Instruction Manual

Model SC25V

Combination 12mm sensor;

pH, Ref, LE and Temperature

YOKOGAWA

IM 12B06J01-40EN-P

3rd edition

(BG)
Всички улътвания за продукти от серията ATEX Ex се предлагат на английски език. Ако се нуждаете от улътвания за продукти от серията Ex на родния ви език, се свържете с най-близкия офис или представителство на фирма Yokogawa.

(CZ)
Všechny uživatelské příručky pro výrobky, na něž se vztahuje nevýbušné schváleni ATEX Ex, jsou dostupné v angličtině. Požadujete-li pokyny týkající se výrobků s nevýbušným schválením ve vašem lokálním jazyku, kontaktujte prosím vaši nejbližší reprezentačni kancelář Yokogawa.

(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.

(EST)
Kõik ATEX Ex toodete kasutamisjuhendid on esitatud inglise keeles. Ex seadmete muukeelse dokumentatsiooni saamiseks pöörduge lähima lokagava (Yokogawa) kontori või esindaja poole.

(E)
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)
All instruction manuals for ATEX Ex related products are available in English. Should you require Ex related instructions in your local language, you are to contact your nearest Yokogawa office or representative.

(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 ję zyku, 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 SC25V, combined 12mm glass sensor (pH, Ref, LE and Temperature). The SC25V is the best choice for the majority of typical process- and waste- water applications. The sensor is designed with titanium liquid earth (LE), increased electrolyte reservoir and large surface area PTFE diaphragm combined with a long pathway inner junction resulting in a longtime stability and prolonged lifetime.

1.2 Unpacking and Checking

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

For some specific sensor information, the size of the sensor label is not big enough. For that reason, a separate label is delivered. This label needs to be connected onto the sensor cable

1.3 Warranty and Service

Yokogawa products and parts are guaranteed free from defects in workmanship and material 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 are excluded from this warranty coverage. In the event of warranty claim, the defective goods should be sent (freight paid) to the Service Department of the relevant sales Organization 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

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

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/Silver chloride reference
: Solid platinum electrode
: Pt1000 temperature sensor

2.2 Wetted parts

Sensor body / shaft	: AR-Glass, PEEK
Earthing ring	: Titanium
Measuring sensor	: Glass (type G or L)
O-ring	: Viton (EPDM back-up)
Reference junction	: Porous PTFE

2.3 Functional specifications (at 25 °C)

Isothermal point	: pH 7 / 3.3M KCl
Reference system	: Ag/AgCl with saturated KCl
Glass impedance	
- G-Glass	: 200 MΩ nominal
- L-Glass	: 775 MΩ nominal
Junction resistance	: < 5 kΩ
Liquid outlet	: non-flow single junction
Temperature element	: Pt1000 to IEC 751
Asymmetry potential	: 8 ± 15 mV
Slope	: > 96 % (of theoretical value)
Sensor length	: 120 mm and 225 mm

Note: The temperature sensor included in the SC25V is designed for process compensation and for indication. It is **NOT** designed for process temperature control.

2.4 Dynamic specifications

Response time pH	: t_{90} < 15 sec. (for 7 to 4 pH step)
Response time temperature	: t_{90} < 90 sec. (for 10 °C step)
Stabilization time pH	: < 2 min. (for 0.02 pH deviation during 10 sec.)

2.5 Operating range

pH	: 0 to 14
Temperature	
- G-Glass	: -10 to +80 ºC (14 to 176 ºF)
- L-Glass	: +15 to +130 ºC (59 to 266 ºF)
Pressure	: 0 to 10 barg (0 to 145 psi)*
	: 0 to 0.985 barng (0 to 14.36 psi) (under pressure)
Conductivity	: > 10 µS/cm

* Damaging the screw thread might influence the max process pressure.

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.

Note: The upper process temperature for the intrinsically safe version is limited by the ambient temperature ($T_{amb.}$) defined for each temperature class (T3, T4, T5 and T6)

2.6 Shipping details

	: SC25V-…..-120	SC25V-…..-225
Package size (LxWxH)	: 300 x 100 x 75 mm	435 x 60 x 60 mm
	: 11.8 x 3.9 x 3.0 inch	17.2 x 2.4 x 2.4 inch
Package weight (max.)	: 0.26 kg (0.57 lbs)	0.28 kg (0.62 lbs)

2.7 Environmental conditions

Storage temperature	: -10 to +50 ºC (14 to 122 ºF)
Ingress Protection	: IP67 (conform IEC 60529)
Sterilizable	: Up to 135 °C (275 °F)
CIP cleaning possible	: YES

2.8 Mechanical specifications

Process connection	: PG13.5

2.9 Regulatory standards

Equipment ratings:

Item	Description	Values
Electrical parameters	Max. input voltage Max. input current Max. input power Max. internal capacitance Max. internal inductance	Ui = 18 VDC Ii = 170 mA Pi = 400 mW Ci = 0.0 nF for connector types without ID-chip = 0.4 nF for connector types with ID-chip = 150 nF for permanent cable types Li = 0.0 mH for connector types Li = 0.1 mH for permanent cable types
Temperature class	T6 T5 T4 T3	-40°C ≤ Ta ≤ +40°C -40°C ≤ Ta ≤ +55°C -40°C ≤ Ta ≤ +55°C -40°C ≤ Ta ≤ +105°C
Specific conditions of use	Potential electrostatic charging hazard: pH sensors containing accessible plastic parts and/or external conductive parts must be installed and used in such a way, that dangers of ignition due to hazardous electrostatic charges cannot occur, especially in the case that the process medium is non-conductive. Use a damp cloth for cleaning the equipment.	

Note 1: Models without ID-chip (-A*P-*** type):
I/O signals are from/to an associated intrinsically safe certified pH/ORP transmitter (e.g. Yokogawa transmitter Model FLX21/FLX202 series or Yokogawa transmitter Model PH202S series).

