

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *VIAVI Solutions / JDSU / Wandel and Goltermann OLA-35* at our website: *Click HERE*



Description and Operating Manual

OLA–35 Low–Reflection Optical Attenuator

BN 2209, series A ff

Order No. BN 2209/00.82
Edition 4063/3.91
Subject to change without notice
Our normal guarantee and delivery terms apply
Printed in the Federal Republic of Germany
© Wandel & Goltermann GmbH & Co, Eningen u. A., 1990
1.3.91 hub/zi/kh

Wandel & Goltermann
Electronic Measurement Technology



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Address

International Sales and Service

Head office

Wandel & Goltermann GmbH & Co
Postfach 12 62
D-7412 Eningen u. A.
Federal Republic of Germany
Tel. +49-71 21-86-0
tlx. 7 29 833 wug d
FAX +49-71 21-8 84 04

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Contents

1 Specifications 1–1
- 1.1 Wavelength 1–1
- 1.2 Attenuation 1–1
- 1.3 Error limits 1–2
- 1.4 Test ports 1–3
- 1.5 Display 1–3
- 1.6 General specifications 1–4
- 1.7 Ordering information 1–5

2 General information – preparing for use 2–1
- 2.1 Test ports 2–2
- 2.2 Power supply 2–9
- 2.3 EMI/RFI suppression 2–14

3 Operation 3–3
- 3.1 Overview 3–3
- 3.2 Instrument settings 3–6
- 3.3 Looping the OLA–35 into a test circuit 3–11
- 3.4 Test example 3–18

4 Measurement notes 4–1
- 4.1 Displayed optical attenuation 4–1
- 4.2 Return loss 4–4
- 4.3 Light attenuation at non–calibrated wavelengths 4–8

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Introduction

The OLA–35 is an optical attenuator designed for low back reflection signal attenuation on fiber optics systems carried by single–mode fibers (9/125 µm) operating at 1300 and 1550 nm.

Due to its excellent reflection characteristics, the OLA–35 is particularly suitable for use on back reflection–sensitive laser systems or on new WDM (wavelength division multiplex) equipment.

The attenuator module is a neutral density filter placed in the broadened light beam between the input and output connections. The attenuation value is variable between 2 and 65 dB (1300 nm) or between 2 and 60 dB (1550 nm) and depends on the position of the filter, which is set using the rotary control on the front panel.

The minimal insertion loss of ≤ 2 dB includes the losses of both test ports.

The actual attenuation is displayed with a resolution of 0.1 dB on the LC display. A high linearity is attained for the entire attenuation range by individual calibration of the display to match the attenuation filter characteristic. The OLA–35 is factory calibrated at 1300 and 1550 nm. It is set to the corresponding nominal wavelength using the slide switch.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

The OLA–35 is looped into the test circuit using test adapters, available for all standard connector systems (DIN, FC, ST, etc.).

The test ports are physical contact (PC) types. This, together with the anti–reflex coated components in the attenuator module, guarantees very low reflection operation.

A high return loss of > 35 dB can be obtained with the OLA–35. However, it can only be realized when the connecting cables used also have very low reflection connectors (e.g. DIN, Super FC–PC, Radiall VFO). Series K31XX test cables from W&G use this type of connector and are therefore particularly suitable for back reflection–sensitive applications.

In normal operation the display of the OLA–35 is battery–powered.

If the attenuation can be read directly from a bit error tester or optical power level meter in the test circuit, the display can be switched off, as the OLA–35 still functions as an attenuator in this mode.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

1 Specifications

1.1 Wavelength 1–1
1.2 Attenuation 1–1
1.3 Error limits 1–2
1.4 Test ports 1–3
1.5 Display 1–3
1.6 General specifications 1–4
1.7 Ordering information 1–5

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

1 Specifications

1.1 Wavelength

Useful range . . . . . 1250 to 1600 nm
Calibrated at . . . . . 1300 and 1550 nm

1.2 Attenuation

Nominal range
1300 nm . . . . . 2 to 65 dB
1550 nm . . . . . 2 to 60 dB

Min. residual attenuation . . . . . ≤ 2 dB
Setting . . . . . continuously variable over entire range (10 turns)
Return loss[1)] . . . . . > 35 dB
Max. tolerable input level . . . . . +10 dBm

[1)] Valid for DIN connectors. Typical value when "high return loss" connectors with a return loss of ≥ 39 dB are used, e.g. Super SC–PC, Super FC–PC. Valid for input and output.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

1.3 Error limits

Overall error[1] ..... ± 0.95 dB

Linearity[2] ..... ± (0.2 dB +0.3 % of displayed value)

Attenuation setting repeatability[2] ..... ± 0.1 dB

---

1) Including connector losses over nominal range of use. The total error is increased by typically +0.3 dB when other connectors (FC, ST, SC, HMS–10) are used.

