Instruction Manual

Model FU20F
pH/ORP SENCOM™ sensor

YOKOGAWA

IM 12B6J3-04E-E
4th edition

(BG)
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(CZ)
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(D)
Alle Betriebsanleitungen für ATEX Ex bezogene Produkte stehen in den Sprachen Englisch. Sollten Sie die Betriebs- anleitungen für Ex-Produkte in Ihrer Landessprache benötigen, setzen Sie sich bitte mit Ihrem örtlichem Yokogawa-Vertreter in Verbindung.

(DK)
Alle brugervejledninger for produkter relateret til CE er tilgængelige på engelsk. Skulle De ønske yderligere oplysninger om håndtering af CE produkter på eget sprog, kan De rette henvendelse herom til den nærmeste Yokogawa afdeling eller forhandler.

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Todos los manuales de instrucciones para los productos antiexplosivos de ATEX están disponibles en inglés. Si desea solicitar las instrucciones de estos artículos antiexplosivos en su idioma local, deberá ponerse en contacto con la oficina o el representante de Yokogawa más cercano.

(F)
Tous les manuels d'instruction des produits ATEX Ex sont disponibles en langue anglaise. Si vous nécessitez des instructions relatives aux produits Ex dans votre langue, veuillez bien contacter votre représentant Yokogawa le plus proche.

(GB)
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(GR)
Ολα τα εγχειριδια λειτουργιας των προιοντων με ATEX Ex διατιθενται στα Αγγλικα. Σε περιπτωση πον χρειαζεοτε οδηγιεξ σχετικα με Ex στην τοπικη γλωσσα παρακαλονμε επικοινωνηστε με το πλησιεστερο γραφειο τηζ Yokogawa η αντιπροσωπο τηξ.

(H)
Az ATEX Ex mûszerek gépkönyveit angol nyelven adjuk ki. Amennyiben helyi nyelven kérik az Ex eszközök leírásait, kérjük keressék fel a legközelebbi Yokogawa irodát, vagy képviseletet.

(I)
Tutti i manuali operativi di prodotti ATEX contrassegnati con Ex sono disponibili in inglese. Se si desidera ricevere i manuali operativi di prodotti Ex in lingua locale, mettersi in contatto con l'ufficio Yokogawa più vicino o con un rappresentante.

(LV)
Visas ATEX Ex kategorijas izstrâdâjumu Lietoðanas instrukcijas tiek piegâdâtas angïu valodâs. Ja vçlaties saòemt Ex ierîèu dokumentâciju citâ valodâ, Jums ir jâsazinâs ar firmas Jokogava (Yokogawa) tuvâko ofisu vai pârstâvi.

(LT)
Visos gaminiø ATEX Ex kategorijos Eksploatavimo instrukcijos teikiami anglø kalbomis. Norëdami gauti priestaisø Ex dokumentacijà kitomis kalbomis susisiekite su artimiausiu bendrovës Yokogawa biuru arba atstovu.

(M)
Il-manwali kollha ta' l-istruzzjonijiet għal prodotti marbuta ma' ATEX Ex huma disponibbli bl-Ingliż. Jekk tkun teħtieġ struzzjonijiet marbuta ma' Ex fil-lingwa lokali tiegħek, għandek tikkuntattja lill-eqreb rappreżentan jew uffiċċju ta' Yokogawa.

(NL)
Alle handleidingen voor producten die te maken hebben met ATEX explosiebeveiliging (Ex) zijn verkrijgbaar in het Engels. Neem, indien u aanwijzingen op het gebied van explosiebeveiliging nodig hebt in uw eigen taal, contact op met de dichtstbijzijnde vestiging van Yokogawa of met een vertegenwoordiger.

(P)
Todos os manuals de instruções referentes aos produtos Ex da ATEX estão disponíveis em Inglês. Se necessitar de instruções na sua língua relacionadas com produtos Ex, deverá entrar em contacto com a delegação mais próxima ou com um representante da Yokogawa.

(PL)
Wszystkie instrukcje obsługi dla urządzeń w wykonaniu przeciwwybuchowym Ex, zgodnych z wymaganiami ATEX, dostępne są w języku angielskim. Jeżeli wymagana jest instrukcja obsługi w Państwa lokalnym języku, prosimy o kontakt z najbliższym biurem Yokogawy.

(RO)
Toate manualele de instructiuni pentru produsele ATEX Ex sunt in limba engleza. In cazul in care doriti instructiunile in limba locala, trebuie sa contactati cel mai apropiat birou sau reprezentant Yokogawa.

(S)
Alla instruktionsböcker för ATEX Ex (explosionssäkra) produkter är tillgängliga på engelska. Om Ni behöver instruktioner för dessa explosionssäkra produkter på annat språk, skall Ni kontakta närmaste Yokogawakontor eller representant.

(SF)
Kaikkien ATEX Ex-tyyppisten tuotteiden käyttöhjeet ovat saatavilla englannin-. Mikäli tarvitsette Ex-tyyppisten tuotteiden ohjeita omalla paikallisella kielellännne, ottakaa yhteyttä lähimpään Yokogawa-toimistoon tai -edustajaan.

(SK)
Všetky návody na obsluhu pre prístroje s ATEX Ex sú k dispozícii v jazyku anglickom. V prípade potreby návodu pre Ex-prístroje vo Vašom národnom jazyku, skontaktujte prosím miestnu kanceláriu firmy Yokogawa.

(SLO)
Vsi predpisi in navodila za AEX Ex sorodni pridelki so pri roki v angliščini. Če so Ex sorodna navodila potrebna v vašem tukejnjem jeziku, kontaktirajte vaš najbliši Yokogawa office ili predstaunika.

CONTENTS

1. PREFACE

1.1 Introduction

This instruction manual provides information for the installation and use of the FU20F SENCOM™ sensor. This digital sensor shows how Yokogawa applies the motto "Simply the Best" to sensor technology. Setup of the sensor is very easy because all sensor specific characteristics, such as calibration data, are stored in the sensor. The FU20F SENCOM™ sensor holds four separate measuring elements in one unbreakable and chemical resistant PPS 40GF (Ryton™) wide body:

- pH glass electrode.
- Long life saturated Ag/AgCl reference system with double junction, combined with ion-trap to prolong the lifetime of the reference probe even in chemically unfavorable environments.
- Integral Pt1000 element for accurate temperature measurements.
- Solid Platinum ORP/LE electrode for accurate simultaneous pH and ORP measurements.

