (Optional) Query the questionable status to verify if a mode-hop affecting the quality of the tune has occurred (FREQuency bit = 0). ➤ (Optional) Query the questionable status to validate if the power setpoint is reachable at the tuned position (POWer bit = 0).

Configuring a Sweep Program

Step	Command		Description
1	STAT:OPER:COND?	*p. 185*	(Optional) Query the operation status to make sure the instrument is idle (condition = 0).
2	SOUR:SWE:SYNC:STATe OFF	*p. 143*	Deactivate the output synchronization signal on the Trig out BNC connector. For an example of output trigger activation (for sweep operations), see *Activating Pulse Trigger Generation During Sweep* on page 85.
3	SOUR:OPT:BCOM:STAT ON	*p. 156*	Activate the backlash compensation optimization.
4	SOUR:WAV:SWE:SPE:LIST?	*p. 177*	(Optional) Query the list of supported sweep speed values.
5	SOUR:WAV:SWE:SPE 1.0e-7	*p. 175*	Select the desired sweep speed (in meter per second).
6	SOUR:WAV:SWE:STAR? MIN	*p. 179*	(Optional) Query the minimum possible position of the sweeping wavelength range.
	or		
	SOUR:FREQ:SWE:STAR? MAX	*p. 153*	(Optional) Query the maximum possible position of the sweeping frequency range
7	SOUR:WAV:SWE:STOP? MAX	*p. 181*	(Optional) Query the maximum possible position of the sweeping wavelength range.
	or		
	SOUR:FREQ:SWE:STOP? MIN	*p. 155*	(Optional) Query the minimum possible position of the sweeping frequency range
8	SOUR:WAV:SWE:STAR 1240 NM	*p. 178*	Select the wavelength sweep start position.
	or		
	SOUR:FREQ:SWE:STAR 198.5 THZ	*p. 152*	Select the frequency sweep start position.
9	SOUR:WAV:SWE:STOP 1360 NM	*p. 180*	Select the wavelength sweep stop position.
	or		
	SOUR:FREQ:SWE:STOP 185.0 THZ	*p. 154*	Select the frequency sweep stop position.
10	SOUR:SWE:CYCL:TYPE OWAY	*p. 162*	Select the type of sweep cycle.

Step	Command		Description
11	SOUR:SWE:CYCL:CONT OFF	*p. 161*	Disable continuous sweep cycle mode (Sweep sequence stops after N cycles).
	SOUR:SWE:CYCL:COUN 4	*p. 161*	Select the number of sweep cycles.
	or		
	SOUR:SWE:CYCL:CONT ON	*p. 161*	Enable continuous sweep cycle mode (you must send the ABORt command to stop the sweep sequence).
12	SOUR:SWE:HOLD? MIN	*p. 165*	(Optional) Query the minimum possible duration for the pause performed after a sweep.
13	SOUR:SWE:HOLD? MAX	*p. 165*	(Optional) Query the maximum possible duration for the pause performed after a sweep.
14	SOUR:SWE:HOLD 200 MS	*p. 164*	Select the duration for the pause performed after a sweep.
15	SOUR:SWE:REST STOP	*p. 166*	Select the final spectrum position after completion of the sweep program.
17	SYST:ERR:NEXT?	*p. 189*	Loop query the error message queue to check for errors during the configuration process.

Performing Non-triggered Sweeps

Performing a non-triggered program of non-triggered sweeps

Step	Command		Description
1	Refresh session calibration		(Optional) See *Performing Internal Wavelength Referencing* on page 66.
2	Configure sweep program		(Optional) Configure the active sweep program: *Configuring a Sweep Program* on page 74.
3	ARM:SOUR IMM	*p. 119*	Select the immediate launch of the sweep program (disable the wait for event in the ARM layer of the sequence).
4	TRIG:SOUR IMM	*p. 191*	Select the immediate launch of each sweep (disable the wait for event in TRIGer layer of the sequence).
5	INIT:IMM:ALL	*p. 137*	Initiate the sweep sequence.
Begin loop			Wait for the sweep(s) to complete
6	STAT:OPER:COND?	*p. 185*	Query the operation status, validate condition: Exit loop and continue with step #8 if the sequence stopped, the instrument is back to idle (condition = 0).
7	ABORt	*p. 118*	(Optional) Request sequence cancellation (required to end the sweep cycling when continuous mode is selected).
End loop			
8	SYST:ERR:NEXT?	*p. 189*	Loop query the error message queue to check for errors during the sequence.
9	STAT:QUES:COND?	*p. 186*	➤ Query the questionable status to make sure the instrument is functional (OPERational bit = 0). ➤ (Optional) Query the questionable status to verify if a mode-hop affecting the quality of the sweeps has occurred (FREQuency bit = 0). ➤ (Optional) Query the questionable status to validate if the power setpoint was reachable across the full spectrum range of the sweeps (POWer bit = 0). ➤ (Optional) Query the questionable status to verify the quality of the session calibration, to make sure an internal wavelength referencing is not required (CALibration bit = 0).

Performing a software triggered program of non-triggered sweeps

Step	Command		Description
1	Refresh session calibration		(Optional) See *Performing Internal Wavelength Referencing* on page 66.
2	Configure sweep program		(Optional) Configure the active sweep program: *Configuring a Sweep Program* on page 74.
3	ARM:SOUR BUS	*p. 119*	Select the *TRG command as the start signal of the sweep program (enable the wait for BUS event in the ARM layer of the sequence).
4	TRIG:SOUR IMM	*p. 191*	Select the immediate launch of each sweep (disable the wait for event in TRIGer layer of the sequence).
5	INIT:IMM:ALL	*p. 137*	Initiate the sweep sequence.
Begin loop			Wait to launch the sweep program.
6	STAT:OPER:COND?	*p. 185*	Query the operation status, validate condition: ➤ Exit loop and continue with step #8 if the sequence is ready to launch the sweep program (condition = SWEeping + Waiting for ARM). ➤ Exit loop and continue with step #11 if the sequence stopped, the instrument is back to idle (condition = 0).
7	ABORt	*p. 118*	(Optional) Request sequence cancellation.
End loop			
8	*TRG	*p. 116*	Launch the sweep program (generate a BUS event to exit the ARM layer). The *TRG event is processed only if the Waiting for ARM status bit is set.
	or		
	ABORt	*p. 118*	Request sequence cancellation.
Begin loop			Wait for the sweep(s) to complete.
9	STAT:OPER:COND?	*p. 185*	Query the operation status, validate condition: Exit loop and continue with step #11 if the sequence stopped, the instrument is back to idle (condition = 0).
10	ABORt	*p. 118*	(Optional) Request sequence cancellation (required to end sweep cycling if the continuous mode is selected).
End loop			
11	SYST:ERR:NEXT?	*p. 189*	Loop query the error message queue to check for errors during the sequence.

Step	Command		Description
12	STAT:QUES:COND?	*p. 186*	➤ Query the questionable status to make sure the instrument is functional (OPERational bit = 0).
			➤ (Optional) Query the questionable status to verify if a mode-hop affecting the quality of the sweeps has occurred (FREQuency bit = 0).
			➤ (Optional) Query the questionable status to validate if the power setpoint was reachable across the full spectrum range of the sweeps (POWer bit = 0).
			➤ (Optional) Query the questionable status to verify the quality of the session calibration, to make sure an internal wavelength referencing is not required (CALibration bit = 0).

Performing Triggered Sweeps

Performing a non-triggered program of software triggered sweeps

Step	Command		Description
1	Refresh session calibration		(Optional) See *Performing Internal Wavelength Referencing* on page 66.
2	Configure sweep program		(Optional) Configure the active sweep program: *Configuring a Sweep Program* on page 74.
3	ARM:SOUR IMM	*p. 119*	Select the immediate launch of the sweep program (disable the wait for event in the ARM layer of the sequence).
4	TRIG:SOUR BUS	*p. 191*	Select the *TRG command as the start signal of each sweep (enable the wait for BUS event in TRIGger layer of the sequence)
5	INIT:IMM:ALL	*p. 137*	Initiate the sweep sequence.
Begin loop			Wait to launch a sweep.
6	STAT:OPER:COND?	*p. 185*	Query the operation status, validate condition: ➤ Exit loop and continue with step #8 if the sequence is ready to launch a sweep (condition = SWEeping + Waiting for TRIG). ➤ Exit loop and continue with step #10 if the sequence stopped, the instrument is back to idle (condition = 0)
7	ABORt	*p. 118*	(Optional) Request sequence cancellation (required to end the sweep cycling if the continuous mode is selected).
End loop			
8	*TRG	*p. 116*	Launch a sweep (generate a BUS event to exit the TRIGger layer). The *TRG event is processed only if the Waiting for TRIG status bit is set.
	or		
	ABORt	*p. 118*	Request sequence cancellation.
9	STAT:OPER:COND?	*p. 185*	Loop query the operation status, wait for exit of the TRIGger layer (Waiting for TRIG bit condition = 0). Then, re-enter the launch sweep loop with step #6.
10	SYST:ERR:NEXT?	*p. 189*	Loop query the error message queue to check for errors during the sequence.

Step	Command		Description
11	STAT:QUES:COND?	*p. 186*	➤ Query the questionable status to make sure the instrument is functional (OPERational bit = 0).
			➤ (Optional) Query the questionable status to verify if a mode-hop affecting the quality of the sweeps has occurred (FREQuency bit = 0).
			➤ (Optional) Query the questionable status to validate if the power setpoint was reachable across the full spectrum range of the sweeps (POWer bit = 0).
			➤ (Optional) Query the questionable status to verify the quality of the session calibration, to make sure an internal wavelength referencing is not required (CALibration bit = 0).

Performing a software-triggered program of software triggered sweeps

Step	Command		Description
1	Refresh session calibration		(Optional) See *Performing Internal Wavelength Referencing* on page 66.
2	Configure sweep program		(Optional) Configure the active sweep program: *Configuring a Sweep Program* on page 74.
3	ARM:SOUR BUS	*p. 119*	Select the *TRG command as the start signal of the sweep program (enable the wait for BUS event in the ARM layer of the sequence).
4	TRIG:SOUR BUS	*p. 191*	Select the *TRG command as the start signal of each sweep (enable the wait for BUS event in TRIGger layer of the sequence).
5	INIT:IMM:ALL	*p. 137*	Initiate the sequence.
Begin loop			Wait to launch the sweep program.
6	STAT:OPER:COND?	*p. 185*	Query the operation status, validate condition:
			➤ Exit loop and continue with step #8 if the sequence is ready to launch the sweep program (condition = SWEeping + Waiting for ARM).
			➤ Exit loop and continue with step #13 if the sequence stopped, the instrument is back to idle (condition = 0).
7	ABORt	*p. 118*	(Optional) Request sequence cancellation.
End loop			
8	*TRG	*p. 116*	Launch the sweep program (generate a BUS event to exit the ARM layer). The *TRG event is processed only if the Waiting for ARM status bit is set.
	or		
	ABORt	*p. 118*	Request sequence cancellation.

Step	Command		Description
Begin loop			Wait to launch a sweep.
9	STAT:OPER:COND?	*p. 185*	Query the operation status, validate condition:
			➤ Exit loop and continue with step #11 if the sequence is ready to launch a sweep (condition = SWEeping + Waiting for TRIG).
			➤ Exit loop and continue with step #13 if the sequence stopped, the instrument is back to idle (condition = 0).
10	ABORt	*p. 118*	(Optional) Request sequence cancellation (required to end the sweep cycling if the continuous mode is selected).
End loop			
11	*TRG	*p. 116*	Launch a sweep (generate a BUS event to exit the TRIGger layer).
			The *TRG event is processed only if the Waiting for TRIG status bit is set.
	or		
	ABORt	*p. 118*	Request sequence cancellation.
12	STAT:OPER:COND?	*p. 185*	Loop query the operation status, wait for exit of the TRIGger layer (Waiting for TRIG bit condition = 0). Then, re-enter the launch sweep loop with step #9.
10	SYST:ERR:NEXT?	*p. 189*	Loop query the error message queue to check for errors during the sequence.
11	STAT:QUES:COND?	*p. 186*	➤ Query the questionable status to make sure the instrument is functional (OPERational bit = 0).
			➤ (Optional) Query the questionable status to verify if a mode-hop affecting the quality of the sweeps has occurred (FREQuency bit = 0).
			➤ (Optional) Query the questionable status to validate if the power setpoint was reachable across the full spectrum range of the sweeps (POWer bit = 0).
			➤ (Optional) Query the questionable status to verify the quality of the session calibration, to make sure an internal wavelength referencing is not required (CALibration bit = 0).

Performing a software-triggered program of hardware triggered sweeps

Step	Command		Description
1	Refresh session calibration		(Optional) See *Performing Internal Wavelength Referencing* on page 66.
2	Configure sweep program		(Optional) Configure the active sweep program: *Configuring a Sweep Program* on page 74.
3	ARM:SOUR BUS	*p. 119*	Select the *TRG command as the start signal of the sweep program (enable the wait for BUS event in the ARM layer of the sequence)
4	TRIG:SOUR EXT	*p. 191*	Select the trigger input jack as the start signal of each sweep (enable the wait for EXTernal event in the TRIGger layer of the sequence)
5	INIT:IMM:ALL	*p. 137*	Initiate the sequence.
Begin loop			Wait to launch the sweep program.
6	STAT:OPER:COND?	*p. 185*	Query the operation status, validate condition: ➤ Exit loop and continue with step #8 if the sequence is ready to launch the sweep program (condition = SWEeping + Waiting for ARM). ➤ Exit loop and continue with step #13 if the sequence stopped, the instrument is back to idle (condition = 0).
7	ABORt	*p. 118*	(Optional) Request sequence cancellation.
End loop			
8	*TRG	*p. 116*	Launch the sweep program (generate a BUS event to exit the ARM layer). The *TRG event is processed only if the Waiting for ARM status bit is set.
	or		
	ABORt	*p. 118*	Request sequence cancellation.
Begin loop			Wait to launch a sweep.
9	STAT:OPER:COND?	*p. 185*	Query the operation status, validate condition: ➤ Exit loop and continue with step #11 if the sequence is ready to launch a sweep (condition = SWEeping + Waiting for TRIG). ➤ Exit loop and continue with step #13 if the sequence stopped, the instrument is back to idle (condition = 0)
10	ABORt	*p. 118*	(Optional) Request sequence cancellation (required to end the sweep cycling if the continuous mode is selected).
End loop			

Step	Command		Description
11	Input electrical trigger		Launch a sweep (generate an EXTernal event to exit the TRIGger layer).
			The external trigger event is processed only if the Waiting for TRIG status bit is set.
	or		
	ABORt	*p. 118*	Request sequence cancellation.
12	STAT:OPER:COND?	*p. 185*	Loop query the operation status, wait for exit of the TRIGger layer (Waiting for TRIG bit condition = 0). Then, re-enter the launch sweep loop with step #9.
10	SYST:ERR:NEXT?	*p. 189*	Loop query the error message queue to check for errors during the sequence.
11	STAT:QUES:COND?	*p. 186*	➤ Query the questionable status to make sure the instrument is functional (OPERational bit = 0).
			➤ (Optional) Query the questionable status to verify if a mode-hop affecting the quality of the sweeps has occurred (FREQuency bit = 0).
			➤ (Optional) Query the questionable status to validate if the power setpoint was reachable across the full spectrum range of the sweeps (POWer bit = 0).
			➤ (Optional) Query the questionable status to verify the quality of the session calibration, to make sure an internal wavelength referencing is not required (CALibration bit = 0).

Activating Pulse Trigger Generation During Sweep

Step	Command		Description
1	Refresh sweep session calibration for the speed you want to use.		See *Performing Internal Wavelength Referencing* on page 66.
2	STAT:OPER:COND?	*p. 185*	(Optional) Query the operation status to make sure the instrument is idle (condition = 0).
3	SOUR:SWE:SYNC:STATe ON	*p. 168*	Activate the output synchronization signal for sweeping operations (on the Trig out BNC connector).
4	SOUR:SWE:SYNC:TYPE PULS	*p. 169*	Activate the Pulse trigger output signal.
5	SOUR:WAV:SWE:SYNC:SAMP? MIN	*p. 184*	(Optional) Query the minimum possible sampling value.
	SOUR:WAV:SWE:SYNC:SAMP? MAX		(Optional) Query the maximum possible sampling value.
6	SOUR:WAV:SWE:SYNC:SAMP 1PM	*p. 183*	Set the sampling of the pulse trigger output signal.
7	SOUR:OPT:BCOM:STAT ON	*p. 156*	Activate the backlash compensation optimization.
8	SOUR:WAV:SWE:SPE:LIST?	*p. 177*	(Optional) Query the list of supported sweep speed values.
9	SOUR:WAV:SWE:SPE 1.0e-7	*p. 175*	Select the wanted sweep speed (in meter per second).
10	SOUR:WAV:SWE:STAR? MIN	*p. 179*	(Optional) Query the minimum and maximum possible position of the sweeping wavelength range.
	SOUR:WAV:SWE:STOP? MAX		The T200S/T500S outputs triggers at constant sweep speed, so you cannot sweep the full wavelength/frequency range as a small range is needed at both ends for acceleration/deceleration. This range depends on the selected speed: see *[SOURce]:SWEep:SYNChronization:TYPE* on page 169
11	SOUR:WAV:SWE:STAR 1550 NM	*p. 178*	Select the wavelength sweep start position.
12	SOUR:WAV:SWE:STOP 1600 NM	*p. 180*	Select the wavelength sweep stop position.
13	SOUR:SWE:CYCL:TYPE OWAY	*p. 162*	Select the type of sweep cycle.
14	SOUR:SWE:CYCL:CONT OFF	*p. 161*	Disable continuous sweep cycle mode.
	SOUR:SWE:CYCL:COUN 1	*p. 161*	Select the number of sweep cycles.
15	SOUR:SWE:HOLD? MIN	*p. 165*	(Optional) Query the minimum possible duration for the pause performed after a sweep.

Step	Command		Description
16	SOUR:SWE:HOLD? MAX	*p. 165*	(Optional) Query the maximum possible duration for the pause performed after a sweep.
17	SOUR:SWE:HOLD 200 MS	*p. 164*	Select the duration for the pause performed after a sweep.
18	SOUR:SWE:REST STOP	*p. 166*	Select the final spectrum position after completion of the sweep program.
19	SYST:ERR:NEXT?	*p. 189*	Loop query the error message queue to check for errors during the configuration process.
20	Perform sweep: see *Performing Non-triggered Sweeps* on page 76 or *Performing Triggered Sweeps* on page 79		
21	FORM:DATA ASC,9	*p. 135*	Select the format of data.
22	SOUR:WAV:SWE:SYNC:DATA?	*p. 182*	Query the wavelength array corresponding to pulse triggers that have been generated during the sweep.

8 *Maintenance*

To help ensure long, trouble-free operation:

➤ Always inspect fiber-optic connectors before using them and clean them if necessary.

➤ Always keep the unit and its surroundings clean, free of dust and dirt, even if you are not using it.

➤ Clean the unit casing and front panel with a cloth slightly dampened with water.

➤ Store the unit at room temperature in a clean and dry area, free of dust and out of direct sunlight.

➤ Avoid high humidity or significant temperature fluctuations.

➤ Avoid unnecessary shocks and vibrations.

WARNING

The use of controls, adjustments and procedures, namely for operation and maintenance, other than those specified herein may result in hazardous radiation exposure or impair the protection provided by this unit.

Cleaning the T200S/T500S

Cleaning the Cover of the T200S/T500S Tunable Laser Source

If the external cover of the T200S/T500S becomes dirty or dusty, clean it by following the instruction below.

CAUTION

Do not use chemically active or abrasive materials to clean the T200S/T500S Tunable Laser Source.

Material needed:

➤ Lint free cleaning cloth.

➤ Isopropyl alcohol.

To clean the external cover of the T200S/T500S:

1. Turn the T200S/T500S off (see *Turning off the T200S/T500S* on page 20) and unplug the power supply cable from the wall socket.

