

Features

- **Power:** Loop-powered 12...28V DC
- **Interchangeable Sensors:** The F12iS accommodates 60 different sensor modules
- **Sensor Verification:** Auto-test generator option provides a true gas response test. Test history is stored in sensor memory for user review at any time
- **LCD Graphic Display:** Allows clear gas concentration display plus complete menu-driven operator interface
- **Heated Sensor Option:** A heated sensor holder allows operation in high humidity to avoid condensation problems
- **Remote Sensor:** A junction box with digital output allows sensor location up to 100 ft from the F12iS display unit
- **Internal Data Logger:** Gas values are stored at user defined intervals from 1...60 minutes. Stored data may be reviewed or graphed on the LCD display
- **Calibration History:** Sensor calibration adjustments of zero and span are stored in sensor memory and may be viewed on the F12iS display
- **Communication:** F12iS is available with optional HART® output
- **Approvals:**



Flow Cell and Calibration Adapters

Calibration adapters slide into the sensor holder for easy connection of calibration gas. A flow cell assembly is also available where pumped sampling systems are used.

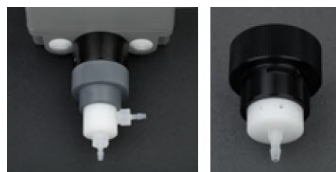


Figure 1: Calibration adapters

An accessory device called a "sensor keeper" is available for storing standby spares. The keeper provides sensor bias circuitry that maintains spare sensors in a ready-to-use state without the need for stabilization time.



Figure 2: Sensor keeper



Installation Options

The sensor holder in the F12iS is normally mounted to the transmitter enclosure. For applications where this configuration is not ideal, there are a number of different configurations for meeting specific requirements. These include a 6 foot (1.9 m) cable extension, a remote junction box for longer sensor separation distances and a duct mount sensor.



Figure 3: F12iS with integral sensor holder
Figure 4: F12iS with integral sensor holder and auto-test generator



Figure 5: 6 foot extended sensor holder
Figure 6: Insertion sensor assembly
Figure 7: Remote sensor holder and digital interface

SPECIFICATIONS

Sensor Type	Electrochemical cell
Gas Type	Sensor dependent
Range	User adjustable within limits of selected sensor
Response Time	Sensor dependent
Accuracy	Generally $\pm 10\%$ of value, limited by available calibration gas accuracy
Repeatability	$\pm 1\%$ (Electronic)
Linearity	$\pm 0.5\%$ (Electronic)
Zero Drift	Less than 2% full scale per month
Span Drift	Dependent on operating environment but generally less than 3% per month
Analog Output	4...20 mA, 600 ohms max at 24V DC
Serial Interface	(Optional) HART® digital signaling over the 4...20mA current loop
Power Requirements	(Standard and HART option) powered from 4...20 mA loop, 12...28V DC, 25 mA max I.S. barrier required for hazardous locations
Additional Power Requirements	Auxiliary power for Heated Sensor Housing option, 24V DC, 93 mA max
Enclosure	IP 65, polycarbonate with stainless steel hardware. Weatherproof and corrosion resistant (Standard) HWD: 4.4 in. (112 mm) \times 4.4 in. (112 mm) \times 3.5 in. (89 mm) (with optional) HWD: 4.9 in. (124 mm) \times 4.9 in. (124 mm) \times 5.5 in. (139 mm)
CE Mark	2014/34/EU – ATEX directive 2014/30/EU – Electromagnetic compatibility
Certifications	ETL: Class I, Division 1, Groups A-D, T4 Class I, Zone 0, Group IIC T4 ATEX: (Ex) II 1 G Ex ia IIC T4 Ga Tamb -30°C to $\leq 60^{\circ}\text{C}$; IP65 IECEX: Ex ia IIC T4 Ga (IECEX ETL.14.0032X) $-30^{\circ}\text{C} \leq T_a \leq 60^{\circ}$
Mounting	(Standard) Wall or pipe mount bracket. U-Bolts suitable for 1.5 in. or 2 in. I.D. (Optional) panel mount kit available.
Auto-Test Option	Dependent on sensor gas type and full scale range
Display	96x32 dot-matrix graphic LCD, backlit, transfective
Controls	Four dome-type push buttons Remote alarm reset input (with optional alarm relays only)
Operating Environment	$-22...140^{\circ}\text{F}$ ($-30...60^{\circ}\text{C}$) Minimum temperature for O2 sensor is 14°F (-10°C) 10...95% RH (non-condensing) IP 65
Weight	(Standard) 1 lb (0.45 kg)

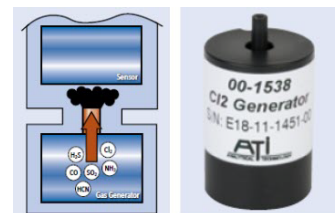
Smart Sensors

The F12iS uses Badger Meter smart sensors that allow easy interchangeability. Each sensor contains signal conditioning electronics and data memory. Sensors can be calibrated using a spare unit in the shop to avoid using calibration gases in the plant. Sensors may be returned to Badger Meter for factory calibration, which is useful for gases that are costly or difficult to obtain. Each sensor adjustment (zero or span) is stored in sensor memory and can be reviewed on the F12iS display. This data is very useful in assessing the sensor's condition and estimating sensor life.