2) Excluding remating.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

1.4 Test ports

Fiber type ..... single–mode fiber 9/125 µm
Internal
connector type .... Ø 2.5 mm (physical contact)

Test adapters

for directly connecting various
2.5 mm connectors ..... DIN, FC–PC,
ST, HMS–10

Adapter cables

Reference cable (9/125 µm);
one end completed with DIN connector,
other end choice from ..... DIN, FC–PC,
HMS–0, –10
Biconic, Radiall, pigtail

Length ..... 2 m

1.5 Display

Type ..... 3 digit LC Display
Display value ..... absolute attenuation
(incl. connector loss)
Resolution ..... 0.1 dB
Over– or underrange ..... LO (< 2 dB)
indication ..... HI (> 65 (60) dB)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

1.6 General specifications

Power supply

Built–in, exchangeable
dry battery . . . . . 9 V, IEC 6LF 22
or NiCd battery . . . . . e.g. Varta TR 7/8
A.C. power . . . . . separate a.c. line adapter/charger

Operating time
with dry battery . . . . . approx. 45 h
with NiCd battery . . . . . approx. 10 h

Auto–off after 15 minutes, or permanent operation. When working with fixed attenuation values the instrument can be left switched off.

EMI/RFI suppression . . . . . to DBP regulation 1046/1984 or CISPR Publ. 11, Cenelec HD 344

Ambient temperature

Nominal range of use . . . . . –10° C to +50° C
Storage and transport . . . . . –40° C to +70° C

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Humidity

< +40° C (relative humidity) . . . . . 5 to 95 %
> +40° C (absolute humidity) . . . . . < 30 g/m^3
Size (w x h x d in mm) . . . . . 98 x 170 x 55
Weight . . . . . approx. 900 g

1.7 Ordering information

OLA–35 Optical Attenuator*) BN 2209/01

To operate the OLA–35, two test adapters are required which correspond to the type of connector system used.

Test adapter "fiber to fiber" connection (at extra cost)

DIN 47256 . . . . . BN 2060/00.30
FC–PC (NTT) . . . . . BN 2060/00.31
ST type AT & T . . . . . BN 2060/00.32
HMS–10/A (SMA connection) . . . BN 2060/00.34
HMS–10 (screw connection
or BNC plug) . . . . . BN 2060/00.35
SC–PC (NTT) . . . . . BN 2060/00.38

*) Without test adapters

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Accessories (charged extra)

Adapter and connector cables (9/125 µm)**),
from DIN 47256 connector to

DIN 47256	K3100
FC type NTT	K3101
Radiall VFO	K3102
Diamond HMS–0 (3.5 mm)	K3104
Biconic	K3105
Diamond HMS–10 (2.5 mm)	K3106
Pigtail	K3199

Shoulder strap ..... BN 820/00.52
NiCd battery ..... BN 820/00.50

LNT–1 AC Line Adapter/Charger .. BN 2068/01
with line cord and 2 charger cables

Please specify type of line cord required:

Line cord with

European plug	K490
US/Japan plug	K491
UK plug	K492
Australian plug	K493

**) The DIN test adapter BN 2060/00.30 is required in order to connect the adapter cables.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MK–1 equipment case . . . . . BN 2090/05
to hold 1 x OLA–35, 1 x LNT–1,
optical cables etc.

MK–4 equipment case . . . . . BN 2092/11
to hold 3 instruments in the
OLS–/OLP–/OLA– range,
2 x LNT–1, cables and test adapters.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2 General information – preparing for use

2.1	Test ports	2–2
2.1.1	Fitting the test adapters	2–2
2.1.2	Cleaning the test ports	2–4
2.2	Power supply	2–9
2.2.1	Dry and rechargeable battery operation	2–9
2.2.2	AC line operation and batery recharging with the LNT–1	2–12
2.3	EMI/RFI suppression	2–14

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2 General information – preparing for use

⚠ Safety instructions

The OLA–35 is a passive optical attenuator. The instrument presents *no danger* from optical radiation. However, when connecting the OLA–35 into a system which is in operation, it should be noted that laser radiation is then accessible. Observe the relevant regulations on protection when using lasers.

⚠ Wear & Tear

The OLA–35 is designed for field use and is able to cope with the wear and tear of everyday use. Due to the way in which the OLA–35 is constructed, the proportion of precision optical components is higher than in other field equipment which makes it more subject to wear and tear. The instrument should therefore be handled with care and protected from misuse.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.1 Test ports

2.1.1 Fitting the test adapters

For normal operation the OLA–35 must be completed with two BN 2060/00.XX test adapters, in order to be able to connect the fiber optics connector or test cable on the system side. The test adapters are usually supplied with the instrument as an unassembled accessory.

After removing both dust caps from the OLA–35, the internal test connections (2.5 mm connector pins) are accessible. Further dust caps to protect these sensitive connector pins should also be pulled off, see Figure 2–1.

The test adapters can now be fitted.

Note:

- When screwing the test adapters in to place, make sure that the internal centering sleeve is correctly positioned. If necessary twist it slightly so that the safety catch clicks.
- After screwing in the test adapters, replace the dust caps which are permanently attached to the housing. This protects the surface of the connector pin from dust. (Loose dust caps are no longer used).
- During assembly take care not to touch the connector pin surfaces so that the fiber end faces are not exposed to dirt or scratched.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Even hand perspiration from finger prints can impair the return loss characteristics of the OLA–35 or increase the attenuation.