2. Slightly damp the cloth with the isopropyl alcohol liquid and gently swipe dirt and dust with the cleaning cloth on the external cover of the T200S/T500S, without applying excessive force onto it.

Cleaning the Fan Grid

To ensure proper cooling of the T200S/T500S from the fan, the cooling fan grid located on the rear panel (see *Rear panel* on page 3) must not be dusty, you must clean it regularly.

> # CAUTION
> **Do not use a vacuum cleaner to clean the fan as this may apply excessive force to it and cause damage to the fan.**

To clean the fan grid:

1. Turn the T200S/T500S off (see *Turning off the T200S/T500S* on page 20) and unplug the power supply cable from the wall socket.

2. Using a duster or a slightly moist cloth, gently clean the external grid of the fan without pressing it.

Cleaning the Optical Connector

To ensure measurement accuracy and prevent loss of optical power, you must regularly verify that the optical connector of the T200S/T500S is clean.

Handle optical fiber with appropriate care and preserve the integrity of optical connectors by keeping them free of contamination.

> # IMPORTANT
> **To reduce the need for cleaning, immediately replace protective caps on the optical connectors when not in use.**

To clean the connectors:

1. Disable the laser output.

2. Make sure you have the following material:

> # IMPORTANT
> **Use only high quality cleaning supplies that are non-abrasive and leave no residue.**

➤ Clean compressed air

➤ Optical grade cleaning swabs

➤ Connector cleaner pen

➤ Fiberscope or similar if available

3. On the front panel, lift the protective cap. Do not disassemble the bulkhead adapter.
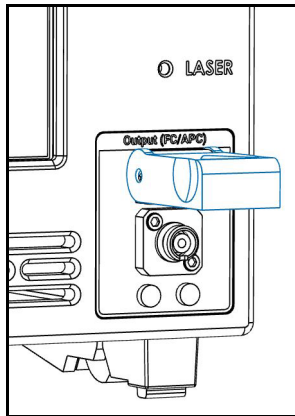
4. Gently clean the connector end, with the following instructions:

4a. Hold the can of compressed air upright and spray the can into the air to purge any propellant.

4b. Spray the clean compressed air on the connector to remove any loose particles or moisture.

5. Clean the fiber end using your cleaning tool.

6. Spray the clean compressed air on the connector again to remove any loose particles or isopropyl alcohol.

7. Check that the connector is clean with a fiberscope (or similar).

Updating the T200S/T500S Software Version

The T200S/T500S embedded software package is a .pkg file available from the EXFO website. Updating the T200S/T500S software version takes less than 10 minutes.

To update the T200S/T500S software version:

1. From the EXFO website (www.EXFO.com/en/exfo-apps), download the last T200S/T500S update package (compressed into a *.zip file).

2. Unzip the package to a USB storage device, so that the necessary *.pkg file is located at the USB device root.

3. Connect the USB storage device to one of the available USB ports.

4. Turn off the T200S/T500S (see *Turning off the T200S/T500S* on page 20).

5. On the front panel, press the ⏻ button to turn on the T200S/T500S.

   The T200S/T500S automatically detects the *.pkg file on the USB device and starts the update wizard (if several *.pkg files are detected, the last copied on the USB device or on the internal drive is taken into account).

CAUTION

To avoid serious system problems:

➤ **Do not turn the T200S/T500S off during the update.**

➤ **Do not remove the USB device before the end of the upgrade process.**

6. Follow the instructions displayed on screen to update the software version.

7. Once the update is finished, the T200S/T500S may start normally or shutdown, depending on the update. In this case, you need to restart it.

8. Once started, connect your T200S/T500S to the Internet and perform a system update: tap the ⚙ button, select the **System** tab and in the **Operating system** area, tap the **Update Windows** button.

Updating the Operating System Version

For security reasons, you should check for updates regularly to keep the T200S/T500S operating system version up to date.

Updating the operating system may take a significant amount of time.

To update the operating system version:

1. Make sure that your T200S/T500S is connected to the Internet with an Ethernet cable.

2. Turn on the T200S/T500S as explained in *Turning on the T200S/T500S and Accessing the GUI* on page 16.

3. In the T200S/T500S task bar, tap the ⚙ button to display the settings window and select the **System** tab.

The **Operating system** area enables you to update the operating system.
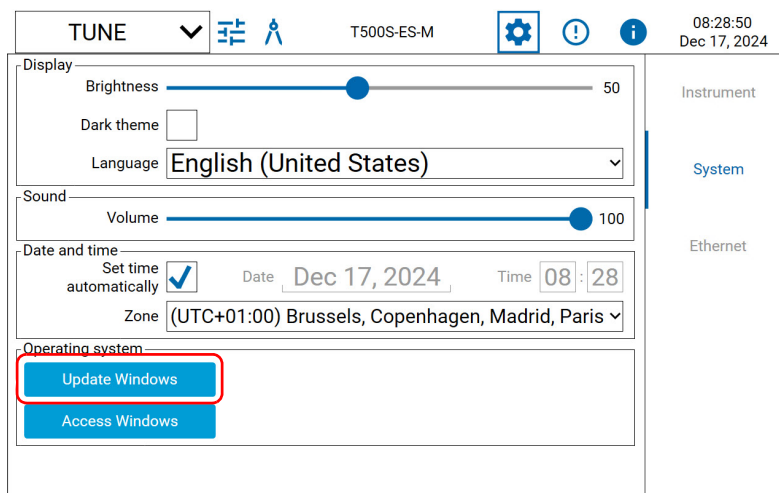
4. Tap the **Update Windows** button.

The T200S/T500S verifies if your system is up to date. This operation might take time. If updates are available, a message gives the list of available updates and prompts you to install them.

If after 15 minutes, the T200S/T500S is still checking for updates, a problem may have occurred during the update checking. In this case, tap **Cancel** and restart the T200S/T500S before running a new operating system update.

5. Tap the **Download, install and restart** button to install the update(s).

The T200S/T500S downloads and installs the updates, and then restarts automatically.

6. Once the T200S/T500S has restarted: in the **Settings** window, tap the **Update Windows** button again to make sure that all updates have been installed.
If all updates have not been installed, perform steps 1 to 5 again to install all the available updates.

Accessing the Operating System

You can access the T200S/T500S operating system with administrator's permissions to perform Windows-specific operations, such as installing an anti-virus program or activating the remote desktop (see *Activating Remote Desktop on the T200S/T500S* on page 94).

> ## CAUTION
>
> **Do not perform modifications on the operating system that could affect the T200S/T500S performances or the proper functioning of the T200S/T500S application (such as partitioning, regional settings or application files).**

Accessing the operating system closes the T200S/T500S application. To open it again, you must restart the system.

To access the operating system:

1. Turn on the T200S/T500S as explained in *Turning on the T200S/T500S and Accessing the GUI* on page 16.

2. In the T200S/T500S task bar, tap the ⚙ button to display the settings window and select the **System** tab.

The **Operating system** area enables you to access the operating system.
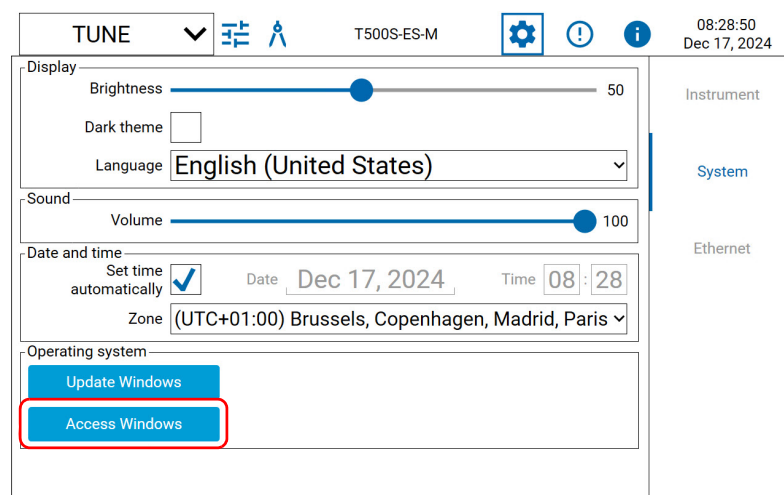
3. Tap the **Access Windows** button.

An information message appears.

4. Tap the **OK** button to close the T200S/T500S application and access the operating system.

The T200S/T500S application is closed and the operating system is available.

5. To open the T200S/T500S application again, restart the T200S/T500S.

Setting a Password on the T200S/T500S

Credentials are necessary to be able to remotely connect to the T200S/T500S (using Remote Desktop).

CAUTION

To be able to properly restart the T200S/T500S after password configuration, please carefully follow the procedure steps, especially concerning the configuration of the automatic logon.

The default credentials are:

➤ Username: Supervisor

➤ Password: no default password is set. To be able to access the T200S/T500S via Remote Desktop, you must imperatively add a password to the Windows session (and set the automatic logon) using the following procedure.

Modifying the T200S/T500S password and automatic logon:

1. Access the operating system as explained in *Accessing the Operating System* on page 92.

2. Press **Ctrl+Alt+Del** and select **Change a password**.

3. In the **Old password** field, leave the field blank.

4. Type the new password and confirm.

5. Configure the autologon with the new password:

    5a. Download and open the Autologon.exe tool (https://docs.microsoft.com/en-us/sysinternals/downloads/autologon).

    5b. In the Autologon window:
    In the Username field, type Supervisor.
    In the Password field, type the password you have just modified.
    Click **Enable**.

    The new password is updated and will be used for automatic logon.

6. Restart the T200S/T500S to open the T200S/T500S application again.

Activating Remote Desktop on the T200S/T500S

The following procedure explains how to activate the Remote Desktop on your T200S/T500S. Once activated, use the credentials set in *Setting a Password on the T200S/T500S* on page 93 to connect to the T200S/T500S via the Remote Desktop.

Recommended resolution for the remote session: 1280x800 scaled to 125 %.

To activate the Remote Desktop on the T200S/T500S:

1. Access the operating system as explained in *Accessing the Operating System* on page 92.

2. Allow remote connections to the T200S/T500S:

    2a. In **Windows Settings\System**, click **Remote Desktop**.

    2b. In the **Remote Desktop** area, select **Enable Remote Desktop** and click **Confirm**.

3. As there is no default password for the T200S/T500S Windows session: you must imperatively add a password and set the automatic logon to be able to access the T200S/T500S via Remote Desktop: follow the procedure in *Setting a Password on the T200S/T500S* on page 93.

4. Restart the T200S/T500S to open the T200S/T500S application again.

Replacing Fuses

You must verify the power fuses in case you cannot turn on the T200S/T500S.

WARNING

To avoid fire hazard, only use the correct fuse type, voltage and current ratings.

The unit contains two fuses (see *Technical Specifications* on page 2 for details). The fuse holder is located at the back of the unit, just above the power inlet.

Before starting:

Make sure you have the following equipment:

➤ 1 small flat-head screwdriver.

➤ 1 or 2 replacement fuses (for fuse type, see *Technical Specifications* on page 2).

To replace a fuse:

1. Turn off the unit and unplug the power cord.

2. Using a flat-head screwdriver as a lever, pull the fuse holder out of the unit.
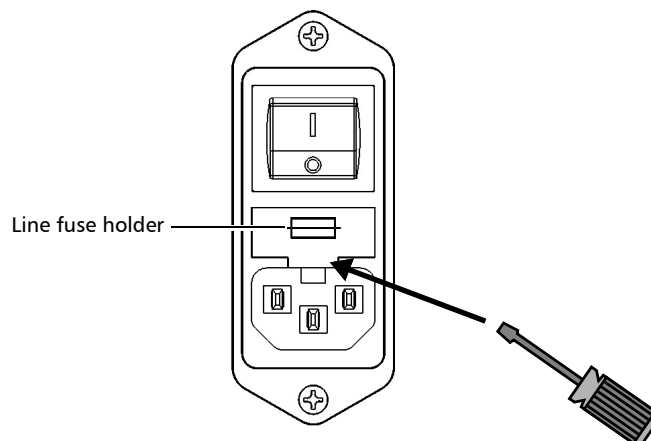
Line fuse holder

3. Check and replace the fuses if necessary.

4. Insert the new fuse into the fuse holder.
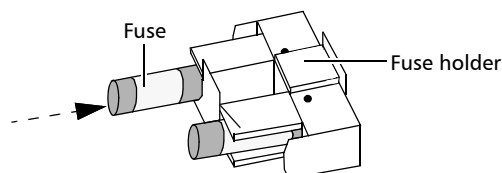
Fuse

Fuse holder

5. Make sure the fuses are placed firmly in the holder prior to reinsertion.

6. Firmly push the fuse holder into place.

Recalibrating the T200S/T500S

EXFO manufacturing and service center calibrations are based on the ISO/IEC 17025 standard (*General Requirements for the Competence of Testing and Calibration Laboratories*). This standard states that calibration documents must not contain a calibration interval and that the user is responsible for determining the re-calibration date according to the actual use of the instrument.

The validity of specifications depends on operating conditions. For example, the calibration validity period can be longer or shorter depending on the intensity of use, environmental conditions and unit maintenance, as well as the specific requirements for your application. All of these elements must be taken into consideration when determining the appropriate calibration validity period of this particular EXFO unit.

Until you collect the required empirical data to support your own calibration interval strategy, EXFO recommends that the next calibration (due) date of an instrument be established according to the following equation:

Next calibration date = Date of first usage + Recommended calibration period (1 year)

Note: You can use the date of first usage only if the product was stored in proper conditions (23 °C ± 5 °C (73,4 °F ± 9 °F)). If it is not the case or if you do not know the date of first usage, you can use the date at which you received the product, as long as the product was sourced from an official EXFO distribution channel.

Restriction:

Next calibration date ≤ calibration date on certificate + recommended calibration period (1 year) + maximum storage period (3 months)

Under normal use, the recommended calibration period for your T200S/T500S is: 1 year.

For newly delivered units, EXFO has determined that the maximum storage period for this product is up to 3 months.

EXFO guarantees that proper storage at room temperature for up to the maximum storage period between calibration and shipment will not affect the performance of the test and measurement instruments and will not reduce the recommended validity period before requiring a new calibration.

To help you with calibration follow-up, EXFO provides a special calibration label that complies with the ISO/IEC 17025 standard and indicates the unit calibration date and provides space to indicate the due date.

To ensure that test and measurement instruments conform to the published specifications, calibration must be carried out at the relevant EXFO plant, or, depending on the product, at an EXFO service center, or at one of EXFO' certified service centers. All calibrations are performed using standards traceable to national metrology institutes.

Recycling and Disposal

This symbol on the product means that you should recycle or dispose of your product (including electric and electronic accessories) properly, in accordance with local regulations. Do not dispose of it in ordinary garbage receptacles.

For complete recycling/disposal information, visit the EXFO web site at www.exfo.com/recycle.

9 Troubleshooting

This section explains how to handle common problems that can occur with your instrument, and how to ask for support.

Solving Common Problems

The following table lists problems that can occur and their possible solution.

Trouble	Possible cause	Possible resolution
Operating system update: After 15 minutes, the T200S/T500S is still checking for updates.	A problem occurred during the update checking.	In the update checking window, tap **Cancel** and restart the T200S/T500S before running a new operating system update.

Forcing the T200S/T500S to Shutdown & Restart

In case of system crash and frozen screen, you can abruptly turn the T200S/T500S off as explained in the following procedure.

CAUTION

Do not stop the T200S/T500S with this procedure if you can turn it off normally as explained in *Turning off the T200S/T500S* on page 20.

To force the T200S/T500S to shutdown and restart:

1. If the touchscreen is frozen: try to shutdown the T200S/T500S as explained in *Turning off the T200S/T500S* on page 20.

   If this does not work, follow the rest of these instructions.

2. On the front panel, press the ⏻ button during 4 seconds.
   The system abruptly stops.

3. On the rear panel, set the power switch to **O**.

4. Wait 10 seconds and set the power switch back to **I**.

5. Restart the T200S/T500S as explained in *Turning on the T200S/T500S and Accessing the GUI* on page 16.

Abruptly Turning off the T200S/T500S (Emergency Shutdown)

In case of emergency (presence of smoke flame or any immediate hazard), you can abruptly turn the T200S/T500S off as explained in the following procedure.

CAUTION

Do not stop the T200S/T500S with this procedure if you can turn it off normally as explained in *Turning off the T200S/T500S* on page 20.

To abruptly turn off the T200S/T500S:

Unplug the T200S/T500S by pulling the power cable off the T200S/T500S power cable connector on the rear panel (see *Rear panel* on page 3).

Restoring Your Unit to Normal Operation

If you encounter major problems with your unit (for example, the unit does not behave the way it used to), you can revert it to its initial state (as it was at time of purchase).

> # CAUTION
>
> **DO NOT TURN OFF your unit while the recovery operation is underway. Doing so may severely damage your unit.**

To reset your unit to its factory settings:

1. Repeatedly turn your device off and then on as explained in the following steps:

   1a. On the front panel, press the ⏻ button during 10 seconds to turn off the T200S/T500S.

   1b. Press the ⏻ button to turn on the T200S/T500S.

   1c. On the first sign that the T200S/T500S has started, hold down the ⏻ button for 10 seconds to turn off the T200S/T500S.

   1d. Press the ⏻ button to turn on the T200S/T500S.

   1e. When the T200S/T500S restarts, hold down the ⏻ button for 10 seconds to turn it off.

   1f. Press the ⏻ button to turn on the T200S/T500S.

   The WinRe (Windows Recovery Environment) appears.

2. In WinRe (Windows Recovery Environment), select **See advanced repair options**.

3. Under **Choose an option**, select **Troubleshoot**.
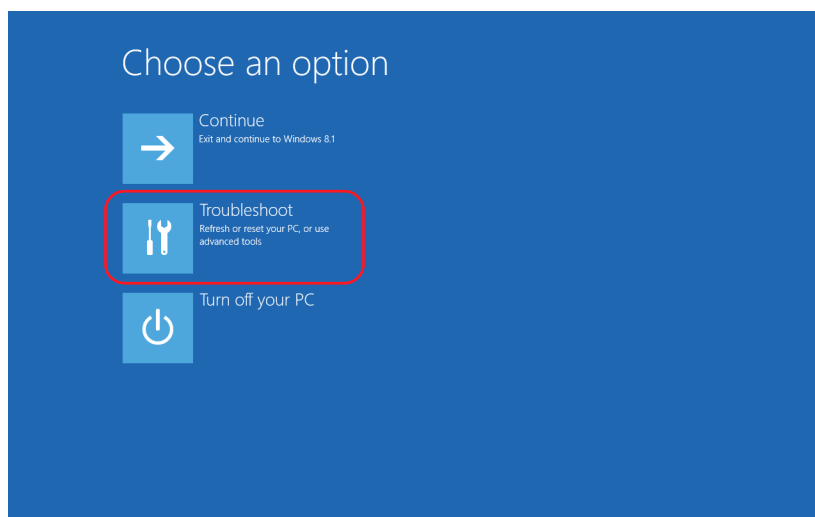
4. Under **Troubleshoot**, select **Platform Imaging Utility** to display the corresponding application.
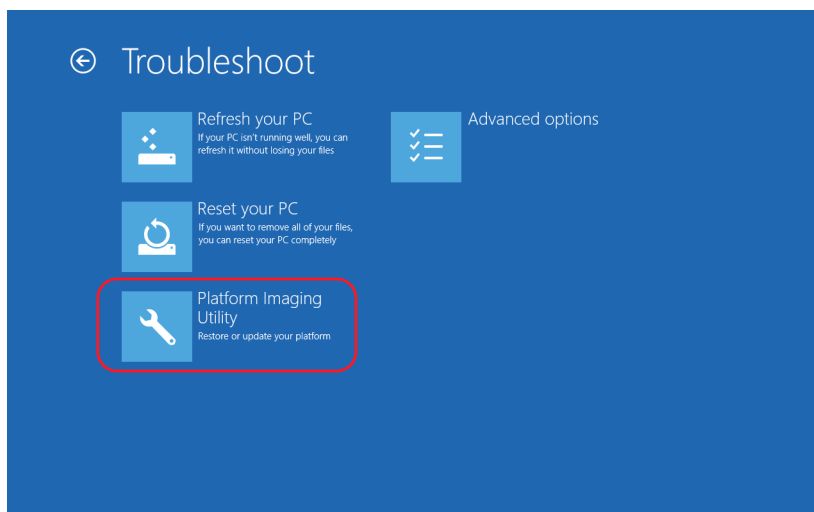
5. From the **Platform Servicing and Imaging Utility** wizard, select **Reset this unit to factory settings** and tap **Next**.
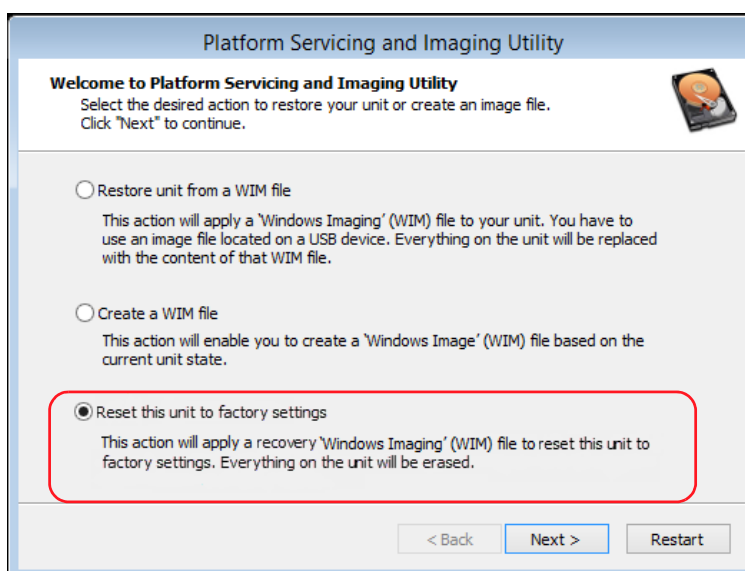
6. Read the warning and tap **Start** to restore the unit to its initial state.