Automatic Sensor Verification

With the F12iS, users can take advantage of the unique auto-test sensor verification system. While other gas transmitters rely on less reliable electronic sensor tests, the auto-test system consists of an actual gas test. A test gas is generated right at the sensor and the response of the sensor is verified. Manual bump testing to verify response is eliminated, greatly reducing maintenance requirements.



Available Sensors

00-1000*	Br ₂ , 0...1/5 ppm (00...1538)	00-1024	AsH ₃ , 0...500/2000 ppb
00-1001*	Br ₂ , 0...5/200 ppm (00...1538, 20 max)	00-1025	AsH ₃ , 0...10/200 ppm
00-1002*	Cl ₂ , 0...1/5 ppm (00...1538)	00-1026	B ₂ H ₆ , 0...500/2000 ppb
00-1003*	Cl ₂ , 0...5/200 ppm (00...1538, 20 max)	00-1027	B ₂ H ₆ , 0...10/200 ppm
00-1004*	ClO ₂ , 0...1/5 ppm (00...1538)	00-1028	GeH ₄ , 0...500/2000 ppb
00-1005*	ClO ₂ , 0...5/200 ppm (00...1538, 20 max)	00-1029	GeH ₄ , 0...10/200 ppm
00-1359	ClO ₂ , 200/1000 ppm	00-1030	H ₂ Se, 0-500/2000 ppb
00-1425*	ClO ₂ , 0...1/5 ppm (low Cl ₂) (00...1538)	00-1031	H ₂ Se, 0...10/200 ppm
00-1006*	F ₂ , 0...1/5 ppm (00...1538)	00-1032	PH ₃ , 0...500/2000 ppb
00-1007*	F ₂ , 0...5/200 (00...1538, 20 max)	00-1033	PH ₃ , 0...10/200 ppm
00-1008*	O ₃ , 0...1/5 ppm (00...1538)	00-1034	PH ₃ , 0...200/2000 ppm
00-1008*	O ₃ , 0...5/200 ppm (00...1538, 20 max)	00-1035	SiH ₄ , 0...10/200 ppm
00-1358	O ₃ , 200/1000 ppm	00-1036*	I ₂ , 0...1/5 ppm (00...1538)
00-1163	O ₃ , 500/2000 ppb (00...1538)	00-1037*	I ₂ , 0...5/200 ppm (00...1538, 20 max)
00-1010*	NH ₃ , 0...50/500 ppm (00...1539, 100 max)	00-1038*	Acid Gas, 0...10/200 ppm (00...1538,20 max)
00-1011	NH ₃ , 0...500/2000 ppm	00-1039*	ETO, 0...20/200 ppm (00...1540, 20 max)
00-1012*	CO, 0...50/1000 ppm (00...1540, 100 max)	00-1040	HCOH, 0...20/200 ppm (00...1540, 20 max)
00-1013	H ₂ , 0...1/10%	00-1349	HCOH, 500/2000 ppm
00-1041	H ₂ , 0...500/2000 ppm	00-1042	H ₂ O ₂ , 0...10/100 ppm (00...1542)
00-1014	O ₂ , 0...5/25%	00-1169	H ₂ O ₂ , 200/2000 ppm
00-1015	COCl ₂ , 0...1/5 ppm	00-1043	Alcohol, 0...50/500 ppm
00-1016	COCl ₂ , 0...5/100 ppm	00-1044	Alcohol, 0...500/2000 ppm
00-1017*	HCl, 0...10/200 ppm (00...1541, 20 max)	00-1057	C ₂ H ₂ , 0...50/500 ppm
00-1018*	HCN, 0...10/200 ppm (00...1611, 20 max)	00-1181	NOX, 0...50/500 ppm
00-1019*	HF, 0...10/200 ppm (00...1538, 20 max)	00-1450*	DMA, 100/200 ppm (00...1539, 100 max)
00-1020*	H ₂ S, 0...10/200 ppm (00...1541, 100 max)	00-1455*	HBr, 10/200 ppm (00...1538, 20 max)
00-1469	H ₂ S, 200/1000 ppm	00-1516	HC Sensor – consult factory)
00-1021	NO, 0...50/500 ppm	00-1045	CH ₃ COOH, 100/500 ppm
00-1022*	NO ₂ , 0...10/200 ppm (00...1538, 20 max)	00-1704	PAA Vapor, 1/5 ppm
00-1023*	SO ₂ , 0...10/500 ppm (00...1542, 20 max)	00-1705	PAA Vapor, 10/100 ppm

Notes: X/XX for each sensor indicates minimum and maximum ranges for that sensor.