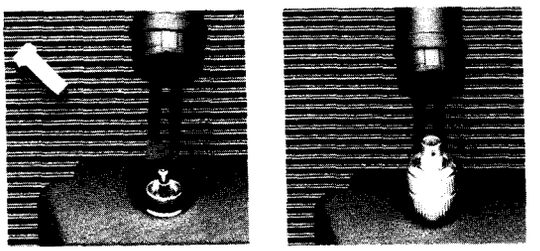


Figure 2–1 OLA–35 port
a) without test adapter
b) with test adapter in place

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.1.2 Cleaning the test ports

The OLA–35 is fitted with physical contact (PC) connectors in a high quality version which guarantee very low reflection operation. Since the fiber ends are in physical contact and the light spot diameter is a mere 9 µm, careful handling of the ports is necessary to ensure reliable operation. The procedures outlined below should be observed.

Make sure that the dust caps are always fitted over the test ports when the instrument is not looped into a test setup, as even small dust particles on the fiber end surfaces can affect the attenuation value or cause damage (see Figure 2–2).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

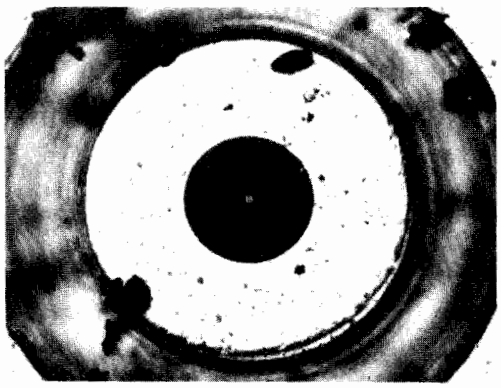


Figure 2–2 Dirty end surface (magnified 200 x)

Important: The test ports should be cleaned before every use of the instrument. Check that the test ports are clean by inspecting them.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

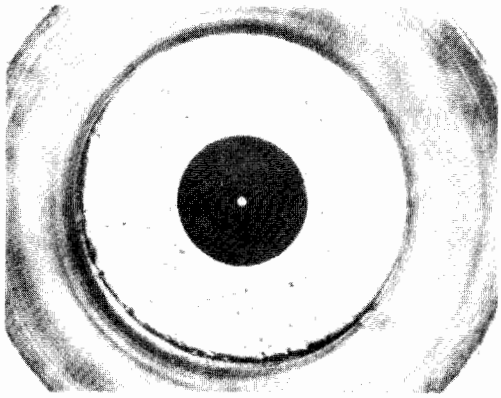


Figure 2–3 Clean end surface (magnified 200 x)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Use the following procedure:

Cleaning:

- Unscrew the test adapters from the test ports. The fiber end surfaces of the plug pins are now easily accessible (see Figure 2–1).
- If the fiber end surfaces are very dirty, lightly press a piece of adhesive tape (e.g. Scotch Magic Tape or similar weak adhesive tape) onto the surfaces of the ports. Remove the tape.
- Moisten a lint–free tissue with isopropyl alcohol and wipe the surfaces of the test ports.
- Wipe again using a dry tissue (cf. Figure 2–1).
- Blow any dust off the test adapters using clean compressed air.
- Replace the test adapters.

As a final check, the fiber end surfaces can be examined under a pocket microscope with a magnification of 200.
For regular inspections and field use we recommend the hand–held microscope:
"BUEHLER FIBRSCOPE 0801–9505"

Buehler Ltd.
41 Waukegan Road
Lake Bluff
Illinois USA 60044

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



Figure 2–4 Cleaning material and ispection microscope

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.2 Power supply

The OLA–35 needs no power supply in order to function as an optical attenuator, as the attenuator module is totally mechanical. However, to display the current attenuation value a LC display is needed. This can be powered by any of the following:

- a 9 V dry battery
- a 9 V rechargeable battery
- an a.c. line adapter/charger unit.

2.2.1 Dry and rechargeable battery operation

One 9 V dry or rechargeable battery is required. The following types are suitable:

- Dry battery: IEC 6LF22 or 6LR61, operating life approximately 45 h; (supplied with the OLA–35 as standard).
- NiCd rechargeable battery: VARTA or SAFT type TR 7/8 or similar, operating life approximately 10 hours. A suitable battery can be ordered as an accessory.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Discharged battery:



Figure 2–5 Discharged battery warning

When the battery voltage drops, the warning "BAT" appears on the left in the display. The OLA–35 switches off automatically after 15 minutes.

To change the battery:

- Turn the instrument upside down.
- Push the slide of the battery cover downwards and remove the cover.
- Pull up the plastic tab and remove the old battery.
- Fit the new battery into the instrument with the contacts to the right, negative pole uppermost. The battery will not fit unless it is correctly positioned. Do not use force.
- Finally replace the cover, and push the slide upwards to lock.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Important: If the dry battery is used to replace a NiCd battery or vice versa, make sure that the switch located inside the battery compartment is correctly positioned (see Figure 2–6). If it is wrongly positioned the dry battery may be destroyed or the NiCd battery will not recharge.

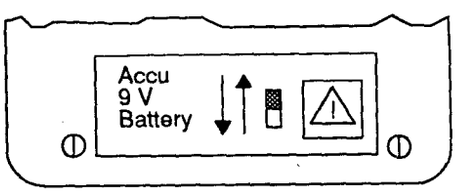


Figure 2–6 Battery type changeover switch

Please dispose of used batteries carefully.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.2.2 AC line operation and batery recharging with the LNT–1

The recommended a.c. line adapter/charger unit, LNT–1 (BN 2068/01 accessory), can also be used to recharge the NiCd battery if one is used. Before connecting up the LNT–1, make sure that the following safety requirements are met.

