

# GGUN - FL-24

## User's manual



doc\_764548\_a\_en\_UM - GGUN FL-24.odt



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## 1. Specifications

Number of optics	4
Detectable tracers	3 of 3 different classes. Classes I / II / III / V (see table 1 below)
Turbidity detection	0.02 to 400 NTU
Built-in thermometer - precision	0.1°C
Built-in thermometer - resolution	0.034°C
Detection threshold	$2 \times 10^{-11}$ g/ml typical (uranine)
Saturation level	2500 mV
Electrical noise	0.01 mV
Analog to digital conversion	24 bit unipolar
Minimum acquisition interval	4 seconds
Power supply	12V (9 to 15V) DC power
Consumption (stdby/normal)	20mA - 60mA
Connections	The probe connects to the datalogger through a 4-wire cable with 2 waterproof connectors
Immersion depth	70m
Head weight (IP68 Stainless steel)	2.2kg
Diameter	48mm
Height	270mm

### WARNING

Always fully plug the connector because the O-ring seal is located in the depths.  
 Avoid intrusion of sand.  
 Never open the GGUN FL-24.

Table 1 - Classes and tracers

Class	Tracer
I	Uranine (Na fluorescein), pyranine, eosine, chlorophyll A (optional)
II	Amidorhodamine G, sulforhodamine B, rhodamine WT, resorufin
III	Tinopal CBS-X, CBS-CL, amino-G-acid , photine CU
V	Naphtionate

Table 2 – GGUN FL-24 products

Number	Product name and optics
720631	GGUN FL-24 - I, II, III
734988	GGUN FL-24 - I, II, V

## 2. Overview

The fluorometer is employed for continuous measurements during tracer tests using dyes such as uranine, rhodamine, Tinopal, etc. As many as three conveniently selected tracers can be used simultaneously. Water flows through the optical cell of the fluorometer (a glass tube of cylindrical cross-section).

The optical system comprises four lamps and three photo detectors mounted on four perpendicular axes on two levels. Each axis is equipped with excitation and detection filters and lenses. The lamps are switched on and off in turn, measuring three independent responses and water turbidity. The offset voltage of the preamplifiers (dark signal) is also recorded at each measuring cycle.

The fluorometer probe hosts an analogue to digital converter for converting the fluorometer signals into unipolar 24-bit words (data resolution 1:16'000'000). The largest signal is 2500 mV. Therefore the smallest is 0.00015 mV. The data flow is sent to the data logger through a 15 m-long or longer cable (4 wires).

The datalogger can be TRMC-GGUN or a TRMC-GGUN-COM.

Table 3 – Datalogger and teletransmitter products

Number	Product name	Documents
735563	TRMC-GGUN	753947 - User's Manual
745679	TRMC-GGUN-COM	753947 - User's Manual

### 3. Operation

In clean and degassed water, the background noise is very stable ( $\approx 0.01$  mV). The residual signal is produced

- by light scattering of water
- by reflections within the optical cell

Under these ideal conditions, as little as  $2 \times 10^{-11}$  g/ml of dye concentration can be detected (uranine). Other dyes are a factor of 8 to 10 less sensitive. The detection threshold increases with turbidity.

The signal measured with an empty optical cell is not significant and must be ignored.

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## 4. Set-up

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To avoid bubble accumulation in the optical cell, the fluorometer should be set up vertically. Air bubbles scatter the light and strongly debase the signal quality, producing peaks.

Plunge the FL-24 into the borehole.

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## 5. Calibration

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Calibration is advisable 2-3 times a year, permitting proper system operation.

You will need a software to do your calibration.

Table 4 – Softwares

<b>Number</b>	<b>Software name</b>	<b>Documents</b>
764563	fluo_cal	764647 – User's manual
764555	fluo_view	764639 – User's manual
764571	FLUO	

fluo\_calib measures live and create a .dat file

fluo\_view measures live and can convert mV to ppb using the .dat file create with fluo\_calib.

FLUO needs a calib.dat file. FLUO measures live and displays values on a graph.

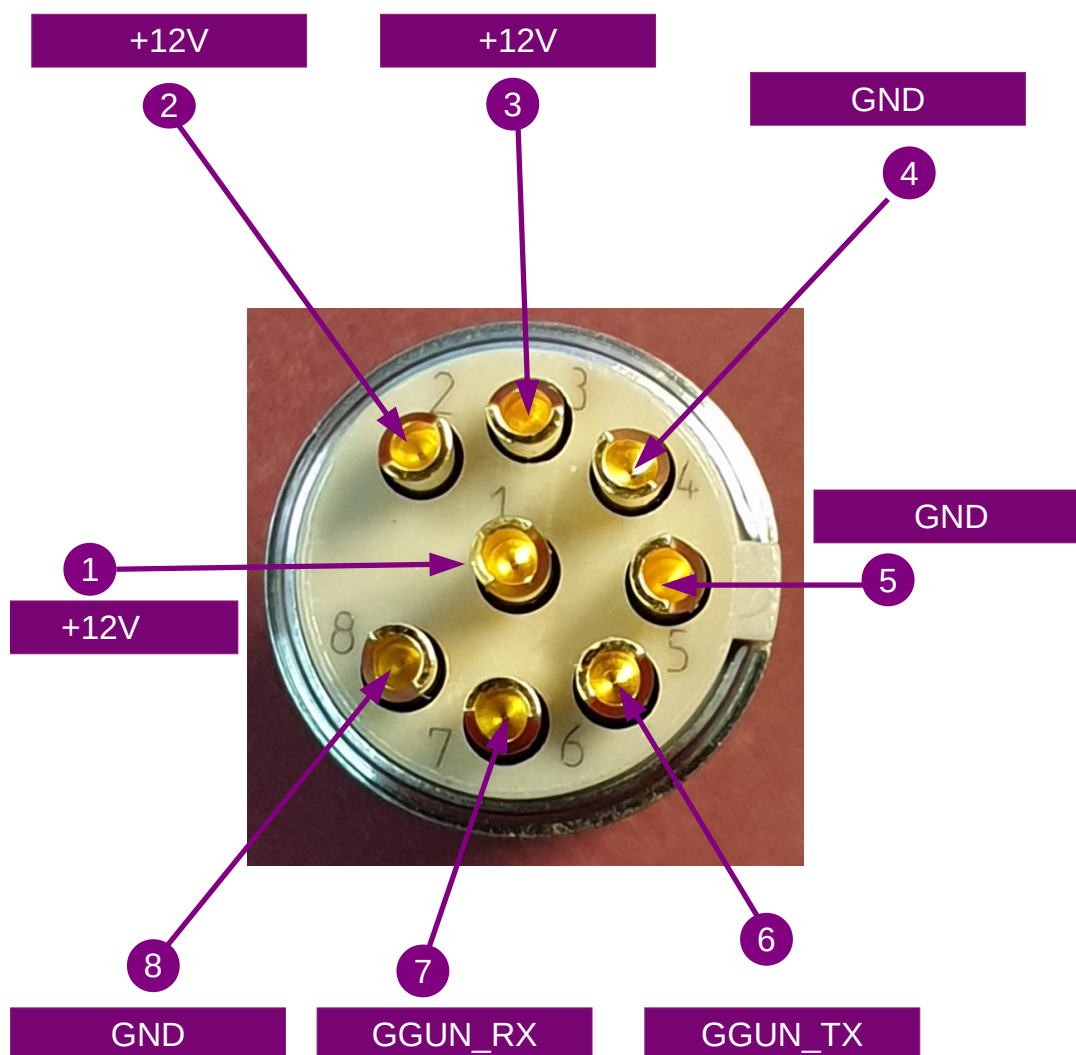
Please look at the document doc\_762336\_a\_calibration for further information.

## 6. Maintenance

To ensure optimal accuracy, the glass tube should be cleaned before each tracer test and after 2 weeks at least. Never dismount the fluorometer. Use a Nylon tube brush.

Intern filters are sensitive to humidity and heat. This is the main reason why the probe should not be used in waters with temperature exceeding 35 °C.

## 7. GGUN Fluorometer connector



## 8. Product numbers related to GGUN FL-24 (datalogger, teletransmitter, cable, tracers)

GGUN FL-24 products

Number	Product name and optics
720631	GGUN FL-24 - I, II, III
734988	GGUN FL-24 - I, II, V

Datalogger and teletransmitter products

Number	Product name	Documents
735563	TRMC-GGUN	753947 - User's Manual
745679	TRMC-GGUN-COM	753947 - User's Manual

Cable for GGUN FL-24 to datalogger

Number	Length	Product name
719146	30m	CAB-FLUO-FL-24-30M
740316	50m	CAB-FLUO-FL-24-50M
734046	70m	CAB-FLUO-FL-24-70M
734038	100m	CAB-FLUO-FL-24-100M
738526	150m	CAB-FLUO-FL-24-150M
761700	200m	CAB-FLUO-FL-24-200M

Tracers

Number	Type	Weight	Tracer
737189	Powder	250g	Uranine
710863	Powder	1kg	Uranine
734517	Liquid	1.5kg/ 5l	Uranine
737247	Powder	250g	Eosine
760405	Powder	5kg	Eosine
737221	Powder	250g	AminoG acid
760413	Powder	5kg	Amino G acid
737213	Powder	250g	Sulforhodamine B
710889	Powder	1kg	Sulforhodamine B
760397	Powder	5kg	Sulforhodamine B
734525	Liquid	1kg/ 5l	Sulforhodamine B
737239	Powder	250g	Sodium naphtionate
760462	Powder	5kg	Sodium naphtionate

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## 9. Contact information

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