Other valuable features of the sensor:

- PTFE reference diaphragm to prevent fouling.
- Polymerized electrolyte to extend the sensor lifetime.
- Available in two versions, a robust dome shape model for applications with a limited amount of solids, and a flat surface model for applications in which solids are a considerable component, such as in the pulp and paper industry.
- Versatile in-line or off-line installation.

Optional quick-removal adapters in both stainless steel and titanium are available to make calibration and maintenance even easier.

The FU20F is provided with a multipole M9 male connector for connection to the Yokogawa FLXA analyzer using the WU11 interconnection cable for SENCOM™ sensor. This cable, available in 4 fixed lengths, is specified for reliable transfer of digital signals and especially designed to be installed in a heavy industrial environment. The double shielded cable will protect both the sensor and the analyzer for interference from high voltages and currents which are present on other cables.

1.2 Unpacking and Checking

Upon delivery, unpack the sensor carefully and inspect it to ensure that it is not damaged during shipment. If damage is found, retain the original packing material and immediately notify the carrier and the relevant local Yokogawa Sales office. Make sure the Model Code and Serial Number on the sensor are the same as on the packing list. Also check if option(s) that were ordered, are included and correct.

1.3 Warranty and Service

Yokogawa products are guaranteed free from defects in workmanship and materials under normal use and service for a period of (typically) 12 months from the date of shipment from the manufacturer. Individual Sales organizations can deviate from the typical warranty period, and the conditions of sale relating to the original purchase order should be consulted. Damage caused by wear and tear, inadequate maintenance, corrosion, or by the effects of chemical processes is excluded from this warranty coverage. In the event of a warranty claim, the defective goods should be sent (freight paid) to the Service Department of the relevant Yokogawa Sales office for repair or replacement (at Yokogawa's discretion).

The following information must be included in the letter accompanying the returned goods:

- Model Code and Serial Number.
- Original Purchase Order and Date.
- Length of time in service and description of the process.
- Description of the fault and circumstances of the failure.
- Process/environmental conditions that may be related to the failure of the sensor.
- Statement as to whether warranty or non-warranty service is requested.

- Complete shipping and billing instructions for return of material, plus the name and phone number of a contact person that can be reached for further information.
- Clean Statement
  Returned goods that have been in contact with process fluids must be decontaminated and disinfected prior to shipment. Goods should carry a certificate to this effect, for the health and safety of our employees. Material Safety Data sheets must be included for all components of the process to which the sensor(options) have been exposed.

1.4 Serial Number definition

The Serial Number is defined by nine (9) alphanumeric characters:

X_1X_2	Production Location
X_3X_4	Year/Month code
$X_5X_6X_7X_8X_9$	Tracking number

Example: N3P600028

Method used for year/month numbering

Table 1: Production Year code

Year	Year code	Year	Year code
2014	P	2026	3
2015	R	2027	4
2016	S	2028	5
2017	T	2029	6
2018	U	2030	7
2019	V	2031	8
2020	W	2032	9
2021	X	2033	A
2022	Y	2034	B
2023	Z	2035	C
2024	1	2036	D
2025	2	2037	E

Table 2: Production Month code

Month	Month code
January	1
February	2
March	3
April	4
May	5
June	6
July	7
August	8
September	9
October	A
November	B
December	C

2. GENERAL SPECIFICATIONS

2.1 Measuring elements

pH glass electrode
Silver Chloride reference
Solid Platinum electrode
Pt1000 temperature sensor

2.2 Wetted parts

Sensor body	: PPS 40GF (Ryton™ with glass filling)
Measuring sensor	: G-glass
Reference junction	: Porous PTFE
Earth pin	: Solid Platinum
O-ring	: Viton

2.3 Functional specifications (at 25°C)

Measuring system

Isothermal point	: pH 7
Reference system	: Ag/AgCl with saturated KCl
Glass impedance	
- Dome shape	: 200 MΩ nominal
- Flat surface	: 700 MΩ nominal
Liquid outlet	: Non-flow double junction
Junction resistance	: 1 to 15 kΩ
Temperature element	: Pt1000 to IEC 751
Asymmetry potential(zero)	: 8 ± 15 mV
Slope	: > 96 % (of theoretical value)

Note: The FU20F temperature sensor is designed for cell compensation and for indication. It is **NOT** designed for process temperature control.

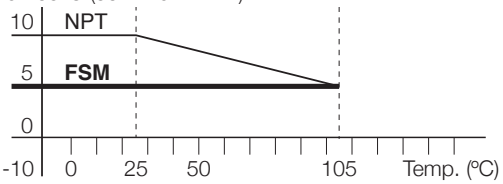
2.4 Dynamic specifications

Startup time sensor	: < 60 sec.
Response time pH	: t_{90} < 15 sec. (for 7 to 4 pH step at 25° C)
Response time temperature	
- Dome shape	: t_{90} < 1 min. (for 10 °C step)
- Flat surface	: t_{90} < 4 min. (for 10 °C step)
Stabilization time pH	: < 2 min. (for 0.02 pH unit during 10 sec.)

2.5 Operating range

pH : 0 to 14
ORP : -1500 to 1500 mV
rH : 0 to 100
Temperature
- Dome shape : -10 °C to 105 °C (14 °F to 221 °F)
- Flat surface : +15°C to 105°C (59 °F to 221 °F)

Pressure : p(bar)



Conductivity : > 50 µS/cm

Note: The pH operating range at room temperature is 0-14 pH, but at high temperatures or range outside 2-12 pH the lifetime will be seriously shortened.

2.6 Transmission signal (Data + and Data -)

General : Bi-directional digital communication (RS 485) with limited MODBUS support
Data rate : 9600 b/s (8,E,1)
Output function : pH or temperature compensated pH
ORP, pH compensated ORP, rH
Temperature
Junction resistance value
Sensor details (Model, Serial Number, production date)
Sensor calibration data (zero, slope, temperature offset)
Sensor status signals (e.g. Glass impedance detection)

Note: The output functions and settings of the sensor are accessible using a dedicated device such as the Yokogawa FLXA analyzer.