Models with ID-chip (-B*P-*** type):
I/O signals are from/to an associated intrinsically safe certified pH/ORP transmitter, Yokogawa Smart Adapter Model SA11-P1.

When the sensor has been connected to non-intrinsically safe equipment which exceeds the restrictions regarding the sensor input circuits, the sensor is not suitable anymore for intrinsically safe use.

Regulatory compliances:

Item	Description, Approval, Certification
LVD	▪ ANSI/ISA 61010-1 ▪ CAN/CSA C22.2 No. 61010-1
RoHS	EU Directive 2011/65/EU and Commission Delegated Directive (EU) 2015/863 amending Annex II, applying Annex IV as regards the application of the sensors, detectors and electrodes per ▪ EN-IEC 63000
PED [1]	EU Directive 2011/68/EU applying Article 4.3: Sound Engineering Practice.
WEEE	EU directive 2012/19/EU This sensor is intended to be sold and used only as a part of equipment which is excluded from the WEEE directive, such as large-scale stationary industrial tools, a large-scale fixed installation etc., and therefore it is in principle fully compliant with WEEE directive. The sensor should be disposed in accordance with applicable national legislations/regulations respectively.
ATEX (EU)	EU Directive 2014/34/EU ATEX approval: DEKRA 11ATEX0014 X CE 0344 Ex II 1 G Ex ia IIC T3…T6 Ga Applied standards: ▪ EN IEC 60079-0 ▪ EN 60079-11
IECEx	IECEx approval: IECEx DEK 11.0064X Ex ia IIC T3…T6 Ga Applied standards: ▪ IEC 60079-0 ▪ IEC 60079-11
FM (Canada)	FM approval Canada: FM20CA0062X IS SI CL I, DIV 1, GP ABCD, T3…T6 CL I, ZN 0, Ex ia IIC, T3…T6 Ga Control Drawing: D&E 2020-023-A51 Applied standards: ▪ CAN/CSA-C22.2 No. 60079-0 ▪ CAN/CSA-C22.2 No. 60079-11 ▪ CAN/CSA-C22.2 No. 61010-1

[1] Damaging the screw thread of the sensor might influence the maximum process pressure

Item	Description, Approval, Certification
FM (United States)	FM approval United States: FM20US0123X IS CL I, DIV 1, GP ABCD, T3…T6 CL I, ZN 0, AEx ia IIC, T3…T6 Ga Control Drawing: D&E 2020-023-A50 Applied standards: ▪ FM Class 3600 ▪ FM Class 3610 ▪ ANSI/ISA 60079-0 ▪ ANSI/ISA 60079-11 ANSI/ISA 61010-1
NEPSI (China)	NEPSI approval: GYJ21.2891X Ex ia IIC T3…T6 Ga Applied standards: ▪ GB 3836.1 ▪ GB 3836.4 ▪ GB 3836.20
PESO (India)	PESO approval: PESO approval is based on ATEX approval DEKRA 11ATEX0014 X, iss. 2 – 29.11.2019 Equipment reference numbers: P512760/1 Applied standards: ▪ EN IEC 60079-0 ▪ EN 60079-11
TS (Taiwan)	TS approval: TS Safety Label is based on IECEx approval IECEx DEK 11.0064X Identification Number: TD04000C Applied standards: ▪ IEC 60079-0 ▪ IEC 60079-11
EAC Ex (Russia)	EAC Ex certificate: RU C-NL.AA87.B.00754 0Ex ia IIC T6…T3 Ga X Applied standards: ▪ GOST 31610.0 (IEC 60079-0) ▪ GOST 31610.11 (IEC 60079-11) ▪ GOST IEC 60079-14

Label information:
The Model Suffix information as well as manufacturer information is written on a product label on or in the product. Example of a product label inside SC25V see example in figure 1.

Figure 1: Sensor MS code label

For other region specific information, the product label is not big enough to show all details. Therefore, for this information an additional label is provided. This label needs to be attached to the sensor cable. Label content of additional label, see example in figure 2.

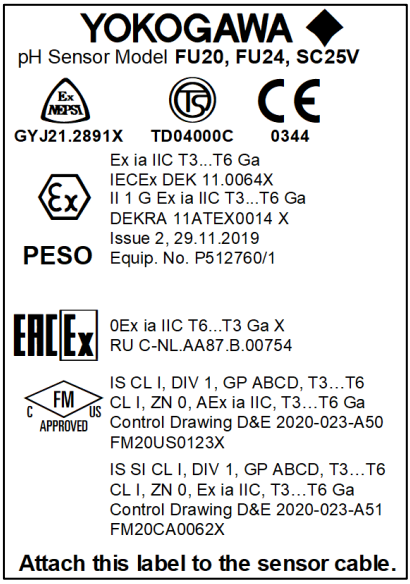


Figure 2: Additional info label

FM-United States

Applying standards	: FM Class 3600 FM Class 3610 FM Class 3810 ANSI/ISA 60079-0 ANSI/ISA 60079-11
Certificate no.*	: FM20US0123X IS CL I, DIV 1, GP ABCD, T3…T6 CL I, ZN 0, AEx ia IIC, T3…T6 Ga Control Drawing: D&E 2020-023-A50
Electrical data	: See Note 3
Specific conditions of use	: See Control Drawing D&E 2020-023-A50

Note 3: Intrinsically safe, entity, for Class I, Division 1, Groups A, B, C and D;
Class I, Zone 0, AEx ia IIC, Ga (entity) for hazardous (classified) locations when installed per control drawing D&E 2020-023-A50.
Sensor input parameters:
Ui= 18V; Ii= 170 mA; Pi= 0.4 W;
Li= 0 mH
Ci= 0.4 nF (Suffix SC25V-B…with ID chip):
Ci= 0 nF (Suffix SC25V-A…without ID-chip)

Ambient temperature:
-40 °C to +40 °C for temperature class T6,
-40 °C to +55 °C for temperature class T4 and T5,
-40 °C to +105 °C for temperature class T3.