   When the operation is complete the application prompts you.

7. Tap **OK**.

   The unit restarts.

   If an error is display at startup, it means that the software package must be updated: in this case, download the last T200S/T500S update package from the EXFO website and install it as described in *Updating the T200S/T500S Software Version* on page 90.

8. Accept the license agreements as you did when you first received your unit.

Saving Debug Data

Saving debug data and sending it to the EXFO customer support service can be useful for remote assistance (see *Contacting the Technical Support Group* on page 103).

To save debug data:

1. In the T200S/T500S task bar, tap the ⓘ button.

2. Tap the **View event log** button.

   The list of event log is displayed.

3. Connect a USB storage device to one of the available USB ports.

4. Tap the **Save event log** button.

   The event log is saved at the root of the USB storage device in .xml format.

Displaying the List of Errors and Warnings

The following procedure explains how to display the last main warnings that occurred on the T200S/T500S.

To display the last issued warning:

If a warning occurs, the ⚠ button appears on screen.

Tap the ⚠ button to display the warning message:

➤ **Mode hop**: a mode hop occurred.

➤ **Power**: the required power is not reached at the selected wavelength/frequency (in TUNE mode), or was not maintained during the entire sweep (in SWEEP mode).

➤ **Dysfunction** or **Calibration dysfunction**: the instrument has detected a malfunction. You can still use the instrument, but it is probably out of specifications. You can try to restart the instrument to solve the issue.

To display/clear the last error or warning messages:

➤ To display the last errors/warning: in the T200S/T500S task bar, tap the ⓘ button.

   The last 100 errors or warnings that occurred are displayed in order of appearance, with their corresponding date and time.

➤ To clear the list of errors/warnings: tap the ⓘ button and at the bottom of the list, tap the **Clear error list** button.

Viewing System Information

You can see information about your product, such as the serial number, options, version numbers, license agreement and contact information at all times.

To view product information:

1. In the task bar, tap the 🛈 button.

2. Do one of the following:

> ➤ To display contact information, tap the **Technical support** tab

> ➤ To display product information, tap the **System information** tab

3. To see the license agreements, tap the **View license agreement** button.

4. Tap the 🛈 button to exit the window.

Displaying the User Documentation

The user guide is available in PDF format on the USB key delivered with the instrument and from the EXFO website: www.EXFO.com/en/resources/

Contacting the Technical Support Group

To obtain after-sales service or technical support for this product, contact EXFO at one of the following numbers. The Technical Support Group is available to take your calls from Monday to Friday, 8:00 a.m. to 7:00 p.m. (Eastern Time in North America).

Technical Support Group

400 Godin Avenue

Quebec (Quebec) G1M 2K2

CANADA

1 866 683-0155 (USA and Canada)

Tel.: 1 418 683-5498

Fax: 1 418 683-9224

support@exfo.com

For detailed information about technical support, and for a list of other worldwide locations, visit the EXFO Web site at www.exfo.com.

If you have comments or suggestions about this user documentation, you can send them to customer.feedback.manual@exfo.com.

To accelerate the process, please have information such as the name and the serial number (see the product identification label), as well as a description of your problem, close at hand.

Transportation

Maintain a temperature range within specifications when transporting the unit. Transportation damage can occur from improper handling. The following steps are recommended to minimize the possibility of damage:

➤ Pack the unit in its original packing material when shipping.

➤ Avoid high humidity or large temperature fluctuations.

➤ Keep the unit out of direct sunlight.

➤ Avoid unnecessary shocks and vibrations.

➤ To avoid damaging the optical core, imperatively turn off the unit as described in *Turning off the T200S/T500S* on page 20.

For instructions on returning the T200S/T500S, please contact EXFO (see *Contacting the Technical Support Group* on page 103).

10 *Warranty*

General Information

EXFO Inc. (EXFO) warrants this equipment against defects in material and workmanship for a period of 1 year from the date of original shipment. EXFO also warrants that this equipment will meet applicable specifications under normal use.

During the warranty period, EXFO will, at its discretion, repair, replace, or issue credit for any defective product, as well as verify and adjust the product free of charge should the equipment need to be repaired or if the original calibration is erroneous. If the equipment is sent back for verification of calibration during the warranty period and found to meet all published specifications, EXFO will charge standard calibration fees.

> # IMPORTANT
> **The warranty can become null and void if:**
>
> ➤ **unit has been tampered with, repaired, or worked upon by unauthorized individuals or non-EXFO personnel.**
>
> ➤ **warranty sticker has been removed.**
>
> ➤ **case screws, other than those specified in this guide, have been removed.**
>
> ➤ **case has been opened, other than as explained in this guide.**
>
> ➤ **unit serial number has been altered, erased, or removed.**
>
> ➤ **unit has been misused, neglected, or damaged by accident.**

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL EXFO BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

Gray Market and Gray Market Products

Gray market is a market where products are traded through distribution channels that are legal but remain unofficial, unauthorized, or unintended by the original manufacturer. Intermediaries using such channels to distribute products are considered to be part of the gray market (hereafter unauthorized intermediary).

EXFO considers that a product originates from the gray market (hereafter gray market product) in the following situations:

➤ A product is sold by an unauthorized intermediary.

➤ A product is designed and destined for a particular market and sold on a second market.

➤ A product is resold, despite being reported lost or stolen.

When products are purchased on the gray market, rather than through an authorized EXFO distribution channel, EXFO is unable to guarantee the source and quality of those products nor the local safety regulations and certifications (CE, UL, etc.).

EXFO will not honor warranty, install, maintain, repair, calibrate, provide technical support nor make any support contracts available for gray market products.

For complete information, refer to EXFO's policy regarding gray market products at www.exfo.com/en/how-to-buy/sales-terms-conditions/gray-market/

Liability

EXFO shall not be liable for damages resulting from the use of the product, nor shall be responsible for any failure in the performance of other items to which the product is connected or the operation of any system of which the product may be a part.

EXFO shall not be liable for damages resulting from improper usage or unauthorized modification of the product, its accompanying accessories and software.

Exclusions

EXFO reserves the right to make changes in the design or construction of any of its products at any time without incurring obligation to make any changes whatsoever on units purchased. Accessories, including but not limited to fuses, pilot lamps, batteries and universal interfaces (EUI) used with EXFO products are not covered by this warranty.

This warranty excludes failure resulting from: improper use or installation, normal wear and tear, accident, abuse, neglect, fire, water, lightning or other acts of nature, causes external to the product or other factors beyond the control of EXFO.

IMPORTANT

In the case of products equipped with optical connectors, EXFO will charge a fee for replacing connectors that were damaged due to misuse or bad cleaning.

Certification

EXFO certifies that this equipment met its published specifications at the time of shipment from the factory.

Service and Repairs

EXFO commits to providing product service and repair for five years following the date of purchase.

To send any equipment for service or repair:

1. Call one of EXFO's authorized service centers (see *EXFO Service Centers Worldwide* on page 108). Support personnel will determine if the equipment requires service, repair, or calibration.

2. If equipment must be returned to EXFO or an authorized service center, support personnel will issue a Return Merchandise Authorization (RMA) number and provide an address for return.

3. If possible, back up your data before sending the unit for repair.

4. Pack the equipment in its original shipping material. Be sure to include a statement or report fully detailing the defect and the conditions under which it was observed.

5. Return the equipment, prepaid, to the address given to you by support personnel. Be sure to write the RMA number on the shipping slip. *EXFO will refuse and return any package that does not bear an RMA number.*

Note: A test setup fee will apply to any returned unit that, after test, is found to meet the applicable specifications.

After repair, the equipment will be returned with a repair report. If the equipment is not under warranty, you will be invoiced for the cost appearing on this report. EXFO will pay return-to-customer shipping costs for equipment under warranty. Shipping insurance is at your expense.

Routine recalibration is not included in any of the warranty plans. Since calibrations/verifications are not covered by the basic or extended warranties, you may elect to purchase FlexCare Calibration/Verification Packages for a definite period of time. Contact an authorized service center (see *EXFO Service Centers Worldwide* on page 108).

EXFO Service Centers Worldwide

If your product requires servicing, contact your nearest authorized service center.

EXFO Headquarters Service Center

400 Godin Avenue	1 866 683-0155 (USA and Canada)
Quebec (Quebec) G1M 2K2	Tel.: 1 418 683-5498
CANADA	Fax: 1 418 683-9224
	support@exfo.com

EXFO Europe Service Center

Winchester House, School Lane	Tel.: +44 2380 246800
Chandlers Ford, Hampshire S053 4DG	Fax: +44 2380 246801
ENGLAND	support.europe@exfo.com

**EXFO Telecom Equipment
(Shenzhen) Ltd.**

3rd Floor, Building C,	Tel: +86 (755) 2955 3100
FuNing Hi-Tech Industrial Park, No. 71-3,	Fax: +86 (755) 2955 3101
Xintian Avenue,	support.asia@exfo.com
Fuhai, Bao'An District,	
Shenzhen, China, 518103	

To view EXFO's network of partner-operated Certified Service Centers nearest you, please consult EXFO's corporate website for the complete list of service partners: https://www.exfo.com/en/services/field-network-testing/exfo-service-centers

A SCPI Command Reference

This section presents detailed information about the command and queries supplied with your T200S/T500S. For more details on T200S/T500S remote control parameters and procedures, see *Remotely Controlling the T200S/T500S* on page 55.

➤ *General Commands* on page 109

➤ *T200S/T500S Specific Commands* on page 118

General Commands

Quick Reference

The T200S/T500S recognizes the required commands identified in IEEE 488.2. The table below summarizes these commands. These commands are fully explained on the following pages.

Command	Function	Section
*CLS	Clear status command	*CLS on page 110
*ESE	Standard event status enable command	*ESE on page 110
*ESE?	Standard event status enable query	*ESE? on page 111
*ESR?	Standard event status register query	*ESR? on page 112
*IDN?	Identification query	*IDN? on page 112
*OPC	Operation complete command	*OPC on page 113
*OPC?	Operation complete query	*OPC? on page 113
*RST	Reset command	*RST on page 114
*SRE	Service request enable command	*SRE on page 115
*SRE?	Service request enable query	*SRE? on page 115
*STB?	Read status byte query	*STB? on page 116
*TRG	Trigger event command	*TRG on page 116
*WAI	Wait for pending operations to be completed	*WAI on page 117

General Commands

	*CLS
Description	The *CLS command clears the Standard Event Status Register and the Error/Event Queue.
Type	Overlapping, no query.
Syntax	*CLS
Parameter(s)	None.
See Also	**ESR?* on page 112

	*ESE
Description	The *ESE command sets the Standard Event Status Enable Register bits, as defined in *Standard Event Status Enable Register (ESE) and Standard Event Status Register (ESR)* on page 58.
	This register contains a mask value for the bits to be enabled in the Standard Event Status Register.
Type	Overlapping.
Syntax	*ESE<wsp><register value>
Parameter(s)	*register value:*
	The <register value> represents the bit values of the Standard Event Status Enable Register, in the range of 0 through 255.
	See the content of this register in *Standard Event Status Enable Register (ESE) and Standard Event Status Register (ESR)* on page 58.
	A value of 1 in the Enable Register enables the corresponding bit in the Status Register, a value of 0 disables the bit.
Example(s)	*ESE 25
	where 25 sets the EXE, DDE and OPC bits)
	*ESE 0
	clears the content of the Standard Event Status Enable register
See Also	**ESE?* on page 111
	*ESR? on page 112

*ESE?

Description	The *ESE? query returns the current contents of the Standard Event Status Enable Register, as defined in *Standard Event Status Enable Register (ESE) and Standard Event Status Register (ESR)* on page 58.
Type	Overlapping.
Syntax	*ESE?
Parameter(s)	None.
Response Syntax	<register value>
Response(s)	*register value:*
	The <register value> value represents the bit values of the Standard Event Status Enable register.
	The <register value> ranges from 0 through 255.
	See the content of this register in *Standard Event Status Enable Register (ESE) and Standard Event Status Register (ESR)* on page 58.
Example(s)	*ESE? returns 133 (the PON, QRY and OPC bits are set)
See Also	*ESE? on page 111
	*ESR? on page 112

*ESR?

Description	The *ESR? query returns the current contents of the Standard Event Status Register, as defined in *Standard Event Status Enable Register (ESE) and Standard Event Status Register (ESR)* on page 58 Reading the Standard Event Status Register clears it.
Type	Overlapping, query only.
Syntax	*ESR?
Parameter(s)	None.
Response Syntax	<register value>
Response(s)	*register value:* The <register value> value represents the bit values of the Standard Event Status register. The <register value> ranges from 0 through 255. See the content of this register in *Standard Event Status Enable Register (ESE) and Standard Event Status Register (ESR)* on page 58.
Example(s)	*ESR? returns 33 (the CME and OPC bits are set)
See Also	*ESE? on page 111 *ESR? on page 112

*IDN?

Description	The *IDN? query returns the unique identification of the device.
Type	Overlapping, query only.
Syntax	*IDN?
Parameter(s)	None.
Response Syntax	<Identification>
Response(s)	*Identification:* The response is organized into four fields separated by commas. The field definitions are as follows: Field 1 (Manufacturer): EXFO Inc. Field 2 (Model): instrument model Field 3 (Serial number): instrument serial number Field 4 (Firmware level): instrument firmware version
Example(s)	*IDN? returns EXFO Inc., T200S,12345678,1.0.0.0
Notes	The overall length of the *IDN? response is less than or equal to 72 characters.

*OPC

Description	This command makes synchronization between the instrument and an external controller possible. The *OPC command causes the instrument to set bit 0 (Operation Complete) in the Standard Event Status Register to the TRUE (logic 1) state when the instrument completes all pending operations.
	Detection of the Operation Complete message can be accomplished by continuous polling of the Standard Event Status Register using the *ESR? common query command. However, using a service request eliminates the need to poll the Standard Event Status Register thereby freeing the controller to do other useful work.
Type	Overlapping.
Syntax	*OPC
Parameter(s)	None.
See Also	*OPC? on page 113
	*WAI on page 117

*OPC?

Description	The *OPC? query makes possible the synchronization between the instrument and an external controller by reading the Output Queue or by waiting for a service request on the Message Available (MAV) bit in the Status Byte Register.
	The *OPC? query causes the instrument to place an ASCII character, 1, into its Output Queue when the device completes all pending operations. A consequence of this action is that the MAV bit in the Status Byte Register is set to state 1.
Type	Overlapping.
Syntax	*OPC?
Parameter(s)	None.
Response Syntax	<Acknowledge>
Response(s)	*Acknowledge:*
	The <Acknowledge> response is a single ASCII-encoded byte corresponding to 1.
	The receipt of an <Acknowledge> response indicates that all pending selected device operations have been completed.
Example(s)	*OPC? returns 1
See Also	*OPC on page 113
	*WAI on page 117

	*RST
Description	The *RST command performs a reset of the instrument. It is the third reset level in a three-level reset strategy. The *RST command does the following:

> ➤ Sets the device-specific functions to a known state that is independent of the past-use history of the device.
> ➤ Forces the device into OCIS state (Operation complete Command Idle State).
> ➤ Forces the device into OQIS state (Operation complete Query Idle State).

The *RST command explicitly DOES NOT affect the following:

> ➤ The state of the Communication interface.
> ➤ The Output Queue.
> ➤ Any Event Enable Register setting, including the Standard Event Status Enable Register setting.
> ➤ Any Event Register setting, including the Standard Event Status Register settings.
> ➤ Calibration data that affects device specifications.
> ➤ The Service Request Enable Register setting.

Type	Overlapping.
Syntax	*RST
Parameter(s)	None.

*SRE

Description	The *SRE command sets the Service Request Enable Register bit value, as defined in *Service Request Enable Register (SRE)* on page 59.
Type	Overlapping.
Syntax	*SRE<wsp><register value>
Parameter(s)	*register value:*
	The <register value>, represents the bit values of the Service Request Enable Register.
	The <register value> value ranges from 0 through 255.
	See the content of this register in *Service Request Enable Register (SRE)* on page 59.
Example(s)	*SRE 52 where 52 sets the ESB, MAV and EAV bits
See Also	*SRE?* on page 115
	STB? on page 116

*SRE?

Description	The *SRE? query returns the current content of the Service Request Enable Register.
	See the content of this register in *Service Request Enable Register (SRE)* on page 59.
Type	Overlapping.
Syntax	*SRE?
Parameter(s)	None.
Response Syntax	<register value>
Response(s)	*register value:*
	The <register value> represents the current bit values of the Service Request Enable Register.
	The <register value> ranges from 0 through 255.
	See the content of this register in *Service Request Enable Register (SRE)* on page 59.
Example(s)	*SRE returns 32 (the ESB bit is set)
See Also	*SRE?* on page 115
	STB? on page 116

*STB?

Description	The *STB? query returns the contents of the Status Byte register, as defined in *Status Byte Register (STB)* on page 59.
Type	Overlapping, query only.
Syntax	*STB?
Parameter(s)	None.
Response Syntax	<register value>
Response(s)	*register value:*
	The <register value> value represents the bit values of the Status Byte Register.
	The <register value> ranges from 0 through 255.
	See the content of this register in *Status Byte Register (STB)* on page 59.
Example(s)	*STB? returns 68 (the MSS and EAV bits are set)
See Also	*SRE?* on page 115

*TRG

Description	This command causes the immediate exit from the event detector of a trigger sequence if the system is waiting for the BUS event source. Otherwise, the command is ignored.
	This command generates a trigger event that starts the sweep or the sweep sequence (depending on the parameters), if the system is waiting for the BUS event source.
Applicability	This command only applies if the command *TRIGger[:SEQuence]:SOURce* on page 191 or *ARM[:SEQuence][:LAYer]:SOURce* on page 119 is set to BUS.
Syntax	*TRG
Parameter(s)	None.
Example(s)	*TRG
See Also	*ARM[:SEQuence][:LAYer]:SOURce* on page 119
	INITiate[:IMMediate][:ALL] on page 137
	TRIGger[:SEQuence]:SOURce on page 191

*WAI

Description	The *WAI command prevents the device from executing any further commands or queries until the no-operation-pending flag becomes TRUE.
Type	Overlapping, no query.
Syntax	*WAI
Parameter(s)	None.
Example(s)	*WAI
See Also	*OPC on page 113

T200S/T500S Specific Commands

Quick Reference

The table below contains a summary of the T200S/T500S specific commands. These commands are fully explained on the following pages.