2.7 Power supply (Supply+ versus Supply Gnd)

Operating range : +2.7 to +3.6 VDC
Power consumption : ≤ 20 mW

Pin #	Signal description
1	Data -
2	Data +
3	Supply +
4	Shield
5	Supply Gnd

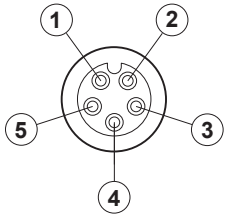


Figure 1: Sensor connector (front view) with gold plated contacts

2.8 Regulatory standards

CE : Decision 768/2008/EC CE N200

- ATEX : Directive 94/9/EC, as amended by Regulation (EC) no. 1882/2003

  Certificate no. : DEKRA 11ATEX0064 X
  Ⓔx II 1 G Ex ia IIC T3...T6 Ga

  Electrical data : For sensor input circuits (by connector) connected to a certified intrinsically safe circuit with the following maximum values
  Ui = 6.1 V; Ii = 230 mA; Pi = 1.2 W; Li = 4 µH; Ci = 30 µF
  or
  Certified intrinsically safe Yokogawa transmitter
  Model FLXA21 series.

  Special conditions (X) : T6 for Tamb. -40 °C to +60 °C
  T5 for Tamb. -40 °C to +75 °C
  T4 for Tamb. -40 °C to +110 °C
  T3 for Tamb. -40 °C to +125 °C

  WARNING

  : Electrostatic charges on the sensor enclosure shall be avoided.

- Pressure : Directive 97/23/EC, as amended by Regulation (EC) no. 1882/2003

  Applying article : 3.3 (Sound Engineering Practice)

  : Damaging the screw thread of the sensor might influence the maximum process pressure.

  WARNING

- EMC : Directive 2004/108/EC
  IEC 61326-1: 2005 Class A (control and laboratory use)
  IEC 61326-1: 2005 (use in industrial locations)

- Low Voltage : Directive 2006/95/EC

  WARNING

  Sensor contains glass parts which if broken can cause cutting injuries.

- WEEE : Directive 2012/19/EC

- RoHS2 : Directive 2011/65/EU

IECEx

Applying standards : IEC 60079-0: 2007
IEC 60079-11: 2006
IEC 60079-26: 2006

Certificate no. : IECEx DEK 11.0065X
Ex ia IIC T3...T6 Ga

CSA

Certificate no.	: 2516979
Master contract no.	: 182892
	IS, Class I Div. 1, GP A, B, C, D T3…T6
Electrical data	: For sensor input circuits (by connector), connected to a certified intrinsically safe circuit, with the following maximum values
	: Ui = 6.1 V; Ii = 230 mA; Pi = 1.2 W; Li = 4 µH; Ci = 30 µF
	or
	Certified intrinsically safe Yokogawa transmitter Model FLXA21 series.
Ambient temperature	: T6 for Tamb. -40 °C to +60 °C
	T5 for Tamb. -40 °C to +75 °C
	T4 for Tamb. -40 °C to +110 °C
	T3 for Tamb. -40 °C to +125 °C

Note: Intrinsically safe when connected as per Control Drawing FF1-K1226QU (see Fig 2)

Control Drawing CSA

The FU20F SENCOM™ sensor shall be installed to a certified intrinsically safe circuit meeting the entity parameters of the sensor as shown in the table as maximum values, or to a certified intrinsically safe Yokogawa transmitter Model FLXA21 series.

When installing this equipment, follow the manufacturer's control drawing. Installation should be in accordance with Canadian Electrical Code, Part 1 or CEC, Part 1.

WARNING

To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing or read, understand and adhere to the manufacturer's live maintenance procedures.

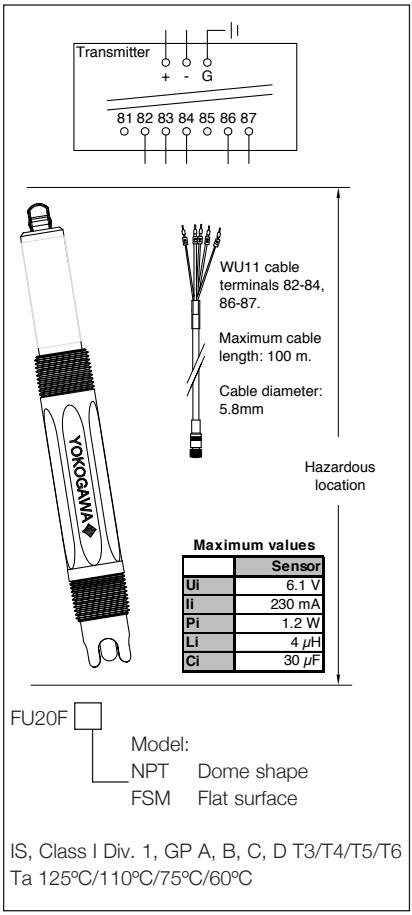


Fig 2: FF1-K1226QU Control Drawing CSA

FM

Certificate no. : 3046277
IS, Class I Div. 1, GP A, B, C, D T3…T6

Electrical data : For sensor input circuits (by connector), connected to a FM approved intrinsically safe apparatus meeting the entity parameters of the SENCOM sensor:
Ui = 6.1 V; Ii = 230 mA; Pi = 1.2 W; Li = 4 µH; Ci = 30 µF
or
FM approved intrinsically safe Yokogawa transmitter Model FLXA21 series.

Ambient temperature: T6 for Tamb. -40 °C to +60 °C
T5 for Tamb. -40 °C to +75 °C
T4 for Tamb. -40 °C to +85 °C
T3 for Tamb. -40 °C to +85 °C

Note: Intrinsically safe when connected as per Control Drawing FF1-K1226QS (see Fig 3)

Control Drawing FM

The FU20F SENCOM™ sensor shall be installed to a FM approved intrinsically safe apparatus meeting the entity parameters of the sensor as shown in the table as maximum values, or to a FM certified intrinsically safe Yokogawa transmitter Model FLXA21 series.

When installing this equipment, follow the manufacturer's control drawing. Installation should be in accordance with ANSI/ISA RP 12.06.01 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electrical Code (ANSI/NFPA 70).

WARNING

To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing or read, understand and adhere to the manufacturer's live maintenance procedures.