When the sensor has been connected to non intrinsically safe equipment which exceeds the restrictions regarding the sensor input circuits, the sensor is not suitable anymore for intrinsically safe use.

* Certification is subject to change, due to new regulations or changes in the product itself. When a certificate is updated, a new revision under the same certificate number is created with a new date.

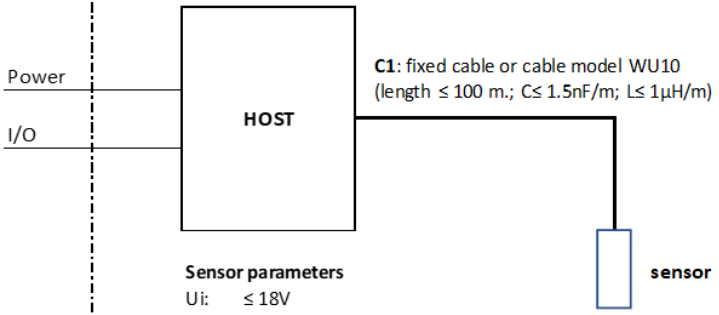
- FM-United States:
  FM20US0123X (effective from 03-2021)

Control drawing: D&E 2020-023-A50 (part 1)

Non-hazardous Location

Hazardous Location

IS CL I, DIV 1, GP ABCD T3 / T4 / T5 / T6
CL I, ZN 0, AEx ia IIC, T3…T6 Ga
Ta 105°C / 55°C / 55°C / 40°C



Sensor parameters

Ui: ≤ 18V
Ii: ≤ 170mA
Pi: ≤ 400mW
Ci: ≤ 0nF for sensor models with connector (without ID-chip)
≤ 0.4nF for sensor models with connector (including ID-chip)
≤ 150nF for sensor models with permanent cable
Remark:
Sensor Ci (in case of an integral cable the Ci includes the capacitance of the cable) shall not exceed the Co of the HOST.
Li: ≤ 0mH for sensor models with connector (without ID-chip)
≤ 0mH for sensor models with connector (including ID-chip)
≤ 0.1mH for sensor models with permanent cable
Remark:
Sensor Li (in case of an integral cable the Li includes the inductance of the cable) shall not exceed the Lo of the HOST.

Remarks:

1 No revision to this drawing without prior approval of FM.

2 Installation must be in accordance with the National Electrical Code (ANSI/NFPA 70), ANSI/ISA-RP12.06.01, and relevant local codes.

3 The sensor shall be installed to a certified intrinsically safe HOST with the following maximum values: Uo= 18 V, Io = 170 mA, Po = 400mW.

4 The sensor does not provide isolation from earth. Installers shall take necessary measures to prevent the possibility of sparking resulting from differing earth potentials between the sensors and interconnecting equipment. This can be realized for example by selecting interconnecting equipment which provides input-to-output and input-to-earth isolation up to 500 V rms.

5 Sensor Model code:

Table 3:

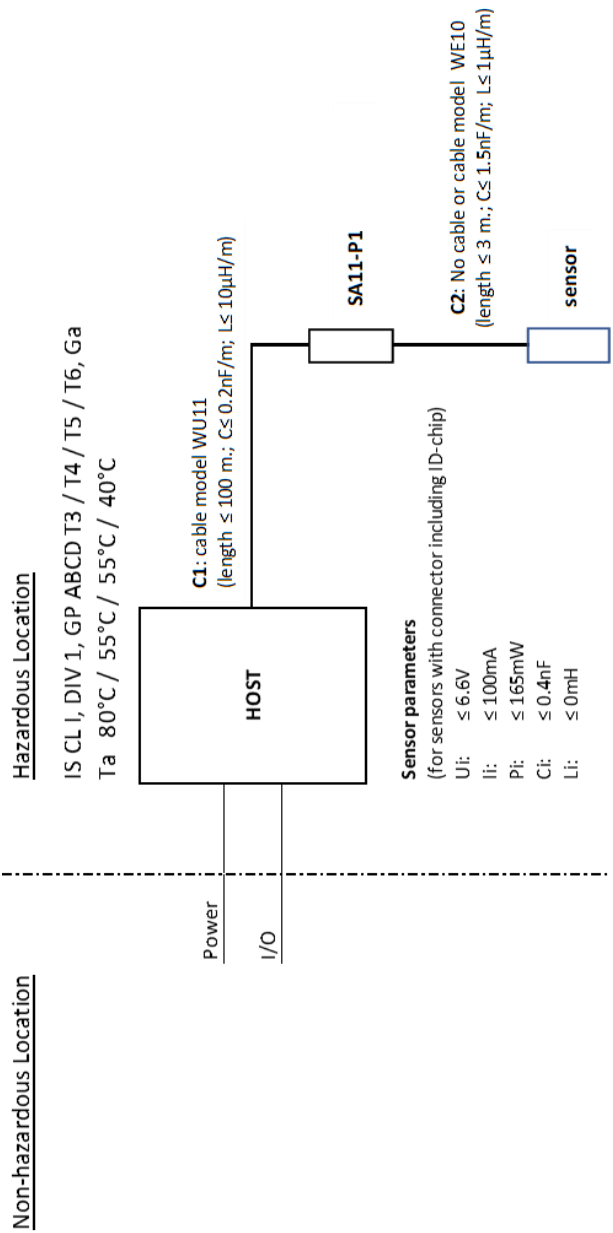
Model	Suffix Codes	Option Codes
SC25V	-abcde-fgh	/j

abcde	Type + Region:	AGP25	Glass body/Straight Thread/Bulb shaped G-glass/without ID-chip/IS for ATEX/IECEx, FM-US, FM-CAN
		ALP25	Glass body/Straight Thread/Bulb shaped L-glass/without ID-chip/IS for ATEX/IECEx, FM-US, FM-CAN
fgh	Sensor length:	Up to three alphanumeric characters (0 to 9)	
j	Option code:	Up to ten alphanumeric characters (A to Z, 0 to 9 or hyphen)	

6 WARNING－POTENTIONAL ELECTROSTATIC CHARGING HAZARD – SEE INSTRUCTIONS

pH sensors containing accessible plastic parts and/or external conductive parts, must be installed and used in such a way, that dangers of ignition due to hazardous electrostatic charges cannot occur, especially in the case that the process medium is non-conductive.