* indicates availability of auto-test. Generator part number shown in (i.e. 00-XXXX).

Auto-test not available for ranges above indicated maximum.

Auto-Test Generators

00-1538	E18-11 Chlorine gas generator
00-1539	E18-15 Ammonia gas generator
00-1540	E18-16 Carbon monoxide gas generator
00-1541	E18-24 Hydrogen sulfide gas generator
00-1542	E18-27 Sulfur dioxide gas generator
00-1611	E18-22 HCN gas generator

ORDERING INFORMATION

F12iS transmitters are designed to use electrochemical sensors only. Specify transmitter and then select sensors from page 2. Add the auto-test generator if that feature is desired. The catalog string below is for reference only. To order, select an "Available Transmitters" configuration listed below.

Model F12iS Toxic Gas Transmitter

Suffix A - Power	
1	24V DC, loop-powered
Suffix B - Sensor Holder Style	
1	Integral sensor holder
2	Remote sensor holder with junction box (order 31-0185 interconnect cable below)
3	Integral heated sensor holder
4	Remote heated sensor holder with junction box (order 31-0068 interconnect cable below)
5	Duct mount sensor holder with 25 ft extension cable (requires 00-1388 adapter)
6	Sensor holder with 6 foot cable
7	Remote junction box plus 6 foot cable with holder
8	Remote junction box with close-coupled duct mount sensor (requires 00-1388 adapter)
Suffix C - Sensor Auto-Test	
1	No auto-test generator holder
2	With auto-test generator holder
Suffix D - Digital Output	
1	None
2	HART® interface

AVAILABLE TRANSMITTERS

00-1720	F12iS-1-1-1-1 toxic (IS) transmitter	00-1767	F12iS-1-2-2-1 toxic (IS) transmitter with remote sensor and AT
00-1721	F12iS-1-1-1-2 toxic (IS) transmitter with HART	00-1768	F12iS-1-2-2-2 toxic (IS) transmitter with remote sensor, HART and AT
00-1722	F12iS-1-1-2-1 toxic (IS) transmitter with AT	00-1769	F12iS-1-4-1-1 toxic (IS) transmitter with heated remote sensor
00-1723	F12iS-1-1-2-2 toxic (IS) transmitter with AT and HART	00-1770	F12iS-1-4-1-2 toxic (IS) with heated remote sensor, and HART
00-1724	F12iS-1-3-1-1 toxic (IS) transmitter with heated sensor	00-1771	F12iS-1-4-2-1 toxic (IS) transmitter with heated REM sensor, and AT
00-1725	F12iS-1-3-1-2 toxic (IS) transmitter with heated sensor and HART	00-1772	F12iS-1-4-2-2 toxic (IS) transmitter with heated REM sensor, HART and AT
00-1726	F12iS-1-3-2-1 toxic (IS) transmitter with AT and heated sensor	00-1773	F12iS-1-5-1-1 toxic (IS) transmitter with duct mount sensor
00-1727	F12iS-1-3-2-2 toxic (IS) transmitter with heated sensor. AT and HART	00-1774	F12iS-1-5-1-2 toxic (IS) transmitter with duct mount sensor and HART
00-1728	F12iS-1-6-1-1 toxic (IS) transmitter with 6 foot sensor	00-1775	F12iS-1-7-1-1 toxic (IS) transmitter with 6 foot remote sensor
00-1729	F12iS-1-6-1-2 toxic (IS) transmitter with 6 foot and HART	00-1776	F12iS-1-7-1-2 toxic (IS) transmitter with 6 foot remote sensor and HART
00-1765	F12iS-1-2-1-1 toxic (IS) transmitter with remote sensor holder		
00-1766	F12iS-1-2-1-2 toxic (IS) transmitter with remote sensor and HART		

ACCESSORIES

00-1056	Calibration adapter
00-1251	Flow cell assembly
03-0118	Flow cell with 03-0460 sensor cap
00-0981	Sensing module keeper for 4 sensors
00-1388	Duct sensor adapter, 1 1/2 in. MNPT
31-0185	4 conductor Interconnect cable, specify length, max 500 ft
31-0068	6 conductor interconnect cable, specify length, max 500 ft

Note: When ordering an F12iS unit with a flow cell, the 03-0460 sensor cap will be supplied in place of the standard sensor cap and does not need to be ordered separately. If a flow cell is being added to an existing F12iS, order the 03-0118 assembly which includes both the flow cell and sensor cap.