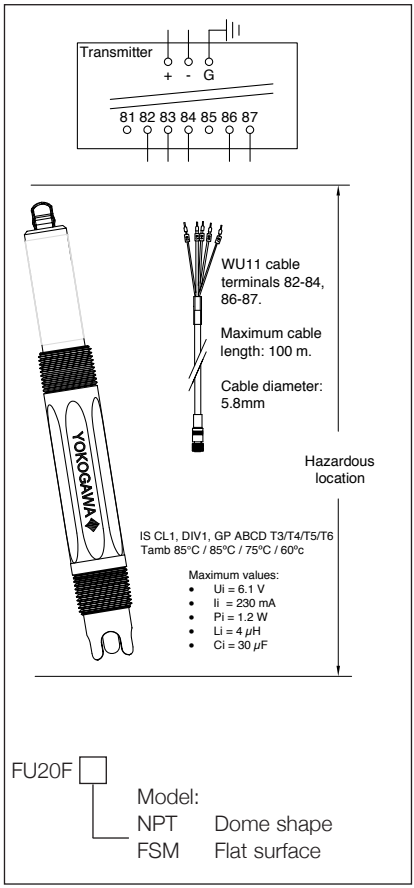


Fig 3: FF1-K1226QS Control Drawing FM

Note: When the sensor has been connected to none intrinsically safe equipment which exceeds the restrictions regarding the sensor input circuit (see electrical data), the sensor is not suitable anymore for intrinsically safe use.

2.9 Shipping details

Package size (L x W x H) : 300 x 100 x 75 mm (11.8 x 3.9 x 3.0 inch)
Package weight : app. 0.33 kg (0.73 lbs)

2.10 Environment and operational conditions

Storage temperature : -10 ºC to 50 °C (14 ºF to 122 °F)
Sensor connection : Hot swapping possible
Water proof : IP67 (conform IEC 60529)

3. INSTALLATION OF FU20F

For optimum measurement results, the FU20F should be installed in a location that offers an acceptable representation of the process composition and **DOES NOT** exceed the specifications of the sensor. The FU20F is designed with 3/4" NPT threaded connections on both ends of the sensor to allow installation in a wide variety of applications.

3.1 Typical installation

The FU20F sensor is designed for versatile in-line, immersion or off-line installation. For best results the FU20F should be mounted with the process flow coming towards the sensor, and positioned at least 15° above the horizontal plane to eliminate air bubbles in the pH glass bulb (see Figure 4).

3.2 Preparing the sensor for use

Remove the sensor from its shipping box and slide of the so-called 'wet pocket', the tube filled with solution to prevent drying out of the measuring elements during shipment or storage.
Although in the sensor all factory calibration data is stored, it is recommended to calibrate the sensor before first use.
A general calibration procedure is described in Section 6 of this Instruction Manual.

3.3 Mounting the sensor

The simplest mounting is to use one of the 3/4" NPT threaded connection of the sensor. Apply Teflon tape to the appropriate threaded end, then install the sensor in the process (see Figure 5).

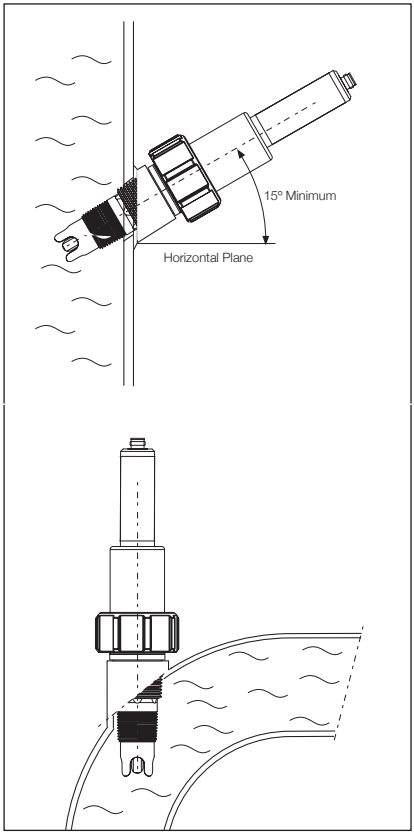


Figure 4: Sensor installation

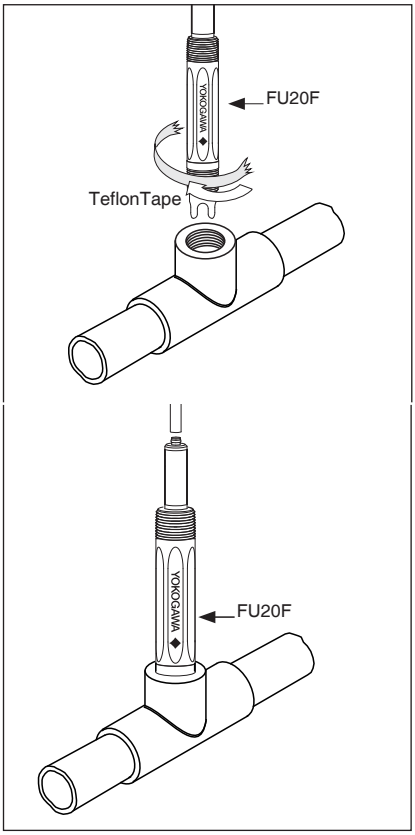


Figure 5: Simple mounting of sensor

The FU20F can also be mounted using one of the optional quick-removal adapters (/NSS, /NTI, /BSS or /BTI). For a detailed description of these adapters see Sections 4 and 7 of this Instruction Manual.

1 Apply Teflon tape to the threaded end of this adapter;
2 Install the adapter in the process connection. Tighten the adapter using a wrench on the adapter flats.

Note: DO NOT over tighten the adapter to prevent damage;

3 Apply Teflon tape to the appropriate threaded end of the sensor;
4 Place the O-ring and screw the mating part of the adapter on the sensor;
5 Mount the sensor in the adapter, making sure that the O-ring seals properly;
6 Hand-tighten the adapter nut.

Other mounting examples of the FU20F are given in Figure 7 and Figure 8.