Control drawing: D&E 2020-023-A50 (part 2)



Remarks:

1 No revision to this drawing without prior approval of FM.

2 Installation must be in accordance with the National Electrical Code (ANSI/NFPA 70), ANSI/ISA-RP12.06.01, and relevant local codes.

3 The sensor shall be installed to a certified intrinsically safe Smart Adapter, model SA11-P1 with the following maximum values: Uo= 6.6 V, Io = 100 mA, Po = 165 mW.

4 The installers shall take necessary measures to prevent the possibility of sparking resulting from differing earth potentials between the sensors and interconnecting equipment. The sensor itself does not provide 500 V rms isolation from earth, the interconnecting equipment Model SA11-P1 Smart Adapter however provide this required isolation.

5 Sensor Model code:

Table 4:

Model	Suffix Codes	Option Codes
SC25V	-abcde-fgh	/j

abcde	Type + Region:	BGP25	Glass body/Straight Thread/Bulb shaped G-glass/with ID-chip/IS for ATEX/IECEx, FM-US, FM-CAN
		BLP25	Glass body/Straight Thread/Bulb shaped L-glass/with ID-chip/IS for ATEX/IECEx, FM-US, FM-CAN
fgh	Sensor length:	Up to three alphanumeric characters (0 to 9)	
j	Option code:	Up to ten alphanumeric characters (A to Z, 0 to 9 or hyphen)	

6 WARNING－POTENTIONAL ELECTROSTATIC CHARGING HAZARD – SEE INSTRUCTIONS

pH sensors containing accessible plastic parts and/or external conductive parts, must be installed and used in such a way, that dangers of ignition due to hazardous electrostatic charges cannot occur, especially in the case that the process medium is non-conductive.

FM-Canada

Applying standards	: CAN/CSA-C22.2 No. 60079-0 CAN/CSA-C22.2 No. 60079-11
Certificate no.*	: FM20CA0062X IS CL I, DIV 1, GP ABCD, T3…T6 CL I, ZN 0, Ex ia IIC, T3…T6 Ga Control Drawing: D&E 2020-023-A51
Electrical data	: See Note 4.
Specific conditions of use	: See Control Drawing D&E 2020-023-A51.

Note 4: Intrinsically safe, entity, for Class I, Division 1, Groups A, B, C and D;
Class I, Zone 0, Ex ia IIC, Ga (entity) for hazardous (classified) locations when installed per control drawing D&E 2020-023-A51.
Sensor input parameters:
Ui= 18 V; Ii= 170 mA; Pi= 0.4 W; Li= 0 mH
Ci= 0.4 nF (Suffix SC25V-B…with ID chip):
Ci= 0 nF (Suffix SC25V-A…without ID-chip)

Ambient temperature:
-40 °C to +40 °C for temperature class T6,
-40 °C to +55 °C for temperature class T4 and T5,
-40 °C to +105 °C for temperature class T3.

When the sensor has been connected to non intrinsically safe equipment which exceeds the restrictions regarding the sensor input circuits, the sensor is not suitable anymore for intrinsically safe use.

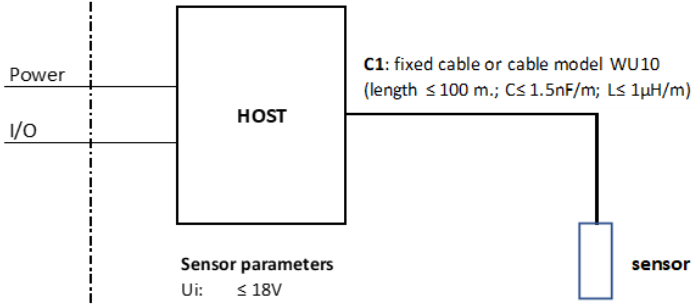
* Certification is subject to change, due to new regulations or changes in the product itself. When a certificate is updated, a new revision under the same certificate number is created with a new date.

- FM-Canada:
  FM20CA0062X (effective from 03-2021)

Non-hazardous Location

Hazardous Location

IS, SI, CL I, DIV 1, GP ABCD T3 / T4 / T5 / T6
CL I, ZN 0, Ex ia IIC, T3...T6 Ga
Ta 105°C / 55°C / 55°C / 40°C



Sensor parameters

Ui: ≤ 18V
Ii: ≤ 170mA
Pi: ≤ 400mW
Ci: ≤ 0nF for sensor models with connector (without ID-chip)
≤ 0.4nF for sensor models with connector (including ID-chip)
≤ 150nF for sensor models with permanent cable
Remark:
Sensor Ci (in case of an integral cable the Ci includes the capacitance of the cable) shall not exceed the Co of the HOST.
Li: ≤ 0mH for sensor models with connector (without ID-chip)
≤ 0mH for sensor models with connector (including ID-chip)
≤ 0.1mH for sensor models with permanent cable
Remark:
Sensor Li (in case of an integral cable the Li includes the inductance of the cable) shall not exceed the Lo of the HOST.

Remarks:

1 No revision to this drawing without prior approval of FM.

2 Installation must be in accordance with the Canadian Electrical Code (CEC) CSA22.1, and relevant local codes.

3 The sensor shall be installed to a certified intrinsically safe HOST with the following maximum values: Uo= 18 V, Io = 170 mA, Po = 400mW.