Important:

Safety class	The LNT–1 is a safety class II instrument as defined in VDE 0411 or IEC publication 348.
AC line voltage	Make sure that the operating voltage of the LNT–1 and the a.c. line voltage correspond.
Temperature	The LNT–1 is designed for indoor use, and can be operated in ambient temperatures between 0 and +50° C.
Ventilation	When in use, set up the LNT–1 so that sufficient ventilation is available.
Condensation	Do not operate the LNT–1 if condensation has formed.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

AC line operation:

- Connect the OLA–35 and the LNT–1 using the charger cable provided: plug the adapter/charger jack into the charging socket on the right–hand side of the OLA–35.
- Plug in the LNT–1 power cord.
- Switch on the OLA–35 using the green ON/OFF button; the attenuation display appears with the indication "PERM".

Charging the NiCd battery:

- Connect the OLA–35 to the LNT–1 as for a.c. line operation.
- Hold down the "ON/OFF" switch on the OLA–35 until the green "CHARGE" LED lights.
- The charging cycle takes 14 hours; at the end of this period charging stops automatically.
- It is also possible to operate the OLA–35 whilst charging is in progress.
- It is also possible to start the charging cycle even if a dry battery is fitted. No charging current will flow if the switch in the battery compartment is correctly set.
- If the a.c. power line fails, charging will not continue. The cycle will need to be restarted.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.3 EMI/RFI suppression

The instrument conforms to the following regulations governing EMI/RFI suppression:

Regulation 1046/1984 of the Federal German Postal Authority (DBP),
VDE regulation 0871, Class B limit value,
CISPR publication 11 (150 kHz to 1 GHz)
CENELEC HD 344 (CLC–CISPR HD4) and
FCC Rules, Part 15, Subpart J, Class A

If this instrument is used in conjunction with other equipment, this must also conform to the above requirements to ensure adequate EMI/RFI suppression. W&G instruments conform to these standards when used as part of a system as long as they are correctly set up and the specified connecting cables are used.

When used correctly with other equipment, these regulations will also be conformed with. Please ensure that only the recommended connecting cables and connectors are used and that adequate screening is provided where necessary.

If a W&G instrument should generate EMI/RFI in spite of the above precautions, we will be happy to offer advice.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3 Operation

3.1	Overview	3–3
3.1.1	Operating keys	3–3
3.1.2	OLA–35 operating instructions	3–5
3.2	Instrument settings	3–6
3.2.1	Switching on	3–6
3.2.2	Setting the wavelength	3–8
3.2.3	Setting the attenuation	3–8
3.3	Looping the OLA–35 into a test circuit	3–11
3.3.1	General information	3–11
3.3.2	Connection via test adapters	3–13
3.3.3	Connection via W&G K31XX adapter cables	3–15
3.4	Test example	3–18

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

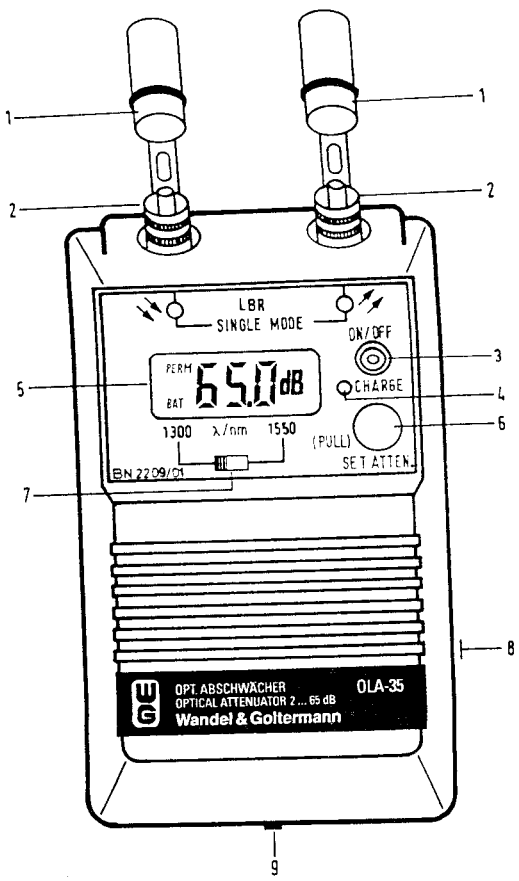


Figure 3–1 Front view of the OLA–35

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

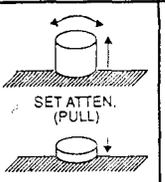
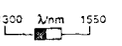
3 Operation

3.1 Overview

3.1.1 Operating keys

No	Symbol	Explanation
1		Dust caps
2		Test ports, with test screwed into place (BN 2060/00.XX)
3	ON/OFF 	ON/OFF switch – press button briefly – Auto–off circuit on – press button longer (approx. 2 seconds) – permanent operation mode – press button longer (approx. 4 seconds) – recharging battery
4	CHARGE ●	LED "CHARGE" lights when the battery is being charged (see ON/OFF switch)
5		Shows attenuation value with the warning that the battery is almost discharged ("BAT") and the OLA–35 is in permanent operation ("PERM")