Command/Query category	Corresponding section
:ABORt	*ABORt* on page 118
:ARM	*ARM Commands and Queries* on page 119
:CALibration	*CALibration Commands and Queries* on page 121
:FORMat	*FORMat Commands and Queries* on page 135
:INITiate	*INITiate Commands and Queries* on page 137
:MEASure	*MEASure Commands and Queries* on page 138
:OUTPut	*OUTPut Commands and Queries* on page 140
[:SOURce]	*SOURce Commands and Queries* on page 145
:STATus	*STATus Commands and Queries* on page 185
:SYSTem	*SYSTem Commands and Queries* on page 187
:TRIGger	*TRIGger Commands and Queries* on page 191
:UNIT	*UNIT Commands and Queries* on page 193

ABORt

Description	This command resets the trigger system and places all trigger sequences in the idle state. The command is not completed until the trigger sequence is in the idle state.
	This command aborts any sweep or reference in progress.
	This command is an event and has no associated *RST condition or query form.
Syntax	ABORt
Parameter(s)	None.
Example(s)	ABOR
See Also	*INITiate[:IMMediate][:ALL]* on page 137
	STATus:OPERation:CONDition? on page 185

ARM Commands and Queries

Quick Reference

Command Overview				Parameter(s)	Section
ARM	[:SEQuence]	[:LAYer]	SOURce	<source>	see *p. 119*
	[:SEQuence]	[:LAYer]	SOURce?		see *p. 120*

ARM[:SEQuence][:LAYer]:SOURce

Description	This command selects the source of the arm event for the sweep sequence.
	At *RST, this value is set to IMMediate.
Syntax	ARM[:SEQuence][:LAYer]:SOURce<wsp><source>
Parameter(s)	*source:*
	Valid arm event source. The allowed values are:
	➤ *BUS*: the sweep sequence is started by the *TRG command. Once initiated with the *INITiate[:IMMediate][:ALL]* on page 137, the instrument waits for the *TRG command to start the sequence. This parameter is not available in Local mode (on GUI). So if you start a sweep using the GUI, this parameter is replaced by IMMediate.
	➤ *IMMediate*: no waiting for an event to occur. The sweep sequence starts as soon as the INITiate command is received (see *INITiate[:IMMediate][:ALL]* on page 137).
Example(s)	ARM:SOUR IMM
	ARM:SOUR? returns IMMediate
See Also	*TRG* on page 116
	ARM[:SEQuence][:LAYer]:SOURce? on page 120
	INITiate[:IMMediate][:ALL] on page 137
	TRIGger[:SEQuence]:SOURce on page 191

ARM[:SEQuence][:LAYer]:SOURce?

Description	This query returns the source of the arm event for the sweep sequence.
	At *RST, this value is set to IMMediate.
Syntax	ARM[:SEQuence][:LAYer]:SOURce?
Parameter(s)	None.
Response Syntax	<source>
Response(s)	*source:*
	Selected arm event source:
	➤ *BUS*: the sweep sequence is started by the *TRG command (see *TRG on page 116). Once initiated with the INITiate[:IMMediate][:ALL] on page 137, the instrument waits for the *TRG command to start the sequence.
	➤ *IMMediate*: no waiting for an event to occur. The sequence starts as soon as the INITiate command is received (see INITiate[:IMMediate][:ALL] on page 137).
Example(s)	ARM:SOUR IMM
	ARM:SOUR? returns IMMediate
See Also	*ARM[:SEQuence][:LAYer]:SOURce on page 119*
	INITiate[:IMMediate][:ALL] on page 137
	TRIGger[:SEQuence]:SOURce? on page 192

CALibration Commands and Queries

Quick Reference

Command Overview					Parameter(s)	Section
CALibration	[ALL]					see *p. 122*
	ALL	DATA	DATE?			see *p. 122*
			TEMPerature?			see *p. 123*
			TIME?			see *p. 124*
	CW|FIXed					see *p. 124*
	CW|FIXed	DATA	DATE?			see *p. 125*
			TEMPerature?			see *p. 126*
			TIME?			see *p. 127*
	SWEep					see *p. 127*
	SWEep	DATA	DATE?		\<speed\>	see *p. 128*
			TEMPerature?		\<speed\>	see *p. 129*
			TIME?		\<speed\>	see *p. 130*
		SPEed	LIST		\<speed list\>|ALL	see *p. 131*
			LIST?			see *p. 131*
	QUICk					see *p. 132*
	[QUICk]	DATA	DATE?			see *p. 132*
			TEMPerature?			see *p. 133*
			TIME?			see *p. 134*

Commands and Queries

CALibration[:ALL]

Description	This command performs a full wavelength referencing of the instrument: Sweep reference at all speeds, Tune reference, and Quick reference.
	During the execution of this command, bit #0 (CALibrating) is set in the Operation Status Condition register (see *Operational / Questionable Status Reporting* on page 60).
Syntax	CALibration[:ALL]
Parameter(s)	None.
Example(s)	CAL:ALL
See Also	*STATus:OPERation:CONDition?* on page 185
	CALibration:CW|FIXed on page 124
	CALibration:SWEep on page 127
	CALibration:QUICk on page 132

CALibration:ALL:DATA:DATE?

Description	This query returns the date (in UTC format) of the last successful full reference.
Syntax	CALibration:ALL:DATA:DATE?
Parameter(s)	None.
Response Syntax	<year>,<month>,<day>
Response(s)	*year:*
	Four-digit integer corresponding to the year of the reference.
	month:
	Integer corresponding to the month of the reference, in the range 1 to 12.
	1 corresponds to January, 2 to February and so on.
	day:
	Integer corresponding to the day of the reference.
	It ranges from 1 to the number of days in the month from the previous field.
Example(s)	CAL:ALL:DATA:DATE? returns 2019,8,22
See Also	*CALibration[:ALL]* on page 122
	CALibration:ALL:DATA:TEMPerature? on page 123
	CALibration:ALL:DATA:TIME? on page 124

CALibration:ALL:DATA:TEMPerature?

Description	This query returns the ambient temperature measured inside the instrument during the last successful full reference.
Syntax	CALibration:ALL:DATA:TEMPerature?
Parameter(s)	None.
Response Syntax	<temperature>
Response(s)	*temperature:*
	Floating point number corresponding to the temperature value measured during the reference.
	The unit of the returned value depends on the unit set with *UNIT:TEMPerature* on page 194.
Example(s)	UNIT:TEMP CEL
	CAL:ALL:DATA:TEMP? returns 2.850000E+001
See Also	*CALibration[:ALL]* on page 122
	CALibration:ALL:DATA:DATE? on page 122
	CALibration:ALL:DATA:TIME? on page 124
	MEASure[:SCALar]:TEMPerature[:DC]? on page 139
	UNIT:TEMPerature on page 194

CALibration:ALL:DATA:TIME?

Description	This query returns the time (in UTC format) of the last successful full wavelength referencing operation.
Syntax	:CALibration:ALL:DATA:TIME?
Parameter(s)	None.
Response Syntax	<hour>,<minute>,<second>
Response(s)	*hour:*
	Integer corresponding to the hour of the reference in 24 hour format, in the range 0 to 23.
	minute:
	Integer corresponding to the number of minutes in the range 0 to 59.
	second:
	Integer corresponding to the number of seconds, in the range 0 to 59.
Example(s)	CAL:ALL:DATA:TIME? returns 14,57,9
See Also	*CALibration[:ALL]* on page 122
	CALibration:ALL:DATA:DATE? on page 122
	CALibration:ALL:DATA:TEMPerature? on page 123

CALibration:CW|FIXed

Description	This command performs a Tune reference.
	During the execution of this command, bit #0 (CALibrating) is set in the Operation Status Condition register (see *Operational / Questionable Status Reporting* on page 60).
Syntax	CALibration:CW|FIXed
Parameter(s)	None.
Example(s)	CAL:FIX
See Also	*STATus:OPERation:CONDition?* on page 185

CALibration:CW|FIXed:DATA:DATE?

Description	This query returns the date (in UTC format) of the last successful tune wavelength reference.
Syntax	CALibration:CW|FIXed:DATA:DATE?
Parameter(s)	None.
Response Syntax	<year>,<month>,<day>
Response(s)	*year:* Four-digit integer corresponding to the year of the reference. *month:* Integer corresponding to the month of the reference, in the range 1 to 12. 1 corresponds to January, 2 to February and so on. *day:* Integer corresponding to the day of the reference. It ranges from 1 to the number of days in the month from the previous field.
Example(s)	CAL:FIX:DATA:DATE? returns 2024,1,22
See Also	*CALibration:CW|FIXed* on page 124 *CALibration:CW|FIXed:DATA:TEMPerature?* on page 126 *CALibration:CW|FIXed:DATA:TIME?* on page 127

CALibration:CW|FIXed:DATA:TEMPerature?

Description	This query returns the ambient temperature measured inside the instrument during the last successful tune wavelength reference.
Syntax	CALibration:CW|FIXed:DATA:TEMPerature?
Parameter(s)	None.
Response Syntax	<temperature>
Response(s)	*temperature:*
	Floating point number corresponding to the temperature value measured during the reference.
	The unit of the returned value depends on the unit set with *UNIT:TEMPerature* on page 194.
Example(s)	UNIT:TEMP CEL
	CAL:FIX:DATA:TEMP? returns 2.850000E+001
See Also	*CALibration:CW|FIXed* on page 124
	CALibration:CW|FIXed:DATA:DATE? on page 125
	CALibration:CW|FIXed:DATA:TIME? on page 127
	MEASure[:SCALar]:TEMPerature[:DC]? on page 139
	UNIT:TEMPerature on page 194

CALibration:CW|FIXed:DATA:TIME?

Description	This query returns the time (in UTC format) of the last successful Tune reference.
Syntax	:CALibration:CW|FIXed:DATA:TIME?
Parameter(s)	None.
Response Syntax	\<hour\>,\<minute\>,\<second\>
Response(s)	*hour:*
	Integer corresponding to the hour of the reference in 24 hour format, in the range 0 to 23.
	minute:
	Integer corresponding to the number of minutes in the range 0 to 59.
	second:
	Integer corresponding to the number of seconds, in the range 0 to 59.
Example(s)	CAL:FIX:DATA:TIME? returns 14,57,9
See Also	*CALibration:CW|FIXed* on page 124
	CALibration:CW|FIXed:DATA:DATE? on page 125
	CALibration:CW|FIXed:DATA:TEMPerature? on page 126

CALibration:SWEep

Description	This command performs a Sweep reference on the speed(s) selected using the *CALibration:SWEep:SPEed:LIST* on page 131 command.
	During the execution of this command, bit #0 (CALibrating) is set in the Operation Status Condition register (see *Operational / Questionable Status Reporting* on page 60).
Syntax	CALibration:SWEep
Parameter(s)	None.
Example(s)	CAL:SWE
See Also	*STATus:OPERation:CONDition?* on page 185
	CALibration:SWEep:SPEed:LIST on page 131
	CALibration:SWEep:SPEed:LIST? on page 131

CALibration:SWEep:DATA:DATE?

Description	This query returns the date (in UTC format) of the last successful Sweep reference of the selected speed.
Syntax	CALibration:SWEep:DATA:DATE?<wsp><speed>
Parameter(s)	*speed*:
	Sweep speed in meter per second on which applies the query.
	To know the list of available speeds, use the following query: *[SOURce]:WAVelength:SWEep:SPEed:LIST?* on page 177.
Response Syntax	<year>,<month>,<day>
Response(s)	*year:*
	Four-digit integer corresponding to the year of the reference.
	month:
	Integer corresponding to the month of the reference, in the range 1 to 12. 1 corresponds to January, 2 to February and so on.
	day:
	Integer corresponding to the day of the reference. It ranges from 1 to the number of days in the month from the previous field.
Example(s)	CAL:SWE:DATA:DATE? 1.0e-7 returns 2023,8,22
See Also	*CALibration:SWEep* on page 127
	CALibration:SWEep:DATA:TEMPerature? on page 129
	CALibration:SWEep:DATA:TIME? on page 130

CALibration:SWEep:DATA:TEMPerature?

Description	This query returns the ambient temperature measured inside the instrument during the last successful Sweep reference of the selected speed.
Syntax	CALibration:SWEep:DATA:TEMPerature?<wsp><speed>
Parameter(s)	*speed*:
	Sweep speed in meter per second on which applies the query.
	To know the list of available speeds, use the following query: *[SOURce]:WAVelength:SWEep:SPEed:LIST?* on page 177.
Response Syntax	<temperature>
Response(s)	*temperature:*
	Floating point number corresponding to the temperature value measured during the reference.
	The unit of the returned value depends on the unit set with *UNIT:TEMPerature* on page 194.
Example(s)	UNIT:TEMP CEL
	CAL:SWE:DATA:TEMP? 1.0e-7 returns 2.850000E+001
See Also	*CALibration:SWEep* on page 127
	CALibration:SWEep:DATA:DATE? on page 128
	CALibration:SWEep:DATA:TIME? on page 130
	MEASure[:SCALar]:TEMPerature[:DC]? on page 139
	UNIT:TEMPerature on page 194

CALibration:SWEep:DATA:TIME?

Description	This query returns the time (in UTC format) of the last successful Sweep reference of the selected speed.
Syntax	:CALibration:SWEep:DATA:TIME?<wsp><speed>
Parameter(s)	*speed*:
	Sweep speed in meter per second on which applies the query.
	To know the list of available speeds, use the following query: *[SOURce]:WAVelength:SWEep:SPEed:LIST?* on page 177.
Response Syntax	<hour>,<minute>,<second>
Response(s)	*hour:*
	Integer corresponding to the hour of the reference in 24 hour format, in the range 0 to 23.
	minute:
	Integer corresponding to the number of minutes in the range 0 to 59.
	second:
	Integer corresponding to the number of seconds, in the range 0 to 59.
Example(s)	CAL:SWE:DATA:TIME? 1.0e-7 returns 14,57,9
See Also	*CALibration:SWEep* on page 127
	CALibration:SWEep:DATA:DATE? on page 128
	CALibration:SWEep:DATA:TEMPerature? on page 129

CALibration:SWEep:SPEed:LIST

Description	This command selects the sweep speed(s) on which you want to perform a Sweep reference.
Syntax	CALibration:SWEep:SPEed:LIST<wsp><speed(s)>|ALL
Parameter(s)	➤ *speed(s)*:
	Value or list of values separated by commas corresponding to the sweep speed(s) in meter per second that you want to select for sweep referencing, such as: <speed 1>,<speed 2>,<speed 3>
	To know the list of available speeds, use the following query: *[SOURce]:WAVelength:SWEep:SPEed:LIST?* on page 177.
	➤ *ALL*:
	Selects all speeds available on the instrument for sweep referencing.
Example(s)	CAL:SWE:SPE:LIST 5.000000E-08,1.000000E-07
See Also	*CALibration:SWEep* on page 127
	CALibration:SWEep:SPEed:LIST? on page 131
	[SOURce]:WAVelength:SWEep:SPEed:LIST? on page 177

CALibration:SWEep:SPEed:LIST?

Description	This query returns the sweep speed(s) selected for sweep reference.
Syntax	CALibration:SWEep:SPEed:LIST?
Parameter(s)	None.
Response Syntax	<speed(s)>
Response(s)	*speed(s):*
	Value or list of values separated by commas corresponding to the sweep speed(s) in meter per second that are selected for sweep referencing.
Example(s)	CAL:SWE:SPE:LIST? returns 5.000000E-08,1.000000E-07
See Also	*CALibration:SWEep* on page 127
	CALibration:SWEep:SPEed:LIST on page 131

CALibration:QUICk

Description	This command performs a quick reference.
	During the execution of this command, bit #0 (CALibrating) is set in the Operation Status Condition register (see *Operational / Questionable Status Reporting* on page 60).
Syntax	CALibration:QUICk
Parameter(s)	None.
Example(s)	CAL:QUIC
See Also	*STATus:OPERation:CONDition?* on page 185

CALibration[:QUICk]:DATA:DATE?

Description	This query returns the date (in UTC format) of the last successful quick reference.
Syntax	CALibration[:QUICk]:DATA:DATE?
Parameter(s)	None.
Response Syntax	<year>,<month>,<day>
Response(s)	*year:*
	Four-digit integer corresponding to the year of the reference.
	month:
	Integer corresponding to the month of the reference, in the range 1 to 12. 1 corresponds to January, 2 to February and so on.
	day:
	Integer corresponding to the day of the reference. It ranges from 1 to the number of days in the month from the previous field.
Example(s)	CAL:DATA:DATE? returns 2019,8,22
See Also	*CALibration:QUICk* on page 132
	CALibration[:QUICk]:DATA:TEMPerature? on page 133
	CALibration[:QUICk]:DATA:TIME? on page 134

CALibration[:QUICk]:DATA:TEMPerature?

Description	This query returns the ambient temperature measured inside the instrument during the last successful quick reference.
Syntax	CALibration[:QUICk]:DATA:TEMPerature?
Parameter(s)	None.
Response Syntax	<temperature>
Response(s)	*temperature:*
	Floating point number corresponding to the temperature value measured during the reference.
	The unit of the returned value depends on the unit set with *UNIT:TEMPerature* on page 194.
Example(s)	UNIT:TEMP CEL
	CAL:DATA:TEMP? returns 2.850000E+001
See Also	*CALibration:QUICk* on page 132
	CALibration[:QUICk]:DATA:DATE? on page 132
	CALibration[:QUICk]:DATA:TIME? on page 134
	MEASure[:SCALar]:TEMPerature[:DC]? on page 139
	UNIT:TEMPerature on page 194

CALibration[:QUICk]:DATA:TIME?

Description	This query returns the time (in UTC format) of the last successful quick wavelength referencing operation.
Syntax	:CALibration[:QUICk]:DATA:TIME?
Parameter(s)	None.
Response Syntax	<hour>,<minute>,<second>
Response(s)	*hour:*
	Integer corresponding to the hour of the reference in 24 hour format, in the range 0 to 23.
	minute:
	Integer corresponding to the number of minutes in the range 0 to 59.
	second:
	Integer corresponding to the number of seconds, in the range 0 to 59.
Example(s)	CAL:DATA:TIME? returns 14,57,9
See Also	*CALibration:QUICk* on page 132
	CALibration[:QUICk]:DATA:DATE? on page 132
	CALibration[:QUICk]:DATA:TEMPerature? on page 133

CALibration:WARMup:ABORt (deprecated)

Description	This command is deprecated.
	This command stops the warmup of the instrument.
	This command is an event and has no associated *RST condition or query form.
Applicability	This command is only valid if bit #11 (WarmingUp) of the Operation Status Condition register is set (see *Operational / Questionable Status Reporting* on page 60).
Syntax	CALibration:WARMup:ABORt
Parameter(s)	None
Example(s)	CAL:WARM:ABOR
See Also	*STATus:OPERation:CONDition?* on page 185

FORMat Commands and Queries

Quick Reference

Command Overview			Parameter(s)	Section
FORMat	[DATA]		<type>[,<length>]	see *p. 135*
	[DATA]?			see *p. 136*

Commands and Queries

FORMat[:DATA]

Description	This command selects the format and length of data readings.
	At *RST, ASCii is selected as the default data format and the length is set to 0.
Syntax	FORMat[:DATA]<wsp><type>[,<nb digits>]
Parameter(s)	➤ *type*:
	Format of data readings. Possibles values are:
	➤ ASCii: numeric data is formatted as ASCII bytes such as: <value1>,<value2>,...
	➤ PACKed: data is formatted as a series of 8-bit binary data bytes such as: #<length><nb of bytes><blocks>
	where:
	<length>: number of subsequent bytes that you have to check to know the total length.
	<nb of bytes>: size of <blocks> in bytes.
	<blocks>: double data bytes (packet of 8 bytes, big endian).
	➤ *nb digits*:
	If the ASCii format is selected, this parameters specifies the number of significant digits (after the point) to be returned. A <nb digits> value of zero indicates that the device selects the number of significant digits to be returned.
	If the PACKed format is selected, the optional parameter <nb digits> is not used.
Example(s)	FORM:DATA ASC,6
See Also	*FORMat[:DATA]?* on page 136

FORMat[:DATA]?