4 The sensor does not provide isolation from earth. Installers shall take necessary measures to prevent the possibility of sparking resulting from differing earth potentials between the sensors and interconnecting equipment. This can be realized for example by selecting interconnecting equipment which provides input-to-output and input-to-earth isolation up to 500 V rms.

5 Sensor Model code:

Table 5:

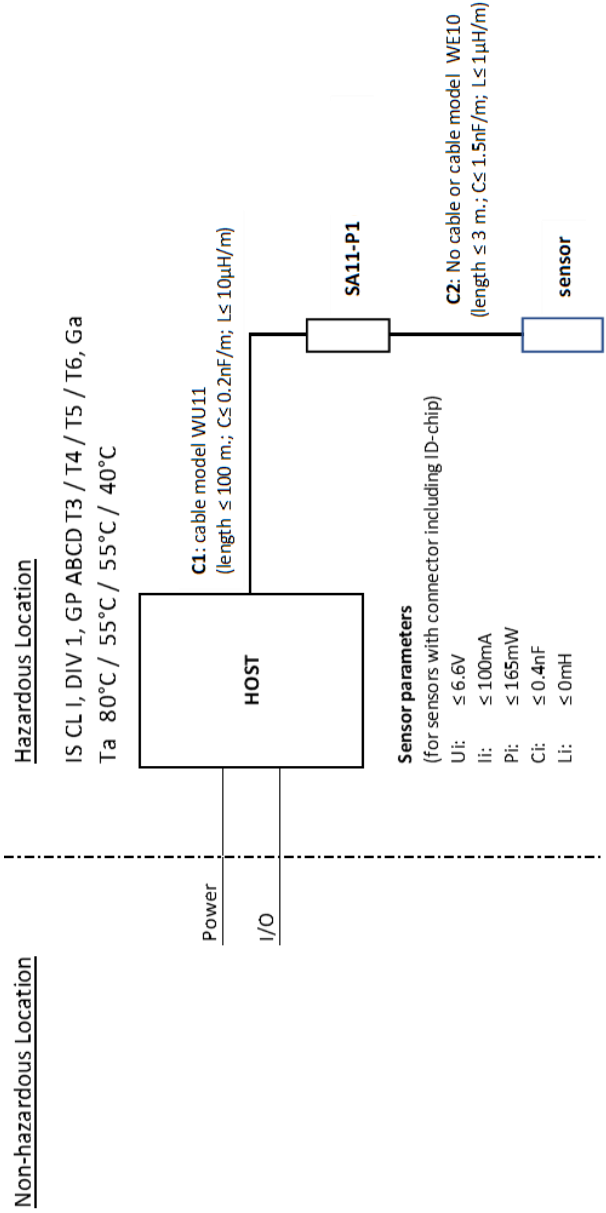
Model	Suffix Codes	Option Codes
SC25V	-abcde-fgh	/j

abcde	Type + Region:	AGP25	Glass body/Straight Thread/Bulb shaped G-glass/without ID-chip/IS for ATEX/IECEx, FM-US, FM-CAN
		ALP25	Glass body/Straight Thread/Bulb shaped L-glass/without ID-chip/IS for ATEX/IECEx, FM-US, FM-CAN
fgh	Sensor length:	Up to three alphanumeric characters (0 to 9)	
j	Option code:	Up to ten alphanumeric characters (A to Z, 0 to 9 or hyphen)	

6 WARNING－POTENTIONAL ELECTROSTATIC CHARGING HAZARD – SEE INSTRUCTIONS
pH sensors containing accessible plastic parts and/or external conductive parts, must be installed and used in such a way, that dangers of ignition due to hazardous electrostatic charges cannot occur, especially in the case that the process medium is non-conductive.

AVERTISSEMENT –
DANGER POTENTIEL DE CHARGES ÉLECTROSTATIQUES – VOIR LES INSTRUCTIONS
Les sondes de pH contenant des pièces en plastique accessibles et / ou des pièces conductrices externes doivent être installées et utilisées de manière à éviter tout risque d'inflammation dû à des charges électrostatiques dangereuses, en particulier dans le cas où le fluide de procédé n'est pas conducteur.

Control drawing: D&E 2020-023-A51 (part 2)



Remarks:

1. No revision to this drawing without prior approval of FM.
2. Installation must be in accordance with the Canadian Electrical Code (CEC) CSA22.1, and relevant local codes.
3. The sensor shall be installed to a certified intrinsically safe Smart Adapter, model SA11-P1 with the following maximum values: Uo= 6.6 V, Io = 100 mA, Po = 165 mW.
4. The installers shall take necessary measures to prevent the possibility of sparking resulting from differing earth potentials between the sensors and interconnecting equipment. The sensor itself does not provide 500 V rms isolation from earth, the interconnecting equipment Model SA11-P1 Smart Adapter however provide this required isolation.
5. Sensor Model code:

Table 6:

Model	Suffix Codes	Option Codes
SC25V	-abcde-fgh	/j

abcde	Type + Region:	BGP25	Glass body/Straight Thread/Bulb shaped G-glass/with ID-chip/IS for ATEX/IECEx, FM-US, FM-CAN
		BLP25	Glass body/Straight Thread/Bulb shaped L-glass/with ID-chip/IS for ATEX/IECEx, FM-US, FM-CAN
fgh	Sensor length:	Up to three alphanumeric characters (0 to 9)	
j	Option code:	Up to ten alphanumeric characters (A to Z, 0 to 9 or hyphen)	

WARNING—POTENTIONAL ELECTROSTATIC CHARGING HAZARD – SEE INSTRUCTIONS
pH sensors containing accessible plastic parts and/or external conductive parts, must be installed and used in such a way, that dangers of ignition due to hazardous electrostatic charges cannot occur, especially in the case that the process medium is non-conductive.

DANGER POTENTIEL DE CHARGES ÉLECTROSTATIQUES – VOIR LES INSTRUCTIONS
Les sondes de pH contenant des pièces en plastique accessibles et / ou des pièces conductrices externes doivent être installées et utilisées de manière à éviter tout risque d'inflammation dû à des charges électrostatiques dangereuses, en particulier dans le cas où le fluide de procédé n'est pas conducteur.

3. INSTALLATION OF SC25V

For optimum measurement results, the SC25V 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 SC25V is designed with PG13.5 threaded connection to allow installation in a wide variety of applications.

3.1 Typical installation

The SC25V sensor can be installed in-line, in a bypass loop or in an immersion assembly. For best results the SC25V should be mounted with the process fluid flowing towards the sensor and positioned at least 15° above the horizontal plane to eliminate air bubbles in the glass bulb.

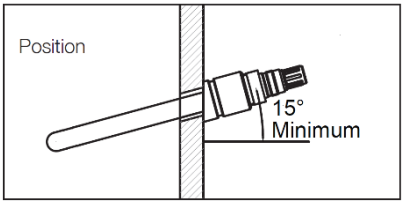


Figure 3: Minimum positioning angle

3.2 Preparing the sensor for use

Remove the sensor from its shipping box Unscrew the nut of the “wet pocket” and slide off. This wet pocket is filled with a weak acid and saline solution to prevent the sensor from drying out during storage and making sure it is ready for immediate use.

During shipment, electrolyte in the sensor could be dislocated. To correct this, place the sensor upright for 24 hours.

Although on the Quality Inspection Certificate (QIC) 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 SC25V can be mounted using:

- PR10 retractable fitting (see fig 4).
- FF20 flow fitting / FS20 subassembly / FD20 immersion fitting (see fig 6)
- For mounting in Yokogawa fittings, a PG13.5 to M25 adapter is available in different materials (see fig 5). More information in chapter 7.
- PD20 immersion fitting / PF20 flow fitting / PS20 flow fitting (see fig 7)
- FF40 fitting with PG13.5 adapter (K1523JA/ JC) or the small flow fitting (K1598AC) with PG13.5 adapter (K1523JB/JD), (see fig 8).

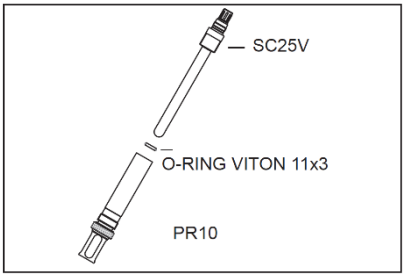


Figure 4: PR10… -PH13 (K1523AB)

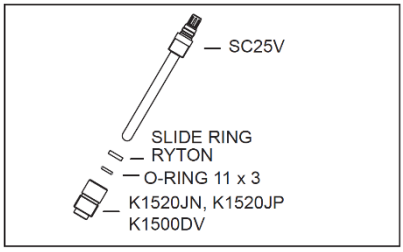


Figure 5: PG13.5 => M25 adapter

WARNING Before mounting sensor to the fitting firstly add M25 adapter on sensor.

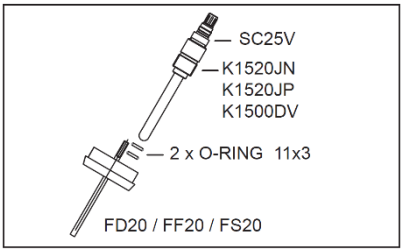


Figure 6: PG13.5 => M25 =>Flow fitting

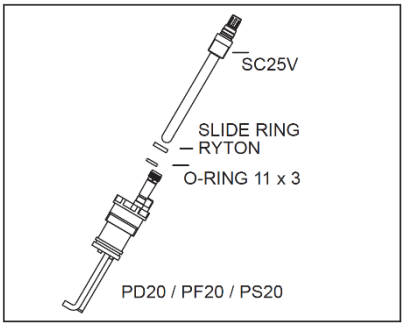


Figure 7: PG13.5 => P.20 fitting

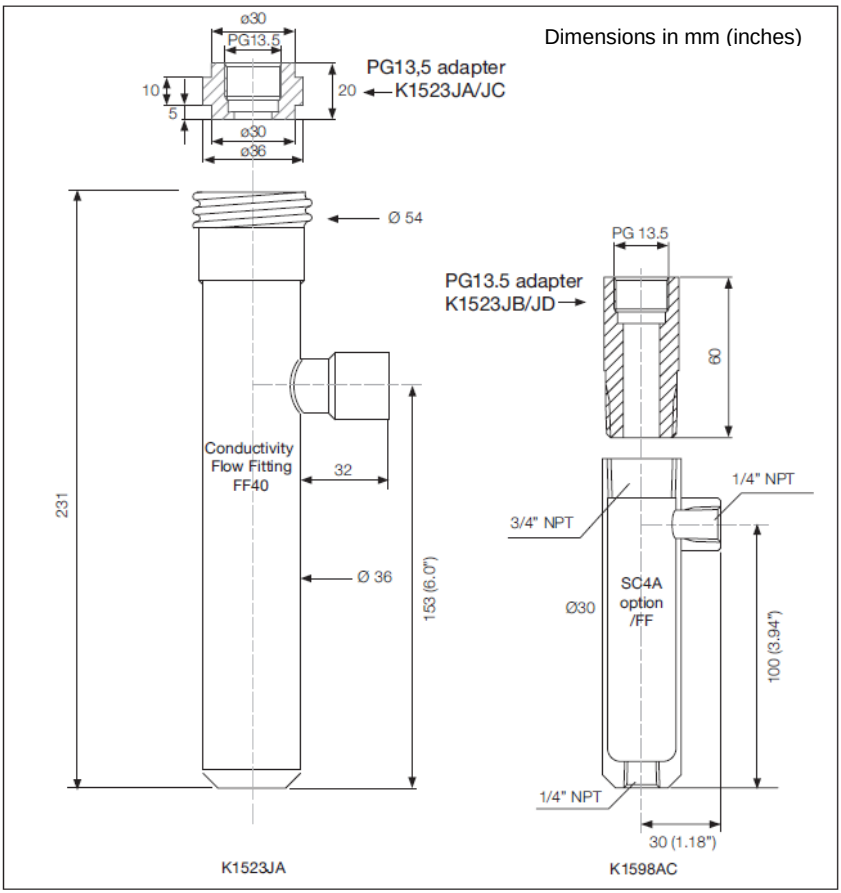


Figure 8: Flow fitting FF40

Flow fitting option /FF K1598AC (incl. 3.1 certificate)