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

No	Symbol	Explanation
6		Rotary control to set the attenuation value – Pull knob up to select the attenuation value – Pusch knob in to lock This rotary control does not have an end–stop. When the setting limits of the attenuation value are reached, the display shows: LO; lower limit (< 2 dB) HI; upper limit (> 65 (60) dB)
7		Wavelength changeover switch
8		Socket for a.c. line *adapter/charger* on the side of the instrument
9		Threaded bush for shoulder strap on the side of the instrument

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3.1.2 OLA–35 operating instructions

- Prepare test ports: see section 2.1 (cleaning, selecting test adapter)
- Loop the OLA–35 into the test circuit: see section 3.3
- Switch on: see section 3.2.1
- Set the required wavelength: see section 3.2.2
- Set the attenuation value: see section 3.2.3

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3.2 Instrument settings

3.2.1 Switching on

ON/OFF button:

The "ON/OFF" button (3) switches the OLA–35 on and off.
When battery powered, the OLA–35 can be operated in either auto–off or permanent operation modes. When powered from the AC line, only permanent operation mode is possible. The ON/OFF button is still used to start the charging cycle (see section 2.2.2)

Auto–off mode:

– Press the ON/OFF button briefly when switching on ("PERM" does not appear in the display).

The attenuation currently set is displayed. The instrument switches off automatically after approximately 15 minutes. The OLA–35 still functions as an attenuator when switched off.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Permanent operation mode:

– Hold the ON/OFF button down (approx. 2 seconds).

The attenuation currently set is displayed with the indication "PERM" (see Figure 3–2). The instrument is then in permanent operation mode.



Figure 3–2 "PERM" indicates permanent operation

AC line operation:

If the OLA–35 is connected to the LNT–1 AC line adapter/charger (see section 2.2.2), it takes over the power supply. The OLA–35 switches to permanent operation mode ("PERM") as soon as the instrument is switched on.
If the a.c. line power supply fails and a battery has been fitted, it takes over the power supply and the instrument switches itself off automatically after approximately 15 minutes.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3.2.2 Setting the wavelength

The slide switch (7) is used to set the wavelength of 1300 nm or 1550 nm.

The OLA–35 is factory calibrated at both these wavelengths. The OLA–35 can also be used to attenuate the light level for wavelengths other than 1300 nm or 1550 nm in the range 1250 nm to 1600 nm. However, the displayed attenuation value needs to be corrected; see section 4.3.

3.2.3 Setting the attenuation

The attenuation range is 2 dB to 65 dB (1300 nm) or 2 dB to 60 dB (1550 nm).

Important: The displayed attenuation value also includes the losses of both connectors on the OLA–35; see section 4.1.

The attenuation is set continuously using the rotary control (SET ATTEN.). (Attenuation can be set to a resolution of 0.1 dB).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

To increase attenuation:

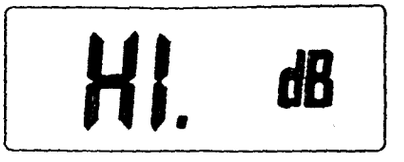
- Pull up knob
- Turn knob clockwise.
- Press knob in again

To decrease attenuation:

- Pull up knob
- Turn knob anticlockwise
- Press knob in again.

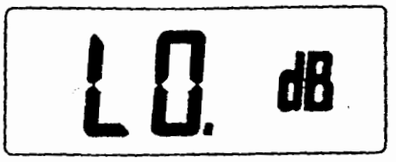
When the knob is pressed in the attenuation setting is locked.

The rotary control has no end–stop. If the upper limit (> 65 dB for 1300 nm, or > 60 dB for 1550 nm) is exceeded, the display shows:



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

If the lower limit (< 2 dB) is exceeded, the display shows:



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3.3 Looping the OLA–35 into a test circuit

3.3.1 General information

The assignment of the test ports as shown on the front panel "left input and right output" can be reversed. Due to the symmetrical construction of the OLA–35 the signal direction has no influence on the attenuator function. The reflection behavior of both test ports is identical, as long as the connectors are the same (type, condition).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

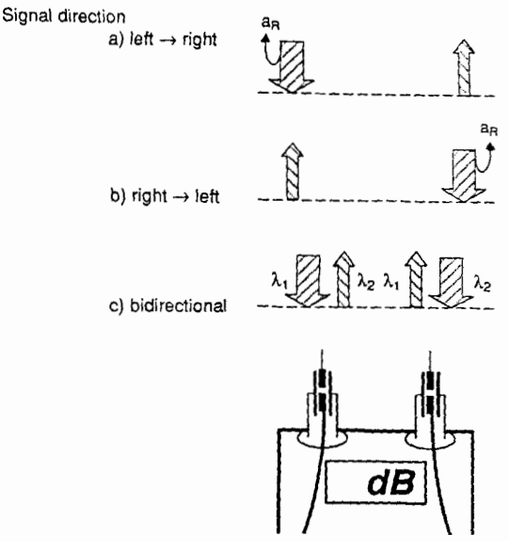


Figure 3–3 Making connections to suit the measurement task
a) b) undirectional operation
c) bidirectional operation (wavelength division multiplex)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3.3.2 Connection via test adapters

If the interfaces where the OLA–35 is to be looped in are cable ends with standard connectors, the OLA–35 can be connected via matching series 2060/00.XX test adapters.