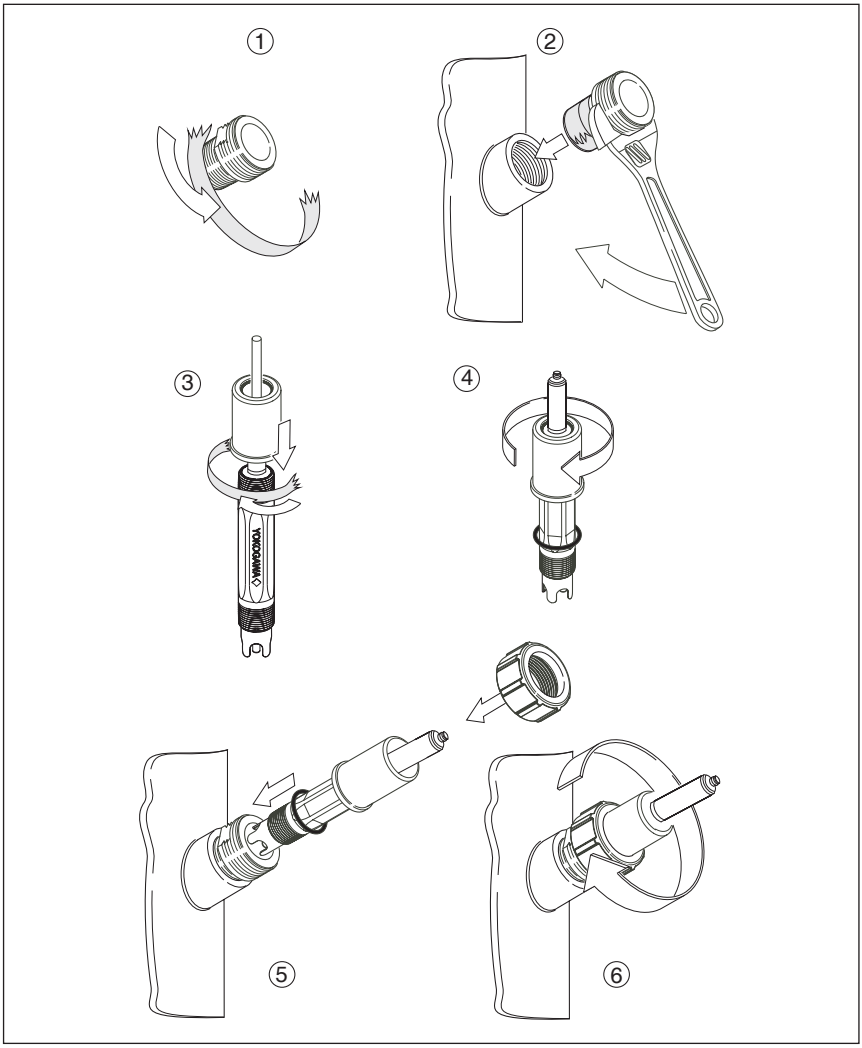


Figure 6: Mounting of sensor with option /NSS, /NTI, /BSS or /BTI

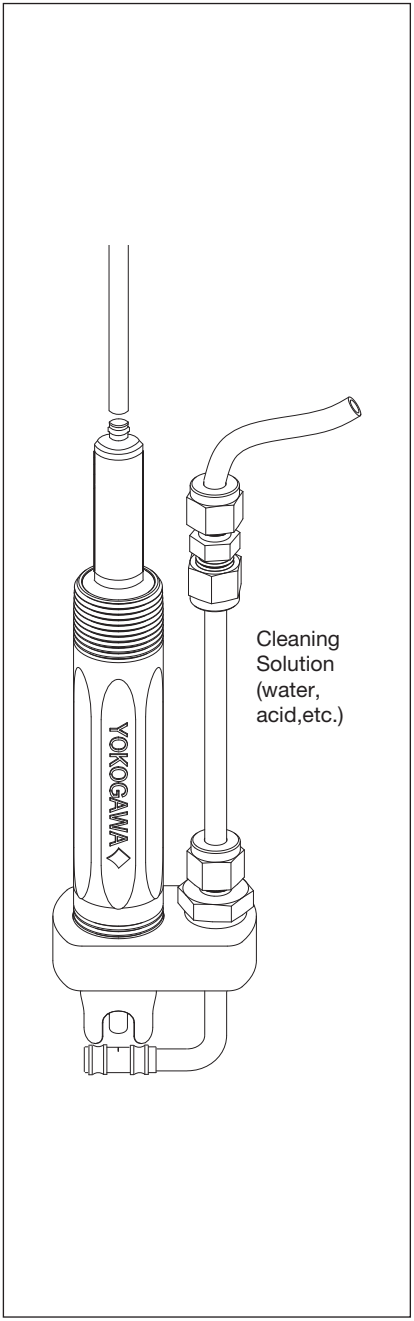


Figure 7: Mounting of sensor in /HCNF (Jet cleaning system)

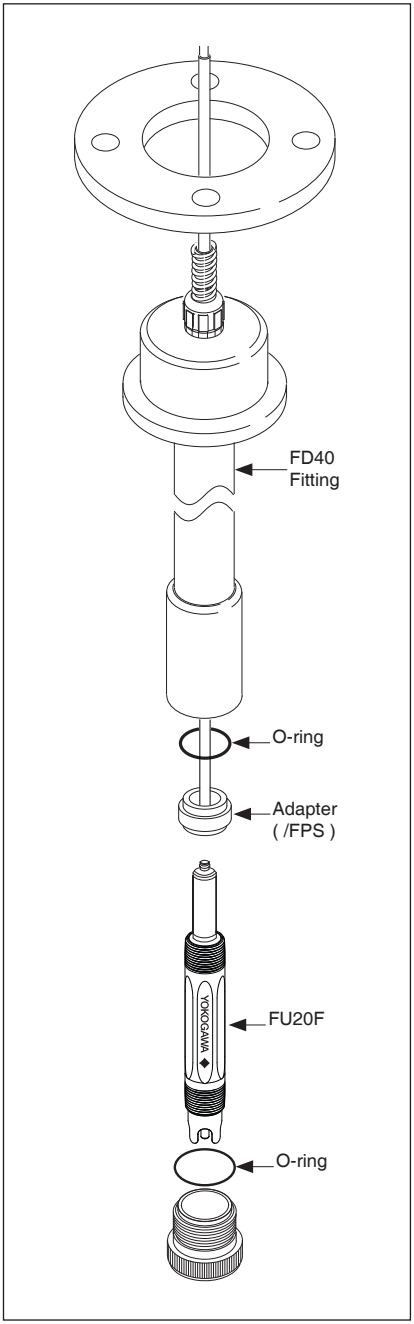


Figure 8: Mounting of sensor with /FPS

4. DIMENSIONS

Dimensions in mm (inches)