4. DIMENSIONS

Dimension according to DIN 19263:2007-05

Criteria	: 120 mm version
L (below plug head)	: 120 ± 2 mm (4.72” ± 0.08”)
Ø shaft	: 11.9 ± 0.1 mm (0.47” ±0.004”)
Criteria	: 225 mm version
L (below plug head)	: 225 ± 2 mm (8.86” ± 0.08”)
Ø shaft	: 11.9 ± 0.1 mm (0.47” ±0.004”)

Concentricity	: < 0,25 mm (0.01”) (centerline plug head - 25 mm from tip)
Perpendicularity	: < 0,5 mm (0.02”) (plug head - 25 mm from tip)
Cylindricity	: < 0,5 mm (0.02”) (centerline sensor)

Criteria : All types
All measuring elements within 25mm from tip.

Dimensions in mm (inches)

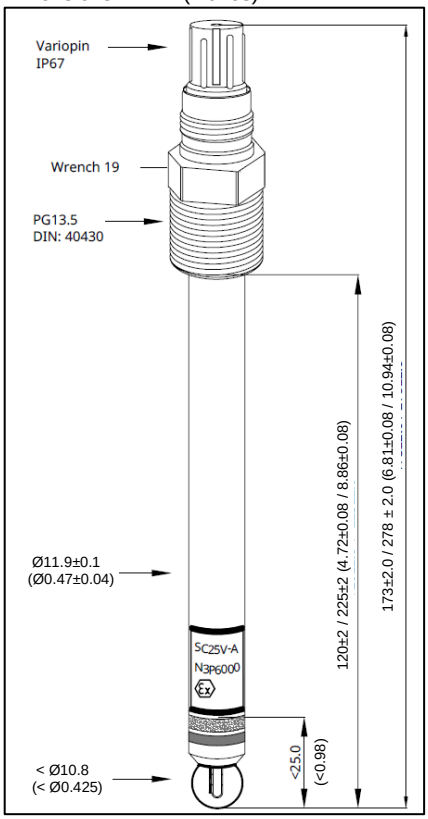


Figure 9: Dimensional drawing SC25V

5. WIRING

The SC25V sensor is provided with a 6 or 8 pins Vario Pin connector
(type SC25V-A*P25 6 pins without ID chip and SC25V-B*P25 8 pins with ID-chip).

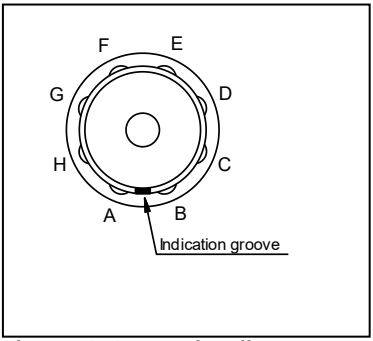


Figure 10. Connection diagram connector type (top view)

Table 7:

Pin no.	SC25V-A*P25 (6 pins)	SC25V-B*P25 (8 pins)
A	pH	pH
B	Reference	Reference
C	pH Guard	pH Guard
D	LE/ORP	LE/ORP
E	Pt1000	Pt1000
F	Pt1000	Pt1000/ID-chip GND
G	Not available	ID-chip VCC
H	Not available	ID-chip DATA

Note: Preferred connection cable is Yokogawa Model WU10-V-D or Model WE10.

6. GENERAL CALIBRATION & MAINTENANCE PROCEDURE

6.1 Calibration for pH measurement

To calibrate the SC25V 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 clean water;
3. Immerse the sensor in the first buffer (pH 6.87 is recommended) and
4. execute calibration as described in the Instruction Manual of the analyzer.
5. Rinse sensor thoroughly with clean water;
6. Immerse the sensor in the second buffer (pH 4.01 or 9.18 is recommended)
7. and execute calibration as described in the Instruction Manual of the analyzer.
8. Rinse sensor thoroughly with clean water.

During calibration, the temperature compensation should be active. The EXA/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 Maintenance of the SC25V sensor

A pH sensor requires routine maintenance to keep the measuring elements clean and functioning. When the sensitivity of the electrode has decreased or the response has slowed down, the electrode should be cleaned. Depending on the process, different cleaning solutions may be required.
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 CODES

Table 8:

Model	Suffix Code		Description
SC25V			Combined 12mm sensor: pH, Ref, LE, Temp. Equiped with Variopin connector
Sensor type	-AGP25		General purpose, Analog, IS for ATEX/IECEx/FM-US/FM-CAN/NEPSI/PESO/TS/EACEx
	-ALP25		High temp. chemical resist., Analog, IS for ATEX/IECEx/FM-US/FM-CAN/NEPSI/PESO/TS/EACEx
	-BGP25		General purpose, SENCOM ID-chip, IS for ATEX/IECEx/FM-US/FM-CAN/NEPSI/PESO/TS/EACEx
	-BLP25		High temp. chemical resist., SENCOM ID-chip, IS for ATEX/IECEx/FM-US/FM-CAN/NEPSI/PESO/TS/EACEx
Sensor length		-120	120 mm
		-225	225 mm

8. SPARE PARTS

Table 9:

Spare part		Description
K1500BV	Sealings	O-RINGS EPDM 11X3 (6 PCS.)
K1500BZ		O-RINGS VITON 11X3 (6 PCS.)
K1500GR		O-RINGS SILICON 11X3 (8PCS)
K1524AA		Set of O-ring 11x3 and slide ring Ryton
FP20-R12		Blind plug set for 1-hole
K1523JA	Adapters	Adapter Pg13.5 in F*40 PPO
K1523JC		Adapter Pg13.5 in F*40 SS
K1520JN		Adapter M25x1.5 - PG13.5 PVC
K1520JP		Adapter M25x1.5 - PG13.5 RVS
K1500DV		Adapter M25x1.5 - PG13.5 PVDF
K1523JB		Adapter PG13.5 to ¾"NPT PPO
K1523JD		Adapter PG13.5 to ¾"NPT SS
K1598AC		Flow fitting (3.1), (In combination with K1523JB/JD)
K9148NA		Adapter for mounting PG13.5-sens. in HA405-120-S3
K9148NB		Adapter for mounting PG13.5-sens. in HA405-120-PP
K9148NC		Adapter for mounting PG13.5-sens. in HA405-120-PV
K1520BA	Buffer solutions	Buffer Solution pH4.01+6.87+9.18(3x0.5L)
K1520BB		Buffer Solution pH 1.68 (3x 0.5L)
K1520BC		Buffer Solution pH 4.01 (3x 0.5L)
K1520BD		Buffer Solution pH 6.87 (3x 0.5L)
K1520BE		Buffer Solution pH 9.18 (3x 0.5L)
WU10-V-D-XX	Connection cables for Suffix -A*P,-B*P	Variopin cable (XX = 02, 05, 10, 15 and 20m)
WU10-V-S-XX		Variopin cable (XX = 02, 05, 10, 15 and 20m)
WE10-H-D-XX		Extension cable for SENCOM SA11
BA11	Connection equipment for Suffix -VS	Active Junction box
SA11-P1		SENCOM SMART adapter
WU11		Interconnection cable
IB100		Interface box

9. CHEMICAL COMPATIBILITY CHART

Table10:

				Material																			
				Viton			EPDM			Ti			PTFE (teflon)			PEEK			Glass		
		Conc.%	Temp. °C	20	60	100	20	60	100	20	60	100	20	60	100	20	60	100	20	60	100
Inorganic acid	Sulfiric acid	10		o	o	o	o	o	o	-	-	-	o	o	o	o	o	o	o	o	o
		50		o	o	o	o	x	-	-	-	-	o	o	o	o	o	o	o	o	o
		95		o	o	o	x	-	-	-	-	-	o	o	o	-	-	-	o	o	o
		fuming		o	o	o	-	-	-	-	-	-	o	o	o	-	-	-	o	o	o
	Hydrochloric acid	10		o	o	o	o	o	o	-	-	-	o	o	o	o	o	x	o	o	o
		sat.		o	o	o	x	x	x	-	-	-	o	o	o	o	o	x	o	o	o
	Nitric acid	25		o	o	x	o	x	-	o	o	o	o	o	o	o	o	o	o	o	o
		50		-	-	-	-	-	-	o	o	o	o	o	o	x	x	x	o	o	o
		95		-	-	-	-	-	-	o	o	o	o	o	o	-	-	-	o	o	o
		fuming		-	-	-	-	-	-				o	o	o	-	-	-	o	o	o
	Phosphoric acid	25		o	o	o	o	o	o	x	x	-	o	o	o	o	o	o	o	o	o
		50		o	o	o	o	o	o	x	-	-	o	o	o	o	o	o	o	o	o
		95		x	x	-	o	o	o	x	-	-	o	o	o	o	o	o	o	o	o
	Hydrofluoric acid	40		o	o	o	-	-	-	-	-	-	o	o	o	-	-	-	x	x	x
		75		o	o	x	-	-	-	-	-	-	o	o	o	-	-	-	-	-	-
Organic acid	Acetic acid	10		-	-	-	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
		glacial		-	-	-	x	x	x	o	o	o	o	o	o	o	o	x	o	o	o
	Formic acid	80		-	-	-	o	o	x	x	x	-	o	o	o	x	x	x	o	o	o
	Citric acid	50		o	o	o	o	o	o	x	x	x	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
	Potassium hydroxide	50		o	o	o	o	x	-	o	x	-	o	o	o	o	o	o	o	o	x
	Sodium hydroxide	40		x	x	x	o	x	-	x	x	-	o	o	o	o	o	o	o	o	x
	Ammonia in water	30		x	x	x	o	o	o	x	x	-	o	o	o	o	o	o	o	o	x
Acid salt	Ammonium chloride	sat.		o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
	Zinc chloride	50		o	o	o	o	o	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
	Sodium sulfite	sat.		-	-	-	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Basic salt	Sodium carbonate	sat.		o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
	Potassium chloride	sat.		o	o	o	o	o	o	o	o	x	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
	Calcium chloride	sat.		o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Neutral salt	Sodium chloride	sat.		o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
	Sodium nitrate	50		o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
	Aluminium chloride	sat.		o	o	o	o	o	o	o	o	x	o	o	o	o	o	o	o	o	o
	Hydrogen peroxide	30		o	o	o	o	o	x	o	o	o	o	o	o	o	o	o	o	o	o
Oxidizing agent	Sodium Hypochloride	50		o	o	x	o	o	o	x	-	-	o	o	o	o	o	o	o	o	o
	Potassium dichromate	sat.		o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
	Chlorinated lime												o	o	o	x	x	x	o	o	o
	Ethanol	80		x	-	-	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Organic solvent	Cyclohexane			o	o	o	-	-	-	o	o	o	o	o	o	o	o	o	o	o	o
	Toluene			-	-	-	-	-	-	o	o	o	o	o	o	o	o	o	o	o	o
	Trichloroethane			x	x	x	-	-	-	o	o	o	o	o	o	o	o	o	o	o	o
	Water			o	o	o	o	o	o	o	o	o	o	o	x	o	o	o	o	o	o

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 responsibility for claims related to this information.

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