Description	This query returns the format and length of data readings.
Syntax	FORMat[:DATA]?
Parameter(s)	None.
Response Syntax	<type>[,<nb digits>]
Response(s)	➤ *type*:

Format of data readings.

➤ ASCii: numeric data is formatted as ASCII bytes such as: <value1>,<value2>,...

➤ PACKed: data is formatted as a series of 8-bit binary data bytes such as: #<length><nb of bytes><blocks>

where:

<length>: number of subsequent bytes that you have to check to know the total length.

<nb of bytes>: size of <blocks> in bytes.

<blocks>: float data bytes (packet of 8 bytes, big endian).

➤ *nb digits*:

If the data is returned in ASCii format, the <nb digits> is the number of significant digits (after the point) to be returned. A <nb digits> value of zero indicates that the device selects the number of significant digits to be returned.

If data is returned in PACKed format, the <nb digits> is not used and always returns 0.

Example(s)	FORM:DATA PACK
	FORM:DATA? returns PACKed, 0
See Also	*FORMat[:DATA]* on page 135

INITiate Commands and Queries

Quick reference

Command Overview			Parameter(s)	Section
INITiate	[IMMediate]	[ALL]		see *p. 137*

Commands and Queries

INITiate[:IMMediate][:ALL]

Description	This command completes one full trigger system cycle and returns to IDLE on completion.
	This command initiates a sweep sequence.
	This command is an event and has no associated *RST condition or query form.
Syntax	INITiate[:IMMediate][:ALL]
Parameter(s)	None.
Example(s)	INIT:IMM:ALL
See Also	*ABORt* on page 118
	[SOURce]:SWEep:CYCLe:CONTinuous on page 160
	STATus:OPERation:CONDition? on page 185

MEASure Commands and Queries

Quick reference

Command Overview				Parameter(s)	Section
MEASure	[SCALar]	POWer	[DC]?		see *p. 138*
		TEMPerature	[DC]?		see *p. 139*

Commands and Queries

MEASure[:SCALar]:POWer[:DC]?

Description	This query returns the power read at the source output.
	This query has no associated *RST condition.
Syntax	MEASure[:SCALar]:POWer[:DC]?
Parameter(s)	None.
Response Syntax	<power>
Response(s)	*power:*
	Floating point number corresponding to the power measured at the laser output.
	The unit of the returned value depends on the unit set with *UNIT:POWer* on page 193.
Example(s)	UNIT:POW DBM
	MEAS:SCAL:POW:DC?returns 5.246000E+000
See Also	*OUTPut[:STATe]?* on page 141
	UNIT:POWer on page 193

MEASure[:SCALar]:TEMPerature[:DC]?

Description	This query returns the actual temperature (for reference monitoring).
	This query has no associated *RST condition.
Syntax	MEASure[:SCALar]:TEMPerature[:DC]?
Parameter(s)	None.
Response Syntax	<temperature>
Response(s)	*temperature:*
	Floating point number corresponding to the temperature measured in the instrument.
	The unit of the returned value depends on the unit set with *UNIT:TEMPerature* on page 194.
Example(s)	UNIT:TEMP CEL
	MEAS:SCAL:TEMP:DC? returns 2.40000E+001
See Also	*CALibration[:ALL]* on page 122
	CALibration[:QUICk]:DATA:TEMPerature? on page 133
	UNIT:TEMPerature on page 194

OUTPut Commands and Queries

Quick reference

Command Overview			Parameter(s)	Section
OUTPut	[STATe]		<state>	see *p. 140*
	[STATe]?			see *p. 141*
	MONitor<n>	[STATe]	<state>	see *p. 141*
		[STATe]?		see *p. 142*
	SYNChronization	[STATe]	<state>	see *p. 143*
		[STATe]?		see *p. 144*

Commands and Queries

OUTPut[:STATe]

Description	This command enables/disables the laser output.
	At *RST, this value is set to ON.
	During the execution of this command, bit #1 (SETTling) is set in the Operation Status Condition register (see *Operational / Questionable Status Reporting* on page 60).
Syntax	OUTPut[:STATe]<wsp><state>
Parameter(s)	*state*:
	State of the laser output. The allowed values are:
	➤ OFF|0: disables the laser output, which means that the source emission is disabled.
	➤ ON|1 (default): enables the laser output.
Example(s)	OUTP:STAT OFF
See Also	*OUTPut[:STATe]?* on page 141
	STATus:OPERation:CONDition? on page 185
	STATus:QUEStionable:CONDition? on page 186

OUTPut[:STATe]?

Description	This query returns the state of the laser output.
	At *RST, this value is set to OFF.
Syntax	OUTPut[:STATe]?
Parameter(s)	None.
Response Syntax	<state>
Response(s)	*state:*
	State of the laser output:
	➤ 0: the laser output is disabled, which means that the source emission is disabled.
	➤ 1 (default): the laser output is enabled.
Example(s)	OUTP ON
	OUTP? returns 1 (open)
See Also	*OUTPut[:STATe]* on page 140

OUTPut:MONitor1|2[:STATe]

Description	This command controls the activation of the output signal generation on the specified monitoring BNC connector located on the rear panel:
	➤ MONitor1 is the **λ out** BNC connector (for spectrum monitoring).
	➤ MONitor2 is the **Power out** BNC connector (for power monitoring).
	During the execution of this command, bit #1 (SETTling) is set in the Operation Status Condition register (see *Operational / Questionable Status Reporting* on page 60).
	At *RST, this value is set to OFF.
Syntax	OUTPut:MONitor1|2[:STATe]<wsp><state>
Parameter(s)	*state*:
	State of the specified monitoring output. The allowed values are:
	➤ OFF|0 (default): the output is closed, which means that no signal is output from the BNC port.
	➤ ON|1: the output is open.
Example(s)	OUTP:MON:STAT OFF
	OUTP:MON:STAT? returns 0 (closed)
See Also	*OUTPut:MONitor1|2[:STATe]?* on page 142
	OUTPut:SYNChronization[:STATe] on page 143

OUTPut:MONitor1|2[:STATe]?

Description	This query indicates if the output signal generation is active for the specified monitoring BNC connector located on the rear panel:

➤ MONitor1 is the **λ out** BNC connector (for spectrum monitoring).

➤ MONitor2 is the **Power out** BNC connector (for power monitoring).

At *RST, this value is set to OFF.

Syntax	OUTPut:MONitor1|2[:STATe]?
Parameter(s)	None.
Response Syntax	<state>
Response(s)	*state:*

State of the specified monitoring output:

➤ 0 (default): the output is closed, which means that no signal is output from the BNC port.

➤ 1: the output is open.

Example(s)	OUTP:MON2:STAT ON
	OUTP:MON2:STAT? returns 1 (open)
See Also	*OUTPut:MONitor1|2[:STATe]* on page 141
	OUTPut:SYNChronization[:STATe]? on page 144

OUTPut:SYNChronization[:STATe]

Description	This command controls the activation of the output signal generation on the **Trig out** BNC connector located on the rear panel, for tuning or sweeping operations. At *RST, this value is set to OFF.
Syntax	OUTPut:SYNChronization[:STATe]<wsp><state>
Parameter(s)	*state*: State of the output trigger. The allowed values are: ➤ OFF|0 (default): disables the output for tuning and sweeping operations, which means that no signal is output from the BNC port. ➤ ON|1: enables the output when the instrument performs tuning and/or sweeping operations. To know what type of trigger is activated, use the following queries: *[SOURce]:CW|FIXed:SYNChronization[:STATe]?* on page 147 and *[SOURce]:SWEep:SYNChronization[:STATe]?* on page 168.
Example(s)	OUTP:SYNC:STAT OFF (closed)
See Also	*[SOURce]:CW|FIXed:SYNChronization[:STATe]* on page 147 *[SOURce]:SWEep:SYNChronization[:STATe]* on page 168 *[SOURce]:SWEep:SYNChronization:TYPE* on page 169 *OUTPut:SYNChronization[:STATe]?* on page 144

	OUTPut:SYNChronization[:STATe]?
Description	This query indicates if the output signal generation is active for the **Trig out** BNC connector located on the rear panel, for tuning or sweeping operations.
	At *RST, this value is set to OFF.
Syntax	OUTPut:SYNChronization[:STATe]?
Parameter(s)	None.
Response Syntax	<state>
Response(s)	*state:*
	State of the output trigger:
	➤ 0 (default): the output is disabled for tuning and sweeping operations, which means that no signal is output from the BNC port.
	➤ 1: the output is enabled when the instrument performs tuning and/or sweeping operations. To know what type of trigger is activated, use the following queries: *[SOURce]:CW|FIXed:SYNChronization[:STATe]?* on page 147 and *[SOURce]:SWEep:SYNChronization[:STATe]?* on page 168.
Example(s)	OUTP:SYNC ON
	OUTP:SYNC? returns 1 (open)
See Also	*[SOURce]:CW|FIXed:SYNChronization[:STATe]?* on page 147
	[SOURce]:SWEep:SYNChronization[:STATe]? on page 168
	OUTPut:SYNChronization[:STATe] on page 143

SOURce Commands and Queries

Quick reference

Command Overview				Parameter(s)	Section
[SOURce]	CW|FIXed	SYNChronization	[:STATe]	<state>	see *p. 147*
			[:STATe]?		see *p. 147*
	FREQuency	[CW|FIXed]		<frequency>[<unit>]|MAXimum|MINimum|DEFault|UP|DOWN	see *p. 148*
		[CW|FIXed]?		[MAXimum|MINimum|DEFault]	see *p. 149*
		STEP	[WIDTh]	<step>[<unit>]|MAXimum|MINimum|DEFault	see *p. 150*
			[WIDTh]?	[MAXimum|MINimum|DEFault]	see *p. 151*
	SWEep	STARt		<start>[<unit>]|MAXimum|MINimum|DEFault	see *p. 152*
		STARt?		[MAXimum|MINimum|DEFault]	see *p. 153*
		STOP		<stop>[<unit>]|MAXimum|MINimum|DEFault	see *p. 154*
		STOP?		[MAXimum|MINimum|DEFault]	see *p. 155*
	OPTimization	BCOMpensation	[STATe]	<state>	see *p. 156*
			[STATe]?		see *p. 156*
		OLINewidth	[STATe]	<state>	see *p. 157*
			[STATe]?		see *p. 157*
	POWer	[LEVel]	[IMMediate]	[AMPLitude] <power>[<unit>]|MAXimum|MINimum|DEFault	see *p. 158*
				[AMPLitude]? [MAXimum|MINimum|DEFault]	see *p. 159*
	SWEep	CYCLe	CONTinuous	<state>	see *p. 160*
			CONTinuous?		see *p. 160*
			COUNt	<count>	see *p. 161*
			COUNt?	[MAXimum|MINimum|DEFault]	see *p. 161*
			TYPE	<type>	see *p. 162*
			TYPE?		see *p. 163*
		HOLDoff		<pause>[<unit>]|MAXimum|MINimum|DEFault	see *p. 164*
		HOLDoff?		[MAXimum|MINimum|DEFault]	see *p. 165*
		REST		<position>	see *p. 166*
		REST?			see *p. 167*
		SYNChronization	[:STATe]	<state>	see *p. 168*
			[:STATe]?		see *p. 168*
			TYPE	<type>	see *p. 169*
			TYPE?		see *p. 170*

Command Overview				Parameter(s)	Section
WAVelength	[CW|FIXed]			<wavelength>[<unit>]|MAXimum|MINimum|DEFault|UP|DOWN	see *p. 171*
	[CW|FIXed]?			[MAXimum|MINimum|DEFault]	see *p. 172*
		STEP	[WIDTh]	<step>[<unit>]|MAXimum|MINimum|DEFault	see *p. 173*
			[WIDTh]?	[MAXimum|MINimum|DEFault]	see *p. 174*
	SWEep	SPEed		<speed>|MAXimum|MINimum|DEFault	see *p. 175*
		SPEed?		[MAXimum|MINimum|DEFault]	see *p. 176*
		SPEed	LIST?		see *p. 177*
		STARt		<start>[<unit>]|MAXimum|MINimum|DEFault	see *p. 178*
		STARt?		[MAXimum|MINimum|DEFault]	see *p. 179*
		STOP		<stop>[<unit>]|MAXimum|MINimum|DEFault	see *p. 180*
		STOP?		[MAXimum|MINimum|DEFault]	see *p. 181*
		SYNChronization	DATA?		see *p. 182*
			SAMPling	<sampling>[<unit>]|MAXimum|MINimum|DEFault	see *p. 183*
			SAMPling?	[MAXimum|MINimum|DEFault]	see *p. 184*

Commands and Queries

[SOURce]:CW|FIXed:SYNChronization[:STATe]

Description	This command enables/disables the output signal generation on the **Trig out** BNC connector (located on the rear panel), for tuning operations.
	At *RST, this value is set to OFF.
Syntax	[SOURce]:CW|FIXed:SYNChronization[:STATe]<wsp><state>
Parameter(s)	*state*:
	State of the output trigger during tuning. The allowed values are:
	➤ OFF|0 (default): disables the output signal for tuning operations.
	➤ ON|1: enables the output signal when the instrument performs tuning operations; the signal is generated when the laser has stabilized on the selected position.
Example(s)	SOUR:FIX:SYNC:STAT ON
	SOUR:FIX:SYNC:STAT? returns 1
See Also	*[SOURce]:CW|FIXed:SYNChronization[:STATe]?* on page 147
	OUTPut:SYNChronization[:STATe] on page 143
	[SOURce]:SWEep:SYNChronization[:STATe] on page 168

[SOURce]:CW|FIXed:SYNChronization[:STATe]?

Description	This query indicates if the output signal generation is active for tuning operations on the **Trig out** BNC connector.
	At *RST, this value is set to 0.
Syntax	[SOURce]:CW|FIXed:SYNChronization[:STATe]?
Parameter(s)	None.
Response Syntax	<state>
Response(s)	*state:*
	Activation state of the output trigger:
	➤ 0: the output signal is disabled for tuning operations.
	➤ 1: the output signal is enabled for tuning operations. The signal is generated when the laser has stabilized on the selected position.
Example(s)	SOUR:FIX:SYNC:STAT ON
	SOUR:FIX:SYNC:STAT? returns 1
See Also	*[SOURce]:CW|FIXed:SYNChronization[:STATe]* on page 147
	OUTPut:SYNChronization[:STATe] on page 143
	[SOURce]:SWEep:SYNChronization[:STATe]? on page 168

[SOURce]:FREQuency[:CW|FIXed]

Description	This command tunes the emission frequency of a non-swept signal to an absolute or relative frequency position.
	During the tuning of the emission frequency, bit #1 (SETTling) is set in the Operation Status Condition register (see *Operational / Questionable Status Reporting* on page 60).
	At *RST, this value is set to DEFault.
Syntax	[SOURce]:FREQuency:[CW|FIXed]<wsp><frequency>[<unit>]| MAXimum|MINimum|DEFault|UP|DOWN
Parameter(s)	➤ *frequency*:
	Value corresponding to the absolute emission frequency in Hertz (if no unit is specified).
	To know the valid frequency range, use the query *[SOURce]:FREQuency[:CW|FIXed]?* on page 149 (MIN and MAX parameters).
	➤ *unit*:
	Unit of the emission frequency: HZ preceded by a possible multiplier. Possible multipliers are listed in *Unit Multipliers* on page 64.
	➤ *MAXimum:*
	Sets the emission frequency to the maximum possible frequency value, depending on the laser model.
	➤ *MINimum:*
	Sets the emission frequency to the minimum possible frequency value, depending on the laser model.
	➤ *DEFault:*
	Sets the emission frequency to the default frequency value, depending on the laser model. To know the default frequency, use the query *[SOURce]:FREQuency[:CW|FIXed]?* on page 149 (DEF parameter).
	➤ *UP:*
	This parameter enables you to perform relative frequency tuning (less accurate position): it sets the emission frequency one step up from the actual frequency value. You can specify the step size with the command *[SOURce]:FREQuency[:CW|FIXed]:STEP[:WIDTh]* on page 150.
	➤ *DOWN:*
	This parameter enables you to perform relative frequency tuning (less accurate position): it sets the emission frequency one step down from the actual frequency value. You can specify the step size with the command *[SOURce]:FREQuency[:CW|FIXed]:STEP[:WIDTh]* on page 150.
Example(s)	SOUR:FREQ:CW 197.5 THZ
	SOUR:FREQ:CW? returns 1.975000E+014
See Also	*[SOURce]:FREQuency[:CW|FIXed]?* on page 149
	[SOURce]:FREQuency[:CW|FIXed]:STEP[:WIDTh] on page 150
	[SOURce]:OPTimization:OLINewidth[:STATe] on page 157
	[SOURce]:WAVelength[:CW|FIXed] on page 171

[SOURce]:FREQuency[:CW|FIXed]?

Description	This query returns a value indicating either the current absolute frequency or the minimum/maximum/default absolute frequency of a non-swept signal.
	At *RST, this value is set to DEFault.
Syntax	[SOURce]:FREQuency[:CW|FIXed]?<wsp> [MAXimum|MINimum|DEFault]
Parameter(s)	➤ *MAXimum*
	The query returns the maximum possible frequency value for the laser model.
	➤ *MINimum*
	The query returns the minimum possible frequency value for the laser model.
	➤ *DEFault*
	The query returns the default frequency value for the laser model.
Response Syntax	<frequency>
Response(s)	*frequency:*
	Floating point number in Hz corresponding to the current frequency or the minimum/maximum/default frequency, depending on the specified query parameters.
Example(s)	SOUR:FREQ:FIX 197.5 THZ
	SOUR:FREQ:FIX? returns 1.975000E+014
See Also	*[SOURce]:FREQuency[:CW|FIXed]* on page 148
	[SOURce]:FREQuency[:CW|FIXed]:STEP[:WIDTh]? on page 151
	[SOURce]:OPTimization:OLINewidth[:STATe]? on page 157
	[SOURce]:WAVelength[:CW|FIXed]? on page 172

[SOURce]:FREQuency[:CW|FIXed]:STEP[:WIDTh]

Description	This command specifies the size of steps used to perform relative frequency of a non-swept signal.
	You can perform relative frequency tuning through the command *[SOURce]:FREQuency[:CW|FIXed]* on page 148 with the UP/DOWN keywords.
	At *RST, this value is set to DEFault.
Syntax	[SOURce]:FREQuency[:CW|FIXed]:STEP[:WIDTh]<wsp> <step>[<unit>]|MAXimum|MINimum|DEFault
Parameter(s)	➤ *step*:
	Value corresponding to the step in Hertz (if no unit is specified).
	To know the valid frequency range, use the query *[SOURce]:FREQuency[:CW|FIXed]:STEP[:WIDTh]?* on page 151 (MIN and MAX parameters).
	➤ *unit*:
	Unit of the frequency step: HZ preceded by a possible multiplier. Possible multipliers are listed in *Unit Multipliers* on page 64.
	➤ *MAXimum:*
	Sets the frequency step to the maximum possible step value.
	➤ *MINimum:*
	Sets the frequency step to the minimum possible step value.
	➤ *DEFault:*
	Sets the frequency step to the default step value. To know the default step, use the query *[SOURce]:FREQuency[:CW|FIXed]:STEP[:WIDTh]?* on page 151 (DEF parameter).
Example(s)	SOUR:FREQ:CW 197.5 THZ
	SOUR:FREQ:CW? returns 1.975000E+014
	SOUR:FREQ:CW:STEP 0.5 THZ
	SOUR:FREQ:CW UP
	SOUR:FREQ:CW? returns 1.980000E+014
See Also	*[SOURce]:FREQuency[:CW|FIXed]* on page 148
	[SOURce]:FREQuency[:CW|FIXed]:STEP[:WIDTh]? on page 151
	[SOURce]:WAVelength[:CW|FIXed]:STEP[:WIDTh] on page 173

[SOURce]:FREQuency[:CW|FIXed]:STEP[:WIDTh]?

Description	This query returns a value indicating either the current frequency step size or the minimum/maximum/default frequency step size for relative tuning of a non-swept signal.
	At *RST, this value is set to DEFault.
Syntax	[SOURce]:FREQuency[:CW|FIXed]:STEP[:WIDTh]?<wsp> [MAXimum|MINimum|DEFault]
Parameter(s)	➤ *MAXimum*
	The query returns the maximum possible step value.
	➤ *MINimum*
	The query returns the minimum possible step value.
	➤ *DEFault*
	The query returns the default step value.
Response Syntax	<step>
Response(s)	*step:*
	Floating point number in Hz corresponding to the current frequency step or the minimum/maximum/default frequency step, depending on the specified query parameters.
Example(s)	SOUR:FREQ:CW:STEP 0.1 THZ
	SOUR:FREQ:CW:STEP? returns 1.000000E+011
See Also	*[SOURce]:FREQuency[:CW|FIXed]?* on page 149
	[SOURce]:FREQuency[:CW|FIXed]:STEP[:WIDTh] on page 150
	[SOURce]:WAVelength[:CW|FIXed]:STEP[:WIDTh]? on page 174

[SOURce]:FREQuency:SWEep:STARt

Description	This command sets the start frequency of a swept signal.
	At *RST, this value will be set to DEFault.
Syntax	[SOURce]:FREQuency:SWEep:STARt<wsp><start>[<unit>]| MAXimum|MINimum|DEFault
Parameter(s)	➤ *start*:
	Value corresponding to the start frequency in Hz (if no unit is specified). To know the valid frequency range, you can use the query *[SOURce]:FREQuency:SWEep:STARt?* on page 153 (MIN and MAX parameters). On T200S-O and T500S-O models, the maximum value is 221.2491 THz if the selected speed is lower than 20 nm/s.
	➤ *unit*:
	Unit of the start frequency: HZ preceded by a possible multiplier. Possible multipliers are listed in *Unit Multipliers* on page 64.
	➤ *MAXimum*
	Sets the start frequency to the maximum possible value.
	➤ *MINimum*
	Sets the start frequency to the minimum possible value.
	➤ *DEFault*
	Sets the start frequency to the default value. To know the valid frequency range, you can use the query *[SOURce]:FREQuency:SWEep:STARt?* on page 153 (DEF parameter)
Example(s)	SOUR:FREQ:SWE:STAR 197.5 THZ
	SOUR:FREQ:SWE:STAR? returns 1.975000E+014
See Also	*[SOURce]:FREQuency[:CW|FIXed]* on page 148
	[SOURce]:FREQuency:SWEep:STARt? on page 153
	[SOURce]:FREQuency:SWEep:STOP on page 154
	[SOURce]:WAVelength:SWEep:STARt on page 178

[SOURce]:FREQuency:SWEep:STARt?

Description	This query indicates either the current or the minimum/maximum/default start frequency of a swept signal.
	At *RST, this value is set to DEFault.
Syntax	[SOURce]:FREQuency:SWEep:STARt?<wsp> [MAXimum|MINimum|DEFault]
Parameter(s)	➤ *MAXimum*
	The query returns the maximum possible start frequency for the laser model.
	➤ *MINimum*
	The query returns the minimum possible start frequency for the laser model.
	➤ *DEFault*
	The query returns the default start frequency for the laser model.
Response Syntax	<start>
Response(s)	*start:*
	Floating point number in Hz corresponding to the current start frequency or the minimum/maximum/default start frequency, depending on the specified query parameters.
Example(s)	SOUR:FREQ:SWE:STAR 197.5 THZ
	SOUR:FREQ:SWE:STAR? returns 1.975000E+014
See Also	*[SOURce]:FREQuency[:CW|FIXed]?* on page 149
	[SOURce]:FREQuency:SWEep:STARt on page 152
	[SOURce]:FREQuency:SWEep:STOP? on page 155
	[SOURce]:WAVelength:SWEep:STARt? on page 179

	[SOURce]:FREQuency:SWEep:STOP
Description	This command sets the stop frequency of a swept signal.
	At *RST, this value will be set to DEFault.
Syntax	[SOURce]:FREQuency:SWEep:STOP<wsp><stop>[<unit>]| MAXimum|MINimum|DEFault
Parameter(s)	➤ *stop*:
	Value corresponding to the stop frequency in Hz (if no unit is specified). To know the valid frequency range, you can use the query *[SOURce]:FREQuency:SWEep:STOP?* on page 155 MIN and MAX parameters). On T200S-O and T500S-O models, the maximum value is 221.2491 THz if the selected speed is lower than 20 nm/s.
	➤ *unit*:
	Unit of the stop frequency: HZ preceded by a possible multiplier. Possible multipliers are listed in *Unit Multipliers* on page 64.
	➤ *MAXimum*
	Sets the stop frequency to the maximum possible value.
	➤ *MINimum*
	Sets the stop frequency to the minimum possible value.
	➤ *DEFault*
	Sets the stop frequency to the default value. To know the default value, you can use the query *[SOURce]:FREQuency:SWEep:STOP?* on page 155 (DEF parameter).
Example(s)	SOUR:FREQ:SWE:STOP 197.5 THZ
	SOUR:FREQ:SWE:STOP? returns 1.975000E+014
See Also	*[SOURce]:FREQuency[:CW|FIXed]* on page 148
	[SOURce]:FREQuency:SWEep:STARt on page 152
	[SOURce]:FREQuency:SWEep:STOP? on page 155
	[SOURce]:WAVelength:SWEep:STOP on page 180

[SOURce]:FREQuency:SWEep:STOP?

Description	This query indicates either the current or the minimum/maximum/default stop frequency of a swept signal.
	At *RST, this value is set to DEFault.
Syntax	[SOURce]:FREQuency:SWEep:STOP?<wsp> [MAXimum|MINimum|DEFault]
Parameter(s)	➤ *MAXimum*
	The query returns the maximum possible stop frequency for the laser model.
	➤ *MINimum*
	The query returns the minimum possible stop frequency for the laser model.
	➤ *DEFault*
	The query returns the default stop frequency for the laser model.
Response Syntax	<stop>
Response(s)	*stop:*
	Floating point number in Hz corresponding to the current stop frequency or the minimum/maximum/default stop frequency, depending on the specified query parameters.
Example(s)	SOUR:FREQ:SWE:STOP 197.5 THZ
	SOUR:FREQ:SWE:STOP? returns 1.975000E+014
See Also	*[SOURce]:FREQuency[:CW|FIXed]* on page 148
	[SOURce]:FREQuency:SWEep:STARt? on page 153
	[SOURce]:FREQuency:SWEep:STOP on page 154
	[SOURce]:WAVelength:SWEep:STOP? on page 181

[SOURce]:OPTimization:BCOMpensation[:STATe]

Description	This command enables/disables the backlash compensation optimization during a sweep.
	At *RST, this value is set to ON.
Syntax	[SOURce]:OPTimization:BCOMpensation[:STATe]<wsp><state>
Parameter(s)	*state*:
	State of the backlash compensation optimization. The allowed values are:
	➤ OFF|0: disables the backlash compensation.
	➤ ON|1: enables the backlash compensation.
Example(s)	SOUR:OPT:BCOM:STAT ON
	SOUR:OPT:BCOM:STAT? returns 1 (compensation enabled)
See Also	*[SOURce]:OPTimization:BCOMpensation[:STATe]?* on page 156
	[SOURce]:OPTimization:OLINewidth[:STATe] on page 157

[SOURce]:OPTimization:BCOMpensation[:STATe]?

Description	This query returns the state of the backlash compensation optimization of the sweep.
	At *RST, this value is set to ON.
Syntax	[SOURce]:OPTimization:BCOMpensation[:STATe]?
Parameter(s)	None.
Response Syntax	<state>
Response(s)	*state:*
	Activation state of the backlash compensation:
	➤ 0: backlash compensation is disabled.
	➤ 1: backlash compensation is enabled.
Example(s)	SOUR:OPT:BCOM:STAT ON
	SOUR:OPT:BCOM:STAT? returns 1 (compensation enabled)
See Also	*[SOURce]:OPTimization:BCOMpensation[:STATe]* on page 156
	[SOURce]:OPTimization:OLINewidth[:STATe]? on page 157

[SOURce]:OPTimization:OLINewidth[:STATe]

Description	This command enables/disables the optimized linewidth optimization while tuning the laser.
	At *RST, this value is set to OFF.
Syntax	[SOURce]:OPTimization:OLINewidth[:STATe]<wsp><state>
Parameter(s)	*state*:
	State of the optimized linewidth optimization. The allowed values are:
	➤ OFF|0: disables optimized linewidth.
	➤ ON|1: enables optimized linewidth.
Example(s)	SOUR:OPT:OLIN:STAT ON
	SOUR:OPT:OLIN:STAT? returns 1 (optimized linewidth active)
See Also	*[SOURce]:FREQuency[:CW|FIXed]* on page 148
	[SOURce]:OPTimization:BCOMpensation[:STATe] on page 156
	[SOURce]:OPTimization:OLINewidth[:STATe]? on page 157
	[SOURce]:WAVelength[:CW|FIXed] on page 171

[SOURce]:OPTimization:OLINewidth[:STATe]?

Description	This query returns the state of the optimized linewidth optimization.
	At *RST, this value is set to OFF.
Syntax	[SOURce]:OPTimization:OLINewidth[:STATe]?
Parameter(s)	None.
Response Syntax	<state>
Response(s)	*state:*
	Activation state of the optimized linewidth optimization:
	➤ 0: optimized linewidth is disabled.
	➤ 1: optimized linewidth is enabled.
Example(s)	SOUR:OPT:OLIN:STAT ON
	SOUR:OPT:OLIN:STAT? returns 1 (optimized linewidth active)
See Also	*[SOURce]:OPTimization:BCOMpensation[:STATe]?* on page 156
	[SOURce]:OPTimization:OLINewidth[:STATe] on page 157

[SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude]

Description	This command sets the setpoint for the output power.
	At *RST, this value will be set to MINimum.
Syntax	[SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude]<wsp> <power>[<unit>]|MAXimum|MINimum|DEFault
Parameter(s)	➤ *power*:
	Value corresponding to the power in dBm or W depending on the unit setting (*UNIT:POWer* on page 193) if no unit is specified. To know the valid power range, use the query *[SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude]?* on page 159 (MIN and MAX parameters).
	➤ *unit*:
	Unit of the power value. Possible units are DBM (dBm) or W (W).
	➤ *MAXimum*
	Sets the power to the maximum possible value.
	➤ *MINimum*
	Sets the power to the minimum possible value.
	➤ *DEFault*
	Sets the power to the default value. To know the default power value, use the query *[SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude]?* on page 159 (DEF parameter).
Example(s)	SOUR:POW:LEV:IMM:AMPL 11.00 DBM
	SOUR:POW:LEV:IMM:AMPL? returns 11.000000E+000
See Also	*[SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude]?* on page 159
	MEASure[:SCALar]:POWer[:DC]? on page 138

[SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude]?

Description	This query indicates either the power set or the minimum/maximum/default setpoint for the output power.
	At *RST, this value is set to MINimum.
Syntax	[SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude]?\<wsp\> [MAXimum|MINimum|DEFault]
Parameter(s)	➤ *MAXimum*
	The query returns the maximum possible power value for the laser model.
	➤ *MINimum*
	The query returns the minimum possible power value for the laser model.
	➤ *DEFault*
	The query returns the default power value for the laser model.
Response Syntax	\<power\>
Response(s)	*power:*
	Floating point number corresponding to the current power value or the minimum/maximum/default power value, depending on the specified query parameters.
	The value is in dBm or W depending on the unit setting (*UNIT:POWer* on page 193).
Example(s)	UNIT:POW DBM
	SOUR:POW? returns 11.000000E+000
See Also	*[SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude]* on page 158
	MEASure[:SCALar]:POWer[:DC]? on page 138

[SOURce]:SWEep:CYCLe:CONTinuous

Description	This command enables/disables the continuous sweep mode.
	At *RST, this value is set to OFF.
Syntax	[SOURce]:SWEep:CYCLe:CONTinuous<wsp><state>
Parameter(s)	*state*:
	State of the sweep. The allowed values are:
	➤ OFF|0: disables continuous sweep cycle mode. The sweep cycles are not continuously repeated.
	➤ ON|1: enables continuous sweep cycle mode. The sweep cycles are continuously repeated.
Example(s)	SOUR:SWE:CYCL:CONT ON
	SOUR:SWE:CYCL:CONT? returns 1 (continuous cycle enabled)
See Also	*[SOURce]:SWEep:CYCLe:CONTinuous?* on page 160
	[SOURce]:SWEep:CYCLe:COUNt on page 161
	[SOURce]:SWEep:CYCLe:TYPE on page 162

[SOURce]:SWEep:CYCLe:CONTinuous?

Description	This query returns the state of the continuous sweep mode.
	At *RST, this value is set to 1.
Syntax	[SOURce]:SWEep:CYCLe:CONTinuous?
Parameter(s)	None.
Response Syntax	<state>
Response(s)	*state:*
	Activation state of the continuous sweep mode:
	➤ 0: the continuous sweep mode is disabled.
	➤ 1: the continuous sweep mode is enabled.
Example(s)	SOUR:SWE:CYCL:CONT ON
	SOUR:SWE:CYCL:CONT? returns 1 (continuous cycle enabled)
See Also	*[SOURce]:SWEep:CYCLe:CONTinuous* on page 160
	[SOURce]:SWEep:CYCLe:COUNt? on page 161
	[SOURce]:SWEep:CYCLe:TYPE? on page 163

[SOURce]:SWEep:CYCLe:COUNt

Description	This command sets the number of sweep cycles you want the instrument to perform, and disables the continuous sweep mode (sets *[SOURce]:SWEep:CYCLe:CONTinuous* on page 160 to OFF).
	At *RST, this value is set to 1.
Applicability	This command applies if the continuous repeat is disabled (*[SOURce]:SWEep:CYCLe:CONTinuous* on page 160 set to OFF).
Syntax	[SOURce]:SWEep:CYCLe:COUNt<wsp><count>
Parameter(s)	➤ *count*:
	Number of sweep cycles you want the instrument to perform, in the range 1 to 10000.
Example(s)	SOUR:SWE:CYCL:CONT OFF
	SOUR:SWE:CYCL:COUN 4
	SOUR:SWE:CYCL:COUN? returns 4
See Also	*[SOURce]:SWEep:CYCLe:CONTinuous* on page 160
	[SOURce]:SWEep:CYCLe:COUNt? on page 161
	[SOURce]:SWEep:CYCLe:TYPE on page 162

[SOURce]:SWEep:CYCLe:COUNt?

Description	This query indicates the number of sweep cycles set.
	At *RST, this value is set to 1.
Syntax	[SOURce]:SWEep:CYCLe:COUNt?
Parameter(s)	None.
Response Syntax	<count>
Response(s)	*count:*
	Integer corresponding to the current number of sweep cycles.
Example(s)	SOUR:SWE:CYCL:COUN 4
	SOUR:SWE:CYCL:COUN? returns 4
See Also	*[SOURce]:SWEep:CYCLe:CONTinuous?* on page 160
	[SOURce]:SWEep:CYCLe:COUNt on page 161
	[SOURce]:SWEep:CYCLe:TYPE? on page 163

[SOURce]:SWEep:CYCLe:TYPE

Description	This command sets the type of sweep cycle you want to perform.
	At *RST, this value is set to OWAY.
Syntax	[SOURce]:SWEep:CYCLe:TYPE<wsp><type>
Parameter(s)	*type*:
	Type of sweep cycle you want the instrument to perform. The allowed values are:
	➤ OWAY: one-way (uni-directional) sweeping. Sweeps are performed from the start to the stop value, based on the configuration of the following commands: FREQuency:SWEep:STARt and STOP or WAVelength:SWEep:STARt and STOP.
	➤ RTRip (only available on T500S): round-trip (bi-directional) sweeping. Sweeps are performed in both directions starting at *[SOURce]:FREQuency:SWEep:STARt* on page 152 or *[SOURce]:WAVelength:SWEep:STARt* on page 178 and returning.
Example(s)	SOUR:SWE:CYCL:TYPE OWAY
	SOUR:SWE:CYCL:TYPE? returns OWAY
See also	*[SOURce]:SWEep:CYCLe:CONTinuous* on page 160
	[SOURce]:SWEep:CYCLe:COUNt on page 161
	[SOURce]:SWEep:CYCLe:TYPE? on page 163

[SOURce]:SWEep:CYCLe:TYPE?

Description	This query indicates the type of sweep cycle to perform.
	At *RST, this value is set to OWAY.
Syntax	[SOURce]:SWEep:CYCLe:TYPE?
Parameter(s)	None.
Response Syntax	<type>
Response(s)	*type:*
	Type of sweep cycle set:
	➤ OWAY: one-way (uni-directional) sweeping. Sweeps are performed from the start to the stop value, based on the configuration of the following commands: FREQuency:SWEep:STARt and STOP or WAVelength:SWEep:STARt and STOP.
	➤ RTRip (only available on T500S): round-trip (bi-directional) sweeping. Sweeps are performed in both directions starting at *[SOURce]:FREQuency:SWEep:STARt* on page 152 or *[SOURce]:WAVelength:SWEep:STARt* on page 178 and returning.
Example(s)	SOUR:SWE:CYCL:TYPE OWAY
	SOUR:SWE:CYCL:TYPE? returns OWAY
See also	*[SOURce]:SWEep:CYCLe:CONTinuous?* on page 160
	[SOURce]:SWEep:CYCLe:COUNt? on page 161
	[SOURce]:SWEep:CYCLe:TYPE on page 162

[SOURce]:SWEep:HOLDoff

Description	This command sets the time duration of the pause to perform after sweep completion.
	If round-trip (bidirectional) sweep is active (see *[SOURce]:SWEep:CYCLe:TYPE* on page 162), the pause is performed after completion of each sweep of the cycle.
	At *RST, this value is set to 0.0 second.
Syntax	[SOURce]:SWEep:HOLDoff\<wsp\>\<pause\>[\<unit\>]| MAXimum|MINimum|DEFault
Parameter(s)	➤ *pause*:
	Numeric value corresponding to the pause in second. To know the valid time range, use the query *[SOURce]:SWEep:HOLDoff?* on page 165 (MIN and MAX parameters).
	➤ *unit*
	Unit of the pause value: S preceded by a possible multiplier. Possible multipliers are listed in *Unit Multipliers* on page 64.
	➤ *MAXimum*
	Sets the pause to the maximum possible value.
	➤ *MINimum*
	Sets the pause to the minimum possible value.
	➤ *DEFault*
	Sets the pause to the default value. To know the default time, use the query *[SOURce]:SWEep:HOLDoff?* on page 165 (DEF parameter).
Example(s)	SOUR:SWE:HOLD 200 MS
	SOUR:SWE:HOLD? returns 2.000000E-001
See Also	*[SOURce]:SWEep:HOLDoff?* on page 165

[SOURce]:SWEep:HOLDoff?

Description	This query returns a value indicating either the current pause duration after sweep completion, or the minimum/maximum/default possible pause duration.
	At *RST, this value is set to 0.0 second.
Syntax	[SOURce]:SWEep:HOLDoff?<wsp> [MAXimum|MINimum|DEFault]
Parameter(s)	➤ *MAXimum*
	The query returns the maximum possible pause duration in second.
	➤ *MINimum*
	The query returns the minimum possible pause duration in second.
	➤ *DEFault*
	The query returns the default pause duration in second.
Response Syntax	<pause>
Response(s)	*pause:*
	Floating point number corresponding to the current pause duration in seconds or the minimum/maximum/default pause duration, depending on the specified query parameters.
Example(s)	SOUR:SWE:HOLD 200 MS
	SOUR:SWE:HOLD? returns 2.000000E-001
See Also	*[SOURce]:SWEep:HOLDoff* on page 164

[SOURce]:SWEep:REST

Description	This command sets the spectrum position when the source return to idle after completion of a sweep sequence.
	At *RST, this value is set to START.
Applicability	This command does not apply if round-trip (bidirectional) sweep is active (see If round-trip (bidirectional) sweep is active (see *[SOURce]:SWEep:CYCLe:TYPE* on page 162).
Syntax	[SOURce]:SWEep:REST<wsp><position>
Parameter(s)	*position*:
	Position of the laser after sweep sequence completion. The allowed values are:
	➤ STARt: on sweep sequence completion, the source goes back to the sweep start position as specified by the commands *[SOURce]:FREQuency:SWEep:STARt* on page 152 and *[SOURce]:WAVelength:SWEep:STARt* on page 178.
	➤ STOP: on sweep sequence completion, the source stays at the sweep stop position. If the sweep sequence is completed normally then the position is specified by the commands *[SOURce]:FREQuency:SWEep:STOP* on page 154 and *[SOURce]:WAVelength:SWEep:STOP* on page 180. If the sequence is canceled then the position will be anywhere within the sweep range.
Example(s)	SOUR:SWE:REST STOP
	SOUR:SWE:REST? returns STOP
See Also	*[SOURce]:FREQuency:SWEep:STARt* on page 152
	[SOURce]:FREQuency:SWEep:STOP on page 154
	[SOURce]:SWEep:REST? on page 167
	[SOURce]:WAVelength:SWEep:STARt on page 178
	[SOURce]:WAVelength:SWEep:STOP on page 180

[SOURce]:SWEep:REST?

Description	This query indicates the spectrum position when the source return to idle after completion of a sweep sequence.
	At *RST, this value is set to START.
Syntax	[SOURce]:SWEep:REST?
Parameter(s)	None.
Response Syntax	<position>
Response(s)	*position:*
	Position of the laser after sweep sequence completion:
	➤ STARt: on sweep sequence completion, the source goes back to the sweep start position as specified by the commands *[SOURce]:FREQuency:SWEep:STARt* on page 152 and *[SOURce]:WAVelength:SWEep:STARt* on page 178.
	➤ STOP: on sweep sequence completion, the source stays at the sweep stop position. If the sweep sequence is completed normally then the position is specified by the commands *[SOURce]:FREQuency:SWEep:STOP* on page 154 and *[SOURce]:WAVelength:SWEep:STOP* on page 180. If the sequence is canceled then the position will be anywhere within the sweep range.
Example(s)	SOUR:SWE:REST STOP
	SOUR:SWE:REST? returns STOP
See Also	*[SOURce]:FREQuency:SWEep:STARt* on page 152
	[SOURce]:FREQuency:SWEep:STOP on page 154
	[SOURce]:SWEep:REST on page 166
	[SOURce]:WAVelength:SWEep:STARt on page 178
	[SOURce]:WAVelength:SWEep:STOP on page 180

[SOURce]:SWEep:SYNChronization[:STATe]

Description	This command enables/disables the output signal generation on the **Trig out** BNC connector (located on the rear panel), for sweeping operations.
	At *RST, this value is set to OFF.
Syntax	[SOURce]:SWEep:SYNChronization[:STATe]<wsp><state>
Parameter(s)	*state*:
	State of the output trigger during sweep. The allowed values are:
	➤ OFF|0 (default): disables the output signal for sweeping operations, which means that no signal is output from the BNC port when the laser is sweeping.
	➤ ON|1: enables the output signal when the instrument performs sweeping operations. To set the type of signal you want to output, use the command *[SOURce]:SWEep:SYNChronization:TYPE* on page 169.
Example(s)	SOUR:SWE:SYNC:STAT ON
	SOUR:SWE:SYNC:STAT? returns 1
See Also	*[SOURce]:SWEep:SYNChronization:TYPE* on page 169
	OUTPut:SYNChronization[:STATe] on page 143

[SOURce]:SWEep:SYNChronization[:STATe]?

Description	This query indicates if the output signal generation is active for sweeping operations on the **Trig out** BNC connector.
	At *RST, this value is set to 0.
Syntax	[SOURce]:SWEep:SYNChronization[:STATe]?
Parameter(s)	None.
Response Syntax	<state>
Response(s)	*state:*
	Activation state of the trigger output:
	➤ 0: the output signal is disabled for sweeping operations.
	➤ 1: the output signal is enabled for sweeping operations, according to the type set with *[SOURce]:SWEep:SYNChronization:TYPE* on page 169.
Example(s)	SOUR:SWE:SYNC:STAT ON
	SOUR:SWE:SYNC:STAT? returns 1
See Also	*[SOURce]:SWEep:SYNChronization:TYPE?* on page 170
	OUTPut:SYNChronization[:STATe] on page 143

[SOURce]:SWEep:SYNChronization:TYPE

Description	This command sets the type of trigger signal you want to output when the laser is sweeping.
	At *RST, this value is set to WINDow.
Syntax	[SOURce]:SWEep:SYNChronization:TYPE<wsp> <type>
Parameter(s)	*type*:
	Type of output trigger signal. The allowed values are:
	➤ WINDow: the T200S/T500S outputs a window trigger during sweep.
	➤ PULSe: the T200S/T500S outputs pulse triggers during sweep according to the selected sampling. To set the pulse trigger sampling, use the command *[SOURce]:WAVelength:SWEep:SYNChronization:SAMPling* on page 183.
	The T200S/T500S outputs triggers at constant sweep speed, so you cannot sweep the full wavelength/frequency range as a small range is needed at both ends for acceleration/deceleration. This range depends on the selected speed: At 0.5 nm/s: 2 pm is required at both ends. At 1 nm/s: 5 pm is required at both ends. At 2 nm/s and 5 nm/s: 20 pm is required at both ends. At 10 nm/s: 50 pm is required at both ends. At 20 nm/s: 130 pm is required at both ends. At 50 nm/s: 1 nm is required at both ends. At 100 nm/s: 2 nm is required at both ends. At 200 nm/s: 5 nm is required at both ends.
Example(s)	SOUR:SWE:SYNC:TYPE WIND
	SOUR:SWE:SYNC:TYPE? returns WIND
See also	*[SOURce]:SWEep:SYNChronization[:STATe]* on page 168
	[SOURce]:WAVelength:SWEep:SYNChronization:SAMPling on page 183

[SOURce]:SWEep:SYNChronization:TYPE?	
Description	This query indicates the type of trigger signal output when the laser is sweeping.
	At *RST, this value is set to WINDow.
Syntax	[SOURce]:SWEep:SYNChronization:TYPE?
Parameter(s)	None.
Response Syntax	<type>
Response(s)	*type:*
	Type of output trigger signal:
	➤ WINDow: the T200S/T500S outputs a window trigger during sweep.
	➤ PULSe: the T200S/T500S outputs pulse triggers during sweep.
Example(s)	SOUR:SWE:SYNC:TYPE WIND
	SOUR:SWE:SYNC:TYPE? returns WIND
See also	*[SOURce]:SWEep:SYNChronization[:STATe]?* on page 168
	[SOURce]:WAVelength:SWEep:SYNChronization:SAMPling? on page 184

[SOURce]:WAVelength[:CW|FIXed]

Description	This command tunes the emission wavelength of a non-swept signal to an absolute or relative wavelength position.
	During the tuning of the emission wavelength, bit #1 (SETTling) is set in the Operation Status Condition register (see *Operational / Questionable Status Reporting* on page 60).
	At *RST, this value is set to DEFault.
Syntax	[SOURce]:WAVelength:[CW|FIXed]<wsp><wavelength>[<unit>]|MAXimum|MINimum|DEFault|UP|DOWN
Parameter(s)	➤ *wavelength*:
	Value corresponding to the absolute emission wavelength in meters (if no unit is specified).
	To know the valid wavelength range, use the query *[SOURce]:WAVelength[:CW|FIXed]?* on page 172 (MIN and MAX parameters.
	➤ *unit*:
	Unit of the emission wavelength: M preceded by a possible multiplier. Possible multipliers are listed in *Unit Multipliers* on page 64.
	➤ *MAXimum*
	Sets the emission wavelength to the maximum possible wavelength value, depending on the laser model.
	➤ *MINimum*
	Sets the emission wavelength to the minimum possible wavelength value, depending on the laser model.
	➤ *DEFault*
	Sets the emission wavelength to the default wavelength value, depending on the laser model.
	To know the default wavelength, use the query *[SOURce]:WAVelength[:CW|FIXed]?* on page 172 (DEF parameter).
	➤ *UP*
	This parameter enables you to perform relative wavelength tuning (less accurate position): it sets the emission wavelength one step up from the actual wavelength value.
	You can specify the step size with the command *[SOURce]:WAVelength[:CW|FIXed]:STEP[:WIDTh]* on page 173.
	➤ *DOWN*
	This parameter enables you to perform relative wavelength tuning (less accurate position): it sets the emission wavelength one step down from the actual wavelength value.
	You can specify the step size with the command *[SOURce]:WAVelength[:CW|FIXed]:STEP[:WIDTh]* on page 173.
Example(s)	SOUR:WAV:CW 1570 NM
	SOUR:WAV:CW? returns 1.570000E-006
See Also	*[SOURce]:FREQuency[:CW|FIXed]* on page 148
	[SOURce]:OPTimization:OLINewidth[:STATe] on page 157
	[SOURce]:WAVelength[:CW|FIXed]? on page 172
	[SOURce]:WAVelength[:CW|FIXed]:STEP[:WIDTh] on page 173

[SOURce]:WAVelength[:CW|FIXed]?

Description	This query returns a value indicating either the current absolute wavelength or the minimum/maximum/default absolute wavelength of a non-swept signal.
	At *RST, this value is set to DEFault.
Syntax	[SOURce]:WAVelength[:CW|FIXed]?<wsp> [MAXimum|MINimum|DEFault]
Parameter(s)	➤ *MAXimum*
	The query returns the maximum possible wavelength value for the laser model.
	➤ *MINimum*
	The query returns the minimum possible wavelength value for the laser model.
	➤ *DEFault*
	The query returns the default wavelength value for the laser model.
Response Syntax	<wavelength>
Response(s)	*wavelength:*
	Value in meter corresponding to the current wavelength or the minimum/maximum/default wavelength, depending on the specified query parameters.
Example(s)	SOUR:WAV:FIX 1570 NM
	SOUR:WAV:FIX? returns 1.570000E-006
See Also	*[SOURce]:FREQuency[:CW|FIXed]?* on page 149
	[SOURce]:OPTimization:OLINewidth[:STATe]? on page 157
	[SOURce]:WAVelength[:CW|FIXed] on page 171
	[SOURce]:WAVelength[:CW|FIXed]:STEP[:WIDTh]? on page 174

[SOURce]:WAVelength[:CW|FIXed]:STEP[:WIDTh]

Description	This command sets the step size used to select the relative wavelength of a non-swept signal.
	You can perform relative wavelength tuning through the command *[SOURce]:WAVelength[:CW|FIXed]* on page 171 with the UP/DOWN keywords.
	At *RST, this value is set to DEFault.
Syntax	[SOURce]:WAVelength[:CW|FIXed]:STEP[:WIDTh]<wsp> <step>[<unit>]|MAXimum|MINimum|DEFault
Parameter(s)	➤ *step*:
	Value corresponding to the step in meters (if no unit is specified).
	To know the valid wavelength range, use the query *[SOURce]:WAVelength[:CW|FIXed]:STEP[:WIDTh]?* on page 174 (MIN and MAX parameters).
	➤ *unit*:
	Unit of the wavelength step: M preceded by a possible multiplier. Possible multipliers are listed in *Unit Multipliers* on page 64.
	➤ *MAXimum*
	Sets the wavelength step to the maximum possible step value.
	➤ *MINimum*
	Sets the wavelength step to the minimum possible step value.
	➤ *DEFault*
	Sets the wavelength step to the default step value. To know the default step, use the query *[SOURce]:WAVelength[:CW|FIXed]:STEP[:WIDTh]?* on page 174 (DEF parameter).
Example(s)	SOUR:WAV:CW 1570 NM
	SOUR:WAV:CW? returns 1.570000E-006
	SOUR:WAV:CW:STEP 10 NM
	SOUR:WAV:CW DOWN
	SOUR:WAV:CW? returns 1.560000E-006
See Also	*[SOURce]:FREQuency[:CW|FIXed]:STEP[:WIDTh]* on page 150
	[SOURce]:WAVelength[:CW|FIXed] on page 171
	[SOURce]:WAVelength[:CW|FIXed]:STEP[:WIDTh]? on page 174

[SOURce]:WAVelength[:CW|FIXed]:STEP[:WIDTh]?

Description	This query returns a value indicating either the current wavelength step size or the minimum/maximum/default wavelength step size for relative tuning of a non-swept signal.
	At *RST, this value is set to DEFault.
Syntax	[SOURce]:WAVelength[:CW|FIXed]:STEP[:WIDTh]?<wsp> [MAXimum|MINimum|DEFault]
Parameter(s)	➤ *MAXimum*
	The query returns the maximum possible step value.
	➤ *MINimum*
	The query returns the minimum possible step value.
	➤ *DEFault*
	The query returns the default step value.
Response Syntax	<step>
Response(s)	*step:*
	Floating point number in meter corresponding to the current wavelength step or the minimum/maximum/default wavelength step, depending on the specified query parameters.
Example(s)	SOUR:WAV:FIX:STEP 5 NM
	SOUR:WAV:FIX:STEP? returns 5.000000E-009
See Also	*[SOURce]:FREQuency[:CW|FIXed]:STEP[:WIDTh]?* on page 151
	[SOURce]:WAVelength[:CW|FIXed]? on page 172
	[SOURce]:WAVelength[:CW|FIXed]:STEP[:WIDTh] on page 173

[SOURce]:WAVelength:SWEep:SPEed

Description	This command sets the speed for a sweep.
	At *RST, this value is set to MAXimum.
Syntax	[SOURce]:WAVelength:SWEep:SPEed<wsp><speed>| MAXimum|MINimum|DEFault
Parameter(s)	➤ *speed*:
	Numeric value corresponding to the speed in meter per second. To know the valid speed values, use the query *[SOURce]:WAVelength:SWEep:SPEed:LIST?* on page 177.
	➤ *MAXimum*
	Sets the speed to the maximum possible value.
	➤ *MINimum*
	Sets the speed to the minimum possible value.
	➤ *DEFault*
	Sets the speed to the default value. To know the default speed, use the query *[SOURce]:WAVelength:SWEep:SPEed?* on page 176 (DEF parameter).
Example(s)	SOUR:WAV:SWE:SPE 100E-009
	SOUR:WAV:SWE:SPE? returns 1.000000E-007
See Also	*[SOURce]:WAVelength:SWEep:SPEed?* on page 176
	[SOURce]:WAVelength:SWEep:SPEed:LIST? on page 177

[SOURce]:WAVelength:SWEep:SPEed?

Description	This query returns a value indicating either the current sweep speed, or the minimum/maximum/default possible sweep speed.
	At *RST, this value is set to MAXimum.
Syntax	[SOURce]:WAVelength:SWEep:SPEed?<wsp> [MAXimum|MINimum|DEFault]
Parameter(s)	➤ *MAXimum*
	The query returns the maximum possible speed in meter per second.
	➤ *MINimum*
	The query returns the minimum possible speed in meter per second.
	➤ *DEFault*
	The query returns the default speed in meter per second.
Response Syntax	<speed>
Response(s)	*speed:*
	Floating point number corresponding to the sweep speed in meter per second or the minimum/maximum/default speed in meter per second, depending on the specified query parameter.
Example(s)	SOUR:WAV:SWE:SPE 100E-009
	SOUR:WAV:SWE:SPE? returns 1.000000E-007
See Also	*[SOURce]:WAVelength:SWEep:SPEed* on page 175
	[SOURce]:WAVelength:SWEep:SPEed:LIST? on page 177

[SOURce]:WAVelength:SWEep:SPEed:LIST?

Description	This query returns the list of supported speeds for a sweep.
	This command has no associated *RST condition.
Syntax	[SOURce]:WAVelength:SWEep:SPEed:LIST?
Parameter(s)	None.
Response Syntax	<speed>
Response(s)	*speed:*
	Value corresponding to the vector of speed values in meter per second. You can use the FORMat:DATA PACK command to set list data transfer in binary format (see *FORMat[:DATA]* on page 135).
	At *RST, ASCii is selected as the default data format type.
Example(s)	FORMat:DATA ASC
	SOUR:WAV:SWE:SPE:LIST? returns #2512.000000E-08,5.000000E-08,1.000000E-07,2.000000E-07
See Also	*FORMat[:DATA]* on page 135
	[SOURce]:WAVelength:SWEep:SPEed on page 175

[SOURce]:WAVelength:SWEep:STARt

Description	This command sets the start wavelength of a swept signal.
	At *RST, this value will be set to DEFault.
Syntax	[SOURce]:WAVelength:SWEep:STARt<wsp><start>[<unit>]|MAXimum|MINimum|DEFault
Parameter(s)	➤ *start*:
	Value corresponding to the start wavelength in meter (if no unit is specified). To known the valid wavelength range, use the query *[SOURce]:WAVelength:SWEep:STARt?* on page 179 (MIN and MAX parameters). On T200S-O and T500S-O models, the maximum value is 1355 nm if the selected speed is lower than 20 nm/s.
	If you activate the Pulse trigger: The T200S/T500S outputs triggers at constant sweep speed, so you cannot sweep the full wavelength/frequency range as a small range is needed at both ends for acceleration/deceleration. This range depends on the selected speed: see *[SOURce]:SWEep:SYNChronization:TYPE* on page 169 for details.
	➤ *unit*:
	Unit of the start wavelength: M preceded by a possible multiplier. Possible multipliers are listed in *Unit Multipliers* on page 64.
	➤ *MAXimum*
	Sets the start wavelength to the maximum possible value.
	➤ *MINimum*
	Sets the start wavelength to the minimum possible value.
	➤ *DEFault*
	Sets the start wavelength to the default value. To known the default wavelength, use the query *[SOURce]:WAVelength:SWEep:STARt?* on page 179 (DEF parameter).
Example(s)	SOUR:WAV:SWE:STAR 1435 NM
	SOUR:WAV:SWE:STAR? returns 1.435000E-006
See Also	*[SOURce]:FREQuency:SWEep:STARt* on page 152
	[SOURce]:WAVelength[:CW|FIXed] on page 171
	[SOURce]:WAVelength:SWEep:STARt? on page 179
	[SOURce]:WAVelength:SWEep:STOP on page 180

[SOURce]:WAVelength:SWEep:STARt?