At present test adapters are available for the following types of connectors (XX) (fiber to fiber):

* DIN 47 256 * NTT FC–PC
* NTT SC connector
* ST type AT&T * HMS–10 Diamond

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

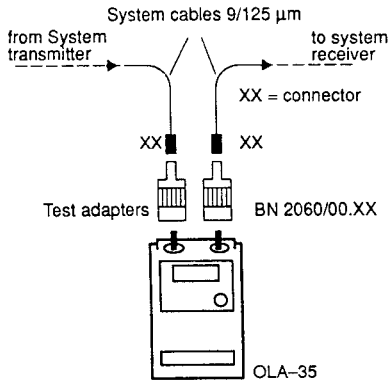


Figure 3–4 Direct connection of system cables via test adapters

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Important: The specified return loss of the OLA–35 given in section 1.2 is only valid when

- the system cable is fitted with connectors which are declared as "high return loss" versions, i.e. with an a_R > 39 dB (e.g. DIN 47256 (Diamond), Super FC–PC (Seikoh Giken)).
- The system connectors are in perfect condition (cleanness, plug/unplug cycles).

3.3.3 Connection via W&G K31XX adapter cables

If the system interfaces where the OLA–35 is to be looped in are in the form of integral sockets (rack), series K31XX adapter cables can be used for bridging purposes. These cables always have a standard DIN connector on one end, while the connector on the other end is user–definable, e.g. Radiall VFO, Diamond HMS–0.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Minimal insertion loss

Due to the careful manufacture and testing of series K31XX adapter cables, minimal insertion losses are achieved. The adapter cables are therefore suitable for use as test– or reference cables. The extremely low insertion loss of the OLA–35 can be fully used when these cables are employed. The displayed attenuation value on the OLA–35 already includes the connector losses from the instrument side.

High return loss

The return loss of the cable primarily depends on the type of connector selected. For connectors with a return loss of ≤ 30 dB, these values can be verified for the whole test setup (including the OLA–35):

K3101 (FC–PC), K3104 (HMS–0), K3105 (Biconic), k3106 (HMS–10)

Adapter cables K3100 (DIN) and K3102 (VFO) have "high return loss" connectors. A total return loss of ≥ 35 dB is therefore achieved.

For extremely low back reflection measurements – e.g. in the laboratory – the OLA–35 can be spliced to the test object via two K3199 (pigtail). This increases the return loss of the OLA–35 further compared to the specified value of 35 dB.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Important: When series K31XX adapter cables are used, the OLA–35 must be fitted with **BN 2060/00.30 (DIN)** test adapters.

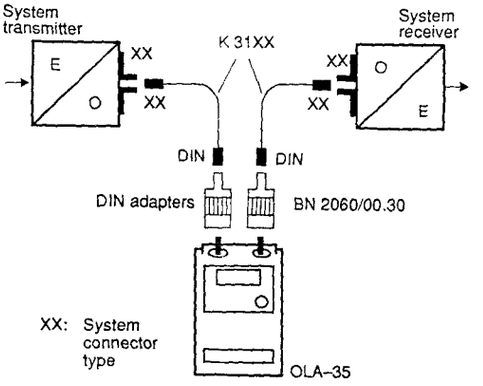


Figure 3–5 Connection via K31XX series adapter cables (monomode systems)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3.4 Test example

Measuring the sensitivity of a digital receiver (Rx), determined as a function of the bit error rate and the minimum permissible receive level.

Setting up the test configuration (see Figure 3–6)

- Disconnect terminal equipment [1], [2] from the fiber optics link (cable rack).
- Loop the OLA–35 into the system (terminal equipment) via the exchange wires K1 and K2. (Select the test adapters according to the system connector XX).
- Connect the bit error test set between the multiplex equipment and the terminal equipment.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Protection from laser radiation

To avoid unnecessary exposure to laser radiation when connecting the OLA–35 to terminal equipment which is in operation, the following procedure should be observed:

- Connect the OLA–35 to the receiver section Rx2 using cable K2 (e.g. right–hand connector).
- Connect cable K1 to the OLA–35 (left–hand connector).
- Connect the free end of cable K1 to the transmitter section Tx1.

Set the attenuation on the OLA–35

- Switch on the OLA–35 and select the wavelength.
- Change the attenuation on the OLA–35 until the required bit error rate is displayed on the PF–4.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

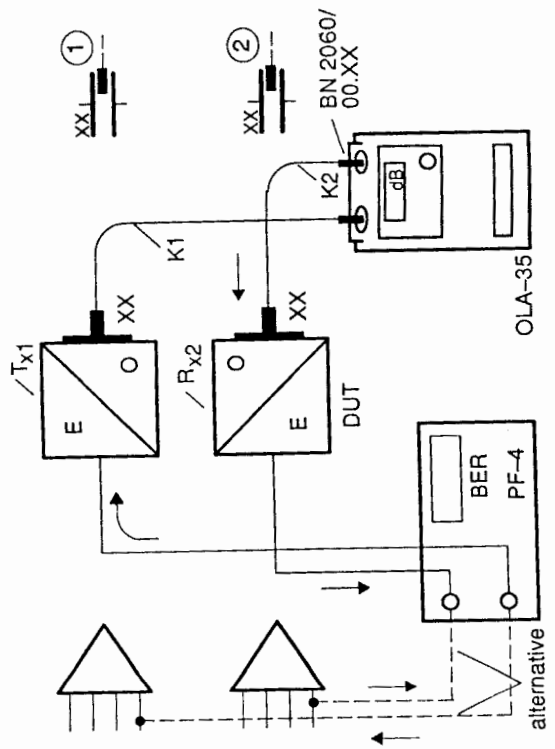


Figure 3–6 Setting the attenuation (OLA–35) as a function of the bit error (PF–4)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Determining the receiver sensitivity (see Figure 3–7)

- Disconnect cable K2 from the receiver R_{x2}.
- Warning – laser radiation accessible.
- Connect an optical power level meter (e.g. OLP–25 from W&G) to the OLA–35 and set the absolute level display and wavelength.
- The displayed level on the OLP–25 corresponds to the minimum receiver sensitivity.