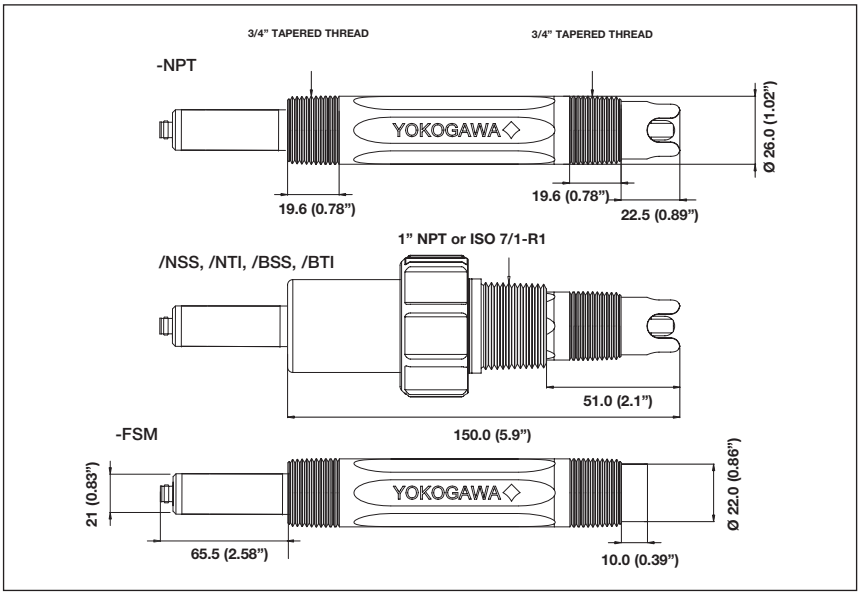


Figure 9: Dimensions of FU20F Sensor

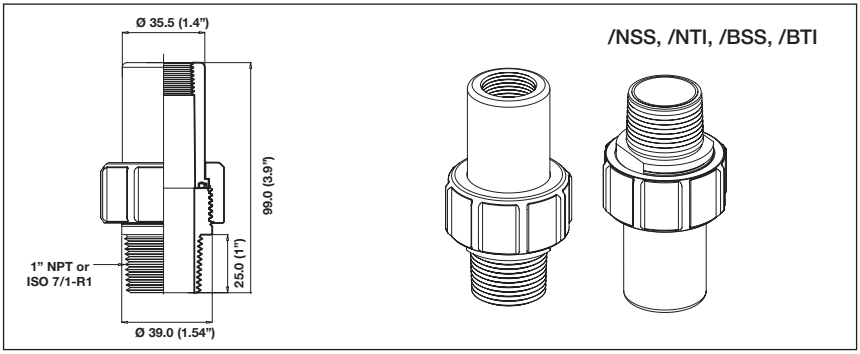


Figure 10: Dimensions of quick-removal adapters /NSS, /NTI, /BSS, /BTI

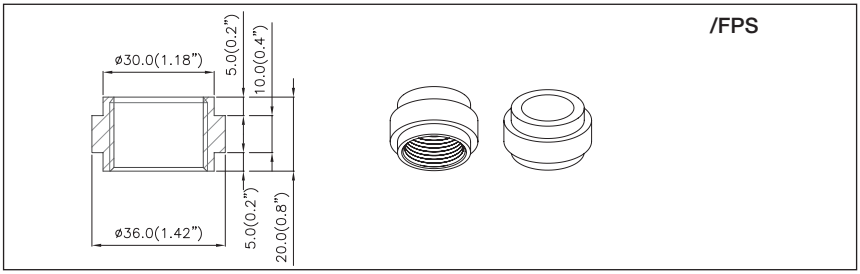


Figure 11: Dimensions of F*40 adapter /FPS

5. WIRING

The FU20F is provided with a multipole M9 male connector for connection to the Yokogawa FLXA analyzer using the WU11 interconnection cable for SENCOM™ sensor. The connections of this M9 male connector (see Section 2.7 for details), the WU11 interconnection cable and the FLXA terminal strip are given in Table 3.

Table 3: Definition M9 sensor connector pin to WU11 cable and FLXA analyzer

M9 Pin #	WU11 wire #	WU11 wire color	FLXA terminal #	Signal description
1	83	Yellow	83	Data -
2	84	Green	84	Data +
3	87	Brown	87	Supply +
4	82	Black	82	Shield
5	86	White	86	Supply Gnd

6. GENERAL CALIBRATION & MAINTENANCE PROCEDURE

Calibration of the FU20F pH/ORP SENCOM™ sensor can be done on site with the FLXA analyzer connected, or in the laboratory with another FLXA analyzer or with the dedicated Yokogawa SENCOM™ PC software, model SPS24. When using another FLXA analyzer, it has to be set correctly for each calibration. Refer to the FLXA analyzer Instruction Manual for details. After calibration all data will be stored in the sensor itself.
If the sensor is reconnected to the FLXA analyzer in the field, the calibration data of the sensor is automatically set into the analyzer.

6.1 Calibration for pH measurement

To calibrate the FU20F pH/ORP SENCOM™ sensor, two buffer solutions with known pH values are required. It is recommended that one buffer solution has a value near to pH 7.00. Depending on the process value to be measured, the second buffer solution should be either acidic (below pH 7.00) or alkaline (above pH 7.00). Normally the IEC buffers (pH 4.01, 6.87 and 9.18) are used.

The following is a very general 2-point calibration procedure:

1. Clean the sensor using a 5% solution of HCl;
2. Rinse sensor thoroughly with demineralized water;
3. Immerse the sensor in the first buffer (pH 6.87 is recommended) and execute calibration as described in the instruction manual of the analyzer or SPS24 PC software;
4. Rinse sensor thoroughly with demineralized water;
5. Immerse the sensor in the second buffer (pH 4.01 or 9.18 is recommended) and execute calibration as described in the instruction manual of the analyzer or SPS24 PC software;
6. Rinse sensor thoroughly with demineralized water.

During calibration, the temperature compensation should be active. The FLXA analyzer automatically compensates for the sensitivity change of the pH sensor at different temperatures.

After calibration, replace or re-install the sensor into the process.

6.2 Calibration for ORP and rH measurement

For calibration of ORP and rH, the procedure for MANUAL CALIBRATION can be used as described in the Instruction Manual of the FLXA analyzer.

The rH value is a function of the reference system and the pH value of the buffer solution. The FU20F sensor has a reference system of saturated Silver/Silver Chloride (Ag/AgCl). The commonly used standards for ORP and rH calibration are made from Chinhydron (Quinhydrone) powder dissolved in pH buffer solutions (1 g / 200 ml). In Table 4 the measurement values are given as function of the used pH buffer solution with Chinhydron powder. The accuracy of the standards is approximately ± 10 mV.

Table 4: ORP, pH compensated ORP and rH as function of pH buffer solution with Chinhydron powder.

pH buffer	ORP (mV)	pH compensated ORP (mV)	rH
1.68	403	88	23.6
4.01	265	88	23.6
6.87	96	88	23.6
7.00	88	88	23.6

6.3 Maintenance of the FU20F sensor

A pH sensor requires routine maintenance to keep the measuring elements clean and functioning. Depending on the process, different cleaning solutions may be required.

WARNING Avoid cleaning the complete sensor with solution. Some cleaning solutions will damage the modelcode sticker and connector which are placed on the electronic housing on top of the sensor. Only clean the measuring elements at the bottom side of the sensor.

In most cases cleaning with water, iso-propanol or methanol is sufficient. In other cases the measuring elements of the sensor have to be cleaned with specific solutions.

Examples:

1. Deposits of limes, hydroxides or carbonates can be removed by immersing the bottom part of the sensor in a solution containing dilute hydrochloric acid (5% is recommended). Afterwards rinse the sensor with water.
2. Deposits of oil and fat can be removed with hot water with a detergent. When the results are unsatisfactory, a mild (carbonate based) abrasive can be used.
3. Protein deposits should be removed with a protein enzymatic solution, for instance a solution containing 8.5 mL concentrated hydrochloric acid and 10 grams of pepsin in 1 liter of water.

Note: Avoid cleaning with non-polar solvent like tri-chloro ethylene, toluene or hexane. The non-polar solvents will break up the gel-layer on the pH glass bulb and requires that the sensor has to be soaked in water for at least 12 hours before it will function again.

The Teflon diaphragm of the sensor can be regenerated by putting it in hot (± 70°C, 158°F) 3 molar Potassium Chlorine (KCl) solution and letting it cool down to room temperature. This procedure clears the diaphragm and will soak the diaphragm with conductive KCl again.

7. MODEL CODE

Model Code	Suffix Code	Option	Description
FU20F			SENCOM™ pH Wide body Sensor
Model	- NPT		Dome shape model
	- FSM		Flat surface model
Options		/HCNF	Hastelloy cleaning system [1]
		/FPS	Adapter for FF40, FS40, FD40 fittings, PPO
		/NSS	1" NPT adapter, Stainless Steel (316L) [2]
		/NTI	1" NPT adapter, Titanium [2]
		/BSS	1" BSP adapter, Stainless Steel (316L) [2]
		/BTI	1" BSP adapter, Titanium [2]

Note 1: The Hastelloy cleaning system includes the nozzle, mounting set, nylon tube and tube mounting set. These parts can be ordered separately as a spare part.

Note 2: The 1" NPT and 1" BSP adapters are standard with a Viton O-ring. Other O-ring materials are available as a spare part.

8. SPARE PARTS

Spare part	Description
	FU20F
K1523DD	/FPS, adapter for FF40, FS40, FD40 fittings, Noryl
K1547PK	/NSS, 1" NPT adapter, Stainless Steel (316L)
K1547PL	/BSS, 1" BSP adapter, Stainless Steel (316L)
K1547PM	/NTI, 1" NPT adapter, Titanium
K1547PN	/BTI, 1" BSP adapter, Titanium
K1500FR	O-ring set (5 pcs.), 29.82 x 2.62 mm, Viton
K1500FS	O-ring set (5 pcs.), 29.82 x 2.62 mm, EPDM
K1500FT	O-ring set (5 pcs.), 29.82 x 2.62 mm, Silicone
	Cleaning system
K1547PJ	/HCNF, Hastelloy Jet cleaning system
K1547PG	Hastelloy nozzle and mounting set
K1547PH	Nylon tube (10 meter) and tube mounting set for /HCNF
	Buffer solutions
K1520BA	Buffer solutions pH 4.01, pH 6.87, pH 9.18 (500 ml each)
K1520BB	Buffer solution pH 1.68 (500 ml)
K1520BC	Buffer solution pH 4.01 (500 ml)
K1520BD	Buffer solution pH 6.87 (500 ml)
K1520BE	Buffer solution pH 9.18 (500 ml)
	Connection equipment
BA10	Junction box for longer cable runs
WU11-M9-xx-WP-V	Interconnection Cable for SENCOM™ Sensor, available lengths xx (03, 05, 10, 20 meter)

9. EU DECLARATION OF CONFORMITY

YOKOGAWA ◆

EU DECLARATION OF CONFORMITY

We: **Yokogawa Process Analyzers Europe B.V.**
Euroweg 2
3825 HD Amersfoort
The Netherlands

herewith declare under our sole responsibility that the product, model: **FU20F**

further specified with model suffix- and option codes: **As listed in Annex-1 in this document**

is manufactured in accordance with the requirements for CE-marking of products as stated in EC Decision:

768/2008/EC on a common framework for the marketing of products

by applying the following standards:

EN-ISO 9001: 2008 Quality management systems - Requirements

Subject product is:

- In compliance with the essential requirements of the specific product legislation:
  - **EMC** **Directive 2004/108/EC**
    by applying the following standards:
    EN 61326-1: 2005 Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements.
    Emission Class A, control and laboratory use
    Immunity For use in industrial locations
  - **LVD** **Directive 2006/95/EC**
    by applying the following standards:
    EN 61010-1: 2010 Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements.
  - **Pressure Equipment** **Directive 97/23/EC (PED)**
    As amended by Regulation (EC) no. 1882/2003, by applying:
    Article 3.3: Sound Engineering Practice
  - **Potentially explosive atmospheres** **Directive 94/9/EC (ATEX)**
    As amended by Regulation (EC) no. 1882/2003
    by applying the following standards:
    EN 60079-0: 2009 Explosive atmospheres – Part 0: Equipment – General requirements
    EN 60079-11: 2007 Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"
    EN 60079-26: 2007 Explosive atmospheres – Part 26: Equipment with equipment protection level (EPL) Ga

    The provisions fulfilled are: ⟨Ex⟩ 1 G Ex ia IIC T3...T6 Ga

    Number of the EC-type Examination Certificate: **DEKRA 11 ATEX 0064 X**
    Name of the notified body: DEKRA Certification B.V.
    Identification number of the notified body: 0344
    Address of the notified body: Meander 1051, 6825 MJ Arnhem, The Netherlands
- Produced according to appropriate quality control procedures.

The CE-mark has been affixed on the product in 2012 for the first time.

If applicable, the product is checked against the latest official released revision of the standards mentioned above; differences do not affect the certified product identified on this declaration.

Amersfoort - July 01, 2014

H. Leijten
General Manager

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Annex-1

Model Code	Suffix Code	Option Code	Description
FU20F			SENCOM™ pH Wide body Sensor
Model	- NPT		Dome shape model
	- FSM		Flat surface model
Options		/HCNF	Hastelloy cleaning system
		/FPS	Adapter for FF40, FS40, FD40 fittings, Noryl
		/NSS	1” NPT adapter, Stainless Steel (316L)
		/NTI	1” NPT adapter, Titanium
		/BSS	1” BSP adapter, Stainless Steel (316L)
		/BTI	1” BSP adapter, Titanium

10. CHEMICAL COMPATIBILITY CHART

			Material						
			PVDF (Kynar)	S.S. 316	VITON	PEEK	PP	PVC	PFA
		Temp. °C / % Conc.	20 60 100	20 60 100	20 60 100	20 60 100	20 60	20 60	20 60 100
Inorganic acid	Sulfiric acid	10	O O O	X X X	O O O	O O O	O O	O X	O O O
		50	O O O	X X X	O O O	O O X	O O	O O	O O O
		95	O X -	X X X	O O O	- - -	X -	X X	O O O
		fuming	- - -	- - -	O O O	- - -	- -	- -	O O O
	Hydrochloric acid	10	O O O	- - -	O O O	O O X	O O	OX	O O O
		sat.	O O O	- - -		O O X	O O	O O	O O O
	Nitric acid	25	O O X	X X X	O O X	O O O	O O	O X	O O O
		50	O O X	X X X	- - -	X X X	X -	O X	O O O
		95	O X -	O O O	- - -	- - -	- -	- -	O O O
		fuming	- - -	O O O	- - -	- - -	- -	- -	O O O
	Phosphoric acid	25	O O O	- - -	O O O	O O O	O O	O X	O O O
		50	O O O	X X X	O O O	O O O	O O	O O	O O O
		95	O O O	O O O	X X -	O O O	O O	O O	O O O
	Hydrofluoric acid	40	O O O	- - -	O O O	- - -	O O	OX	O O O
		75	O O O	- - -	O O O	- - -	O O	XX	O O O
Organic acid	Acetic acid	10	O O O	O O X	- - -	O O O	O O	O X	O O O
		glacial	O X -	O O X	- - -	O O X	O X	X X	O O O
	Formic acid	80	O O O	X X X	- - -	X X X	O O	O -	O O X
	Citric acid	50	O O O	O O O	O O O	O O O	O O	O O	O O O
Alkali	Calcium hydroxide	sat.	O O O	O O O	O O O	O O O	O O	O O	O O O
	Potassium hydroxide	50	O O X	O O O	O O O	O O O	O O	O O	O O O
	Sodium hydroxide	40	O O X	O O O	X X X	O O O	O O	O X	O O O
	Ammonia in water	30	O O O	O O O	X X X	O O O	O O	O X	O O O
Acid salt	Ammonium chloride	sat.	O O O	X X X	O O O	O O O	O O	O O	O O O
	Zinc chloride	50	O O O	X X X	O O O	O O O	O O	O O	O O O
	Iron (III) chloride	50	O O O	- - -	O O O	O O O	O O	O O	O O O
Basic salt	Sodium sulfite	sat.	O O O	O O O	- - -	O O O	O O	O O	O O O
	Sodium carbonate	sat.	O O O	O O O	O O O	O O O	O O	O O	O O O
Neutral salt	Potassium chloride	sat.	O O O	X X X	O O O	O O O	O O	O O	O O O
	Sodium sulfate	sat.	O O O	O O O	O O O	O O O	O O	O O	O O O
	Calcium chloride	sat.	O O O	X X X	O O O	O O O	O O	O O	O O O
	Sodium chloride	sat.	O O O	X X X	O O O	O O O	O O	O O	O O O
	Sodium nitrate	50	O O O	X X X	O O O	O O O	O O	O O	O O O
	Aluminium chloride	sat.	O O O	- - -	O O O	O O O	O O	O O	O O O
Oxidizing agent	Hydrogen peroxide	30	O O O	O O O	O O O	O O O	O O	O O	O O O
	Sodium hypochloride	50	O O O	X X X	O O X	O O O	X X	X X	O O O
	Potassium dichromate	sat.	O O O	O O O	O O O	O O O	O O	O O	O O O
	Chlorinated lime		O X -	X X X		X X X	- -	O O	O O O
Organic solvent	Ethanol	80	O O X	O O O	X - -	O O O	O O	O X	O O O
	Cyclohexane		O O X	O O O	O O O	O O O	- -	O O	O O O
	Toluene		O O O	O O O	- - -	O O O	X -	- -	O O O
	Trichloroethane		X X X	O O X	X X X	O O O	- -	- -	O O O
	Water		O O O	O O O	O O O	O O O	O O	O O	O O O

O = can be used, X = shortens useful life, - = cannot be used

Note: Information in this list is based on our general experience and literature data and given in good faith. However Yokogawa is unable to accept responsobility for claims related to this information.

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