Description	This query indicates either the current or the minimum/maximum/default start wavelength of a swept signal.
	At *RST, this value is set to DEFault.
Syntax	[SOURce]:WAVelength:SWEep:STARt?<wsp> [MAXimum|MINimum|DEFault]
Parameter(s)	➤ *MAXimum*
	The query returns the maximum possible start wavelength for the laser model.
	➤ *MINimum*
	The query returns the minimum possible start wavelength for the laser model.
	➤ *DEFault*
	The query returns the default start wavelength for the laser model.
Response Syntax	<start>
Response(s)	*start:*
	Floating point number in meter corresponding to the current start wavelength or the minimum/maximum/default start wavelength, depending on the specified query parameters.
Example(s)	SOUR:WAV:SWE:STAR 1435 NM
	SOUR:WAV:SWE:STAR? returns 1.435000E-006
See Also	*[SOURce]:FREQuency:SWEep:STARt? on page 153*
	[SOURce]:WAVelength[:CW|FIXed]? on page 172
	[SOURce]:WAVelength:SWEep:STARt on page 178
	[SOURce]:WAVelength:SWEep:STOP? on page 181

[SOURce]:WAVelength:SWEep:STOP

Description	This command sets the stop wavelength of a swept signal.
	At *RST, this value will be set to DEFault.
Syntax	[SOURce]:WAVelength:SWEep:STOP<wsp><stop>[<unit>]| MAXimum|MINimum|DEFault
Parameter(s)	➤ *stop*:
	Value corresponding to the stop wavelength in meters (if no unit is specified). To know the valid wavelength range, use the query *[SOURce]:WAVelength:SWEep:STOP?* on page 181 (MIN and MAX parameters). On T200S-O and T500S-O models, the maximum value is 1355 nm if the selected speed is lower than 20 nm/s.
	If you activate the Pulse trigger: The T200S/T500S outputs triggers at constant sweep speed, so you cannot sweep the full wavelength/frequency range as a small range is needed at both ends for acceleration/deceleration. This range depends on the selected speed: see *[SOURce]:SWEep:SYNChronization:TYPE* on page 169 for details.
	➤ *unit*:
	Unit of the stop wavelength: M preceded by a possible multiplier. Possible multipliers are listed in *Unit Multipliers* on page 64.
	➤ *MAXimum*
	Sets the stop wavelength to the maximum possible value.
	➤ *MINimum*
	Sets the stop wavelength to the minimum possible value.
	➤ *DEFault*
	Sets the stop wavelength to the default value. To know the default wavelength, use the query *[SOURce]:WAVelength:SWEep:STOP?* on page 181 DEF and parameter).
Example(s)	SOUR:WAV:SWE:STOP 1490 NM
	SOUR:WAV:SWE:STOP? returns 1.490000E-006
See Also	*[SOURce]:FREQuency:SWEep:STOP* on page 154
	[SOURce]:WAVelength[:CW|FIXed] on page 171
	[SOURce]:WAVelength:SWEep:STARt on page 178
	[SOURce]:WAVelength:SWEep:STOP? on page 181

[SOURce]:WAVelength:SWEep:STOP?

Description	This query indicates either the current or the minimum/maximum/default stop wavelength of a swept signal.
	At *RST, this value is set to DEFault.
Syntax	[SOURce]:WAVelength:SWEep:STOP?<wsp> [MAXimum|MINimum|DEFault]
Parameter(s)	➤ *MAXimum*
	The query returns the maximum possible stop wavelength for the laser model.
	➤ *MINimum*
	The query returns the minimum possible stop wavelength for the laser model.
	➤ *DEFault*
	The query returns the default stop wavelength for the laser model.
Response Syntax	<stop>
Response(s)	*stop:*
	Floating point number in meter corresponding to the current stop wavelength or the minimum/maximum/default stop wavelength, depending on the specified query parameters.
Example(s)	SOUR:WAV:SWE:STOP 1490 NM
	SOUR:WAV:SWE:STOP? returns 1.490000E-006
See Also	*[SOURce]:FREQuency:SWEep:STOP?* on page 155
	[SOURce]:WAVelength[:CW|FIXed]? on page 172
	[SOURce]:WAVelength:SWEep:STARt? on page 179
	[SOURce]:WAVelength:SWEep:STOP on page 180

[SOURce]:WAVelength:SWEep:SYNChronization:DATA?

Description	This query returns the wavelength array corresponding to pulse triggers that have been generated during the last sweep.
	At *RST, this result is cleared.
Syntax	[SOURce]:WAVelength:SWEep:SYNChronization:DATA?
Parameter(s)	None.
Response Syntax	<wavelength array>
Response(s)	*wavelength array:*
	Wavelength values in meters corresponding to the pulse triggers that have been generated during the last sweep. The accuracy is 1 fm.
	This array may differ slightly from the original sweep parameters.
	To select the format of data returned by this query (and the number of significant digits you want to get), use the command *FORMat[:DATA]* on page 135.
Example(s)	WAV:SWE:STAR 1400 nm
	WAV:SWE:STOP 1401 nm
	WAV:SWE:SYNC:SAMP 100 pm
	SWE:SYNC on
	SWE:SYNC:TYPE pulse
	INIT
	FORM:DATA ASC,11
	SOUR:WAV:SWE:SYNC:DATA? returns 1.40000002900E-06,1.40010007700E-06,1.40020015300E-06,1.40030011700E-06,1.40040013000E-06,1.40050005200E-06,1.40060021300E-06,1.40070010000E-06,1.40080021800E-06,1.40090016400E-06
	In this example, the two last digits of the returned values are non-significants, as the maximum accuracy is 1 fm.
See Also	*FORMat[:DATA]* on page 135
	[SOURce]:SWEep:SYNChronization[:STATe] on page 168
	[SOURce]:SWEep:SYNChronization:TYPE on page 169
	[SOURce]:WAVelength:SWEep:SYNChronization:SAMPling on page 183

[SOURce]:WAVelength:SWEep:SYNChronization:SAMPling

Description	This command sets the sampling of the pulse trigger output signal.
	At *RST, this value is set to MINimum.
Applicability	This command applies if *[SOURce]:SWEep:SYNChronization:TYPE* on page 169 is set to PULSe.
Syntax	[SOURce]:WAVelength:SWEep:SYNChronization:SAMPling\<wsp> \<sampling>[\<unit>]|MAXimum|MINimum|DEFault
Parameter(s)	➤ *sampling*:
	Numeric value corresponding to the sampling in meters (if no unit is specified).
	The accuracy is 0.1 pm.
	To know the valid sampling range, use the query *[SOURce]:WAVelength:SWEep:SYNChronization:SAMPling?* on page 184 (MIN and MAX parameters).
	If you select a sampling lower than 1 pm, the span is limited and depends on the laser model:
	➤ O-band: 60 nm maximum span.
	➤ ES-band: 62.5 nm maximum span.
	➤ SCL/CL-band: 65 nm maximum span.
	➤ CLU-band: 72.5 nm maximum span.
	➤ *unit*:
	Unit of the sampling value: M preceded by a possible multiplier. Possible multipliers are listed in *Unit Multipliers* on page 64.
	➤ *MAXimum*
	Sets the sampling to the maximum possible value.
	➤ *MINimum*
	Sets the sampling to the minimum possible value.
	➤ *DEFault*
	Sets the sampling to the default value.
	To know the default sampling, use the query *[SOURce]:WAVelength:SWEep:SYNChronization:SAMPling?* on page 184 (DEF parameter).
Example(s)	SOUR:WAV:SWE:SYNC:SAMP 5PM
	SOUR:WAV:SWE:SYNC:SAMP? returns 5.000000E-12
See Also	*[SOURce]:SWEep:SYNChronization:TYPE* on page 169
	[SOURce]:WAVelength:SWEep:SYNChronization:SAMPling? on page 184

[SOURce]:WAVelength:SWEep:SYNChronization:SAMPling?

Description	This query returns a value indicating either the current sampling of the pulse trigger output signal, or the minimum/maximum/default possible sampling value.
	At *RST, this value is set to MINimum.
Syntax	[SOURce]:WAVelength:SWEep:SYNChronization:SAMPling?<wsp> [MAXimum|MINimum|DEFault]
Parameter(s)	➤ *MAXimum*
	The query returns the maximum possible sampling in meter.
	➤ *MINimum*
	The query returns the minimum possible sampling in meter.
	➤ *DEFault*
	The query returns the default sampling in meter.
Response Syntax	<sampling>
Response(s)	*sampling:*
	Floating number corresponding to the sampling in meter or the minimum/maximum/default sampling in meter, depending on the specified query parameter.
Example(s)	SOUR:WAV:SWE:SYNC:SAMP 1PM
	SOUR:WAV:SWE:SYNC:SAMP? returns 1.000000E-12
See Also	*[SOURce]:WAVelength:SWEep:SYNChronization:SAMPling* on page 183

STATus Commands and Queries

Quick Reference

Command Overview			Parameter(s)	Section
STATus	OPERation	CONDition?		see *p. 185*
	QUEStionable	CONDition?		see *p. 186*

Commands and Queries

STATus:OPERation:CONDition?

Description	This query returns the content of the condition register associated with the operation status structure. Reading the condition register is nondestructive.
Type	Overlapping, query only.
Syntax	STATus:OPERation:CONDition?
Parameter(s)	None.
Response Syntax	<condition>
Response(s)	*condition:*
	Unique integer in the range 0 to 65535, which represents the current operation condition of the instrument.
	See the content of this register in *Operational Status Condition Register* on page 60.
Example(s)	STAT:OPER:COND?
See Also	*STATus:QUEStionable:CONDition?* on page 186

STATus:QUEStionable:CONDition?

Description	This query returns the content of the condition register associated with the questionable status structure. Reading the condition register is nondestructive.
Type	Overlapping, query only.
Syntax	STATus:QUEStionable:CONDition?
Parameter(s)	None.
Response Syntax	<condition>
Response(s)	*condition:*
	Unique integer in the range 0 to 65535, which represents the current questionable condition of the instrument.
	See the content of this register in *Questionable Status Condition Register* on page 61.
Example(s)	STAT:QUES:COND?
See Also	*STATus:OPERation:CONDition?* on page 185

SYSTem Commands and Queries

Quick Reference

Command Overview			Parameter(s)	Section
SYSTem	DATE		\<year\>,\<month\>,\<day\>	see *p. 187*
	DATE?			see *p. 188*
	ERRor	[:NEXT]?		see *p. 189*
	TIME		\<hour\>,\<minute\>,\<second\>	see *p. 190*
	TIME?			see *p. 190*

Commands and Queries

<div align="right">

SYSTem:DATE
</div>

Description	This command sets the instrument's internal calendar to the current date in UTC format.
	This command has no associated *RST condition.
Syntax	SYSTem:DATE\<wsp\>\<year\>,\<month\>,\<day\>
Parameter(s)	*year:*
	Four-digit number corresponding to the year in the instrument's date.
	month:
	Number corresponding to the month in the instrument's date, in the range 1 to 12.
	1 corresponds to January, 2 to February and so on.
	day:
	Number corresponding to the day in the instrument's date. It ranges from 1 to the number of days in the month from the previous field. This command keeps track of the number of days in each month, accounting for leap years through the range of years that it accepts.
Example(s)	SYST:DATE 2019,8,29
See Also	*SYSTem:DATE?* on page 188
	SYSTem:TIME on page 190

SYSTem:DATE?

Description	This query returns the current date (in UTC format) from the instrument's internal calendar.
	This query has no associated *RST condition.
Syntax	SYSTem:DATE?
Parameter(s)	None.
Response Syntax	<year>,<month>,<day>
Response(s)	*year:*
	Integer corresponding to the year in the instrument's date.
	month:
	Integer corresponding to the month in the instrument's date, in the range 1 to 12.
	1 corresponds to January, 2 to February and so on.
	day:
	Integer corresponding to the day in the instrument's date. It ranges from 1 to the number of days in the month from the previous field. This command keeps track of the number of days in each month, accounting for leap years through the range of years that it accepts.
Example(s)	SYST:DATE? returns 2019,8,22
See Also	*SYSTem:DATE* on page 187
	SYSTem:TIME? on page 190

SYSTem:ERRor[:NEXT]?

Description	This query returns the error/event queue for the next item and removes it from the queue.
	This query has no associated *RST condition.
Type	Overlapping, query only.
Syntax	SYSTem:ERRor[:NEXT]?
Parameter(s)	None.
Response Syntax	<code>,<description[,Info]>
Response(s)	➤ *code:*
	Error code as a unique integer in the range -32768 to 32767.
	All positive numbers are instrument-specific.
	The zero value indicates that no error or event has occurred.
	➤ *description:*
	Quoted string containing a description followed by an optional information text. Each code has a unique and fixed description associated with it. The date and time are appended to the information text separated by a semi-colon using the following format:
	<Date><wsp><Time> where
	<Date> = Year/Month/Day
	<Time> = Hour:Minute:Second (24 hour time)
	The maximum length of <Description[,Info]> is 255 characters.
Example(s)	SYST:ERR:NEXT? returns -222,"Data out of range, instrument T200S, 2019/08/30 10:34:52"
See Also	*SYSTem:DATE?* on page 188
	SYSTem:TIME? on page 190

SYSTem:TIME

Description	This command sets the instrument's internal clock to the current time in UTC format.
	This command has no associated *RST condition.
Syntax	SYSTem:TIME<wsp><hour>,<minute>,<second>
Parameter(s)	*hour:*
	Hour information in 24 hour format, in the range 0 to 23.
	minute:
	Number of minutes in the range 0 to 59.
	second:
	Number of seconds, in the range 0 to 59.
Example(s)	SYST:TIME 9,58,41
See Also	*SYSTem:DATE* on page 187
	SYSTem:TIME? on page 190

SYSTem:TIME?

Description	This query returns the current time (in UTC format) from the instrument's internal clock.
	This query has no associated *RST condition.
Syntax	SYSTem:TIME?
Parameter(s)	None.
Response Syntax	<hour>,<minute>,<second>
Response(s)	*hour:*
	Integer corresponding to the hour information in 24 hour format, in the range 0 to 23.
	minute:
	Integer corresponding to the number of minutes in the range 0 to 59.
	second:
	Integer corresponding to the number of seconds, in the range 0 to 59.
Example(s)	SYST:TIME? returns 9,48,22
See Also	*SYSTem:DATE?* on page 188
	SYSTem:TIME on page 190

TRIGger Commands and Queries

Quick Reference

Command Overview			Parameter(s)	Section
TRIGger	[SEQuence]	SOURce		see *p. 191*
	[SEQuence]	SOURce?		see *p. 192*

Commands and Queries

TRIGger[:SEQuence]:SOURce

Description	This command selects the source of the trigger event for a sweep.
	If you perform round-trip (bidirectional) cycles (see *[SOURce]:SWEep:CYCLe:TYPE* on page 162), two trigger events are required per cycle.
	At *RST, this value is set to IMMediate.
Syntax	TRIGger[:SEQuence]:SOURce<wsp><source>
Parameter(s)	*source:*
	Valid trigger event source. The allowed values are:
	➤ BUS: the source signal comes from the command **TRG* on page 116. This parameter is not available in Local mode (on GUI). So if you start a sweep using the GUI, this parameter is replaced by IMMediate.
	➤ EXTernal: the source signal comes from the external trigger signal jack (via the Trig In port located on the instrument rear panel).
	➤ IMMediate: no waiting for an event to occur to start a sweep.
Example(s)	TRIG:SOUR IMM
	TRIG:SOUR? returns IMMediate
See Also	**TRG* on page 116
	ARM[:SEQuence][:LAYer]:SOURce on page 119
	INITiate[:IMMediate][:ALL] on page 137
	[SOURce]:SWEep:CYCLe:COUNt on page 161
	TRIGger[:SEQuence]:SOURce? on page 192

TRIGger[:SEQuence]:SOURce?

Description	This query returns the selected source of the trigger event detector for a sweep sequence.
	At *RST, this value is set to IMMediate.
Syntax	TRIGger[:SEQuence]:SOURce?
Parameter(s)	None.
Response Syntax	<source>
Response(s)	*source:*
	Selected trigger event source:
	BUS: the source signal is generated by the command *TRG* on page 116.
	EXTernal: the source signal comes from the external signal jack (via the Trig In port located on the instrument rear panel).
	IMMediate: no waiting for an event to occur to start a sweep.
Example(s)	TRIG:SOUR EXT
	TRIG:SOUR? returns EXTernal
See Also	*ARM[:SEQuence][:LAYer]:SOURce?* on page 120
	INITiate[:IMMediate][:ALL] on page 137
	[SOURce]:SWEep:CYCLe:COUNt? on page 161
	TRIGger[:SEQuence]:SOURce on page 191

UNIT Commands and Queries

Quick Reference

Command Overview		Parameter(s)	Section
UNIT	POWer	\<unit\>	see *p. 193*
	POWer?		see *p. 194*
	TEMPerature	\<unit\>	see *p. 194*
	TEMPerature?		see *p. 195*

Commands and Queries

UNIT:POWer

Description	This command selects a default unit for commands that set absolute power.
	At *RST, this value is set to DBM.
Syntax	UNIT:POWer\<wsp\>\<unit\>
Parameter(s)	*unit:*
	Default unit for commands that set absolute power. The allowed values are:
	DBM: sets the power unit to dBm.
	W: sets the power unit to watt.
Example(s)	UNIT:POW W
See Also	*UNIT:POWer?* on page 194
	UNIT:TEMPerature on page 194

UNIT:POWer?

Description	This query returns the selected default unit for commands that set absolute power.
	At *RST, this value is set to DBM.
Syntax	UNIT:POWer?
Parameter(s)	None.
Response Syntax	<unit>
Response(s)	*unit:*
	Default unit for commands that set absolute power:
	DBM: the default power unit is set to dBm.
	W: the default power unit is set to watt.
Example(s)	UNIT:POW DBM
	UNIT:POW? returns DBM
See Also	*UNIT:POWer* on page 193
	UNIT:TEMPerature? on page 195

UNIT:TEMPerature

Description	This command selects a default unit for commands that set temperature.
	At *RST, this value is set to CEL.
Syntax	UNIT:TEMPerature<wsp><unit>
Parameter(s)	*unit:*
	Default temperature for commands that set temperature. The allowed values are:
	C|CEL: selects Celsius as the temperature unit.
	F|FAR: selects Fahrenheit as the temperature unit.
	K: selects Kelvin as the temperature unit.
Example(s)	UNIT:TEMP C
See Also	*UNIT:POWer* on page 193
	UNIT:TEMPerature? on page 195

UNIT:TEMPerature?

Description	This query returns the selected default unit for commands that set temperature.
	At *RST, this value is set to CEL.
Syntax	UNIT:TEMPerature?
Parameter(s)	None.
Response Syntax	<unit>
Response(s)	*unit:*
	Default unit for commands that set temperature:
	C|CEL: the temperature unit is set to Celsius.
	F|FAR: the temperature unit is set to Fahrenheit.
	K: the temperature unit is set to Kelvin.
Example(s)	UNIT:TEMP F
	UNIT:TEMP? returns FAR
See Also	*UNIT:POWer?* on page 194
	UNIT:TEMPerature on page 194

Chinese Regulation on Restriction of Hazardous Substances (RoHS)

中国关于危害物质限制的规定

NAMES AND CONTENTS OF THE TOXIC OR HAZARDOUS SUBSTANCES OR ELEMENTS CONTAINED IN THIS EXFO PRODUCT

包含在本 EXFO 产品中的有毒有害物质或元素的名称及含量

Part Name 部件名称	Lead 铅 (Pb)	Mercury 汞 (Hg)	Cadmium 镉 (Cd)	Hexavalent Chromium 六价铬 (Cr(VI)	Polybrominated biphenyls 多溴联苯 (PBB)	Polybrominated diphenyl ethers 多溴二苯醚 (PBDE)
Enclosure 外壳	O	O	O	O	O	O
Electronic and electrical sub-assembly 电子和电气组件	X	O	X	O	X	X
Optical sub-assembly[a] 光学组件[a]	X	O	O	O	O	O
Mechanical sub-assembly[a] 机械组件[a]	O	O	O	O	O	O

Note:

注:

This table is prepared in accordance with the provisions of SJ/T 11364.

本表依据SJ/T 11364 的规定编制。

O: Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.

O:表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572 标准规定的限量要求以下。

X: indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572. Due to the limitations in current technologies, parts with the "X" mark cannot eliminate hazardous substances.

X:表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 标准规定的限量要求。

标记"X"的部件，皆因全球技术发展水平限制而无法实现有害物质的替代。

a. If applicable.

如果适用。

MARKING REQUIREMENTS

标注要求

Product 产品	Environmental protection uses period (years) 环境保护使用期限（年）	Logo 标志
This EXFO product 本 EXFO 产品	10	🔟
Battery[a] 电池[a]	5	5️⃣

a. If applicable.

如果适用。

EXFO