Note: By using a continuously variable filter in the OLA–35 the attenuation is very stable a'cross the entire attenuation range.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

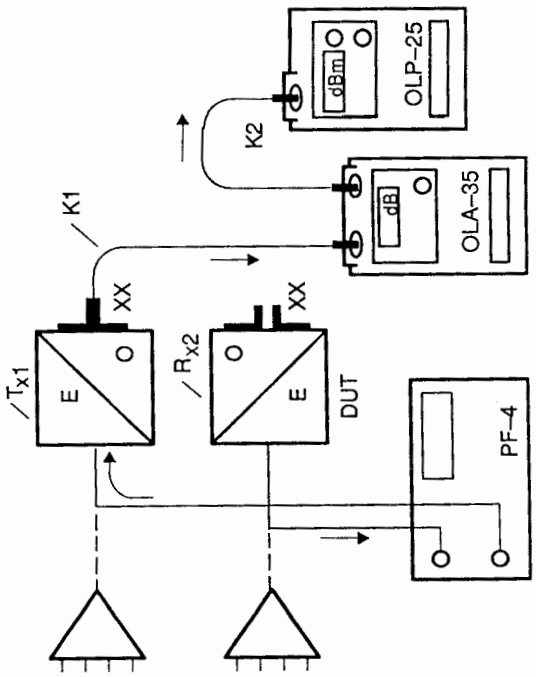


Figure 3–7 Read off receiver sensitibity on the optical level meter

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4 Measurement notes

4.1 Displayed optical attenuation 4–1
4.2 Return loss 4–4
4.3 Light attenuation at non–calibrated wavelengths 4–8

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4 Measurement notes

4.1 Displayed optical attenuation

The optical attenuation displayed on the OLA–35 corresponds to the actual insertion loss a, which includes the losses of the attenuation module and the connector losses (see Figure 4–1). As these losses are included in the calibration, there is no need to correct for connector losses as would normally be the case.

As two connectors (one to the instrument and the other to the system cable side) are involved when characterizing the insertion loss of fiber optics connectors, the cable side on the OLA–35 is represented by the reference connector to DIN 47 256. This makes it possible to specify the whole connection using W&G test cables (K31XX series, see also section 3.3.2).
The attenuation error given in the specifications (see also the error limits in section 1.3) refers to this configuration; see Figure 4–1.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

If the OLA–35 is operated using alternative connectors (FC, ST, HMS–10) via BN 2060/00.XX test adapters (see section 3.3.1) and using cables from other manufacturers, the error data in section 1.3 should be taken as a typical value. The losses of both test ports are considerably influenced by the connectors used (general condition, temperature) and may be greater than or less than the additional + 0.3 dB stated.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

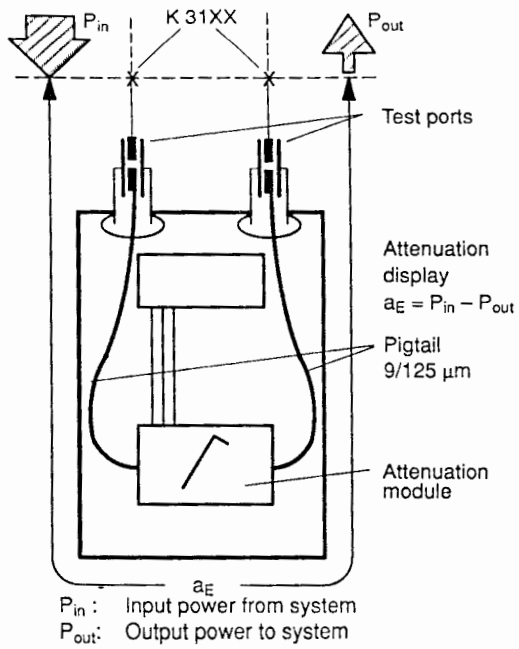


Figure 4–1 Displayed attenuation a on the OLA–35

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4.2 Return loss

The attenuator module (see Figure 4–1) of the OLA–35 has a return loss of at least 43 dB. The return loss effective at the test ports of the OLA–35 however is a value consisting of the module and the test ports. (The total effective return loss is less than the smallest value of the individual return losses). At the moment standard physical contact connectors for single–mode applications have a return loss considerably less than 43 dB. Typical a_R values of physical contact connectors are around 30 dB (company data). For the user this means that when operating the OLA–35 in this configuration he can expect an effective return loss of ≤ 30 dB. Only the use of new "high return loss" connectors with a return loss of ≥ 39 dB make full use of the excellent return loss characteristics of the OLA–35:

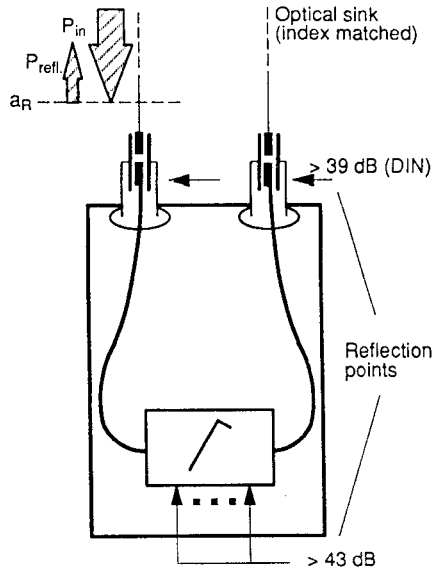
– DIN 47 256 (Diamond–W&G) –> K3100
– Super FC–PC (Seikoh Giken)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

The return loss of ≥ 35 dB given in the specifications is valid for the min. residual attenuation. Figure 4–1 shows the return loss behavior over the entire setting range.

The connectors to DIN 47 256 are included as reference connections, as used on the test cables from Wandel & Goltermann (K31XX series).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



P_{in} : Input power from system
P_{refl}: Reflected level, generated from the sum of the partial reflections
a_R: Actual return loss

Figure 4–2 Effective return loss a_R referred to left–hand test port

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

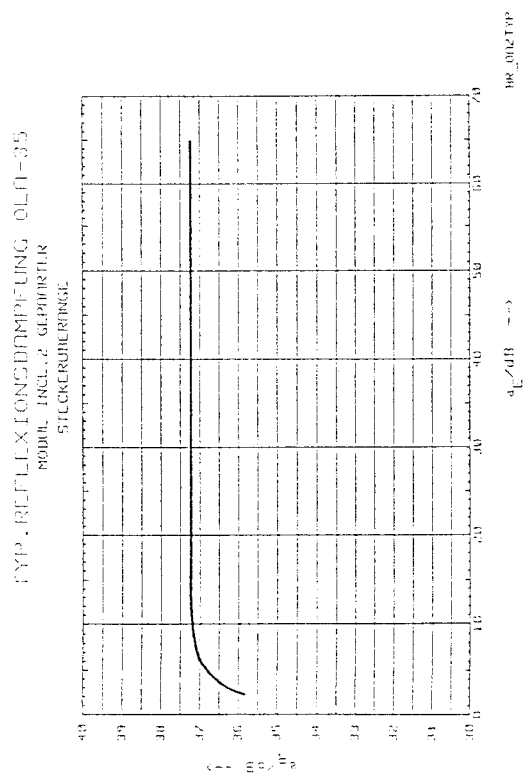


Figure 4–3 Retrun loss a_R when the attenuation of the OLA–35 is altered

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4.3 Light attenuation at non–calibrated wavelengths

The attenuation display of the OLA–35 is calibrated at 1300 nm and 1550 nm. The OLA–35 can also be used in systems with wavelengths other than 1300 nm or 1550 nm. The attenuation can be set correctly using correction factors as given in the set of curves in Figure 4–4.

Example:
- System wavelength = 1250 nm
- The attenuation a_E displayed on the OLA–35 is 50.0 dB (wavelength switch on 1300 nm)

Correction:
- The correction value read off the set of curves (–50 nm curve):
  $\Delta a = +0.6$ dB
- Actual attenuation a = 50.6 dB

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

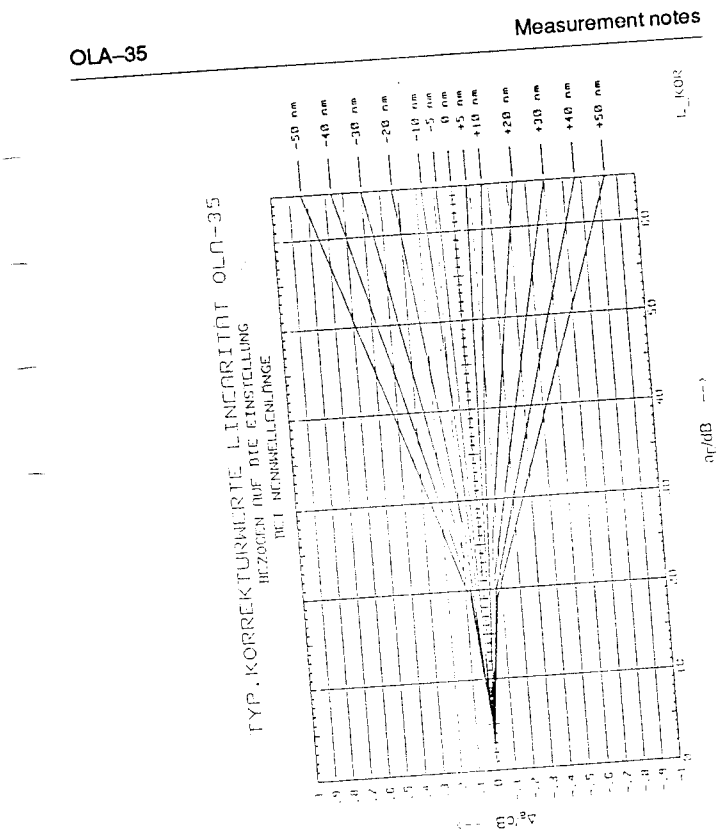


Figure 4–4 Correction values Δa for determining the actual attenuation $a = a_E + \Delta a$

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP