

# FLS F3.00

Paddlewheel flow sensor



# FLS F3.00

The FLS F3.00 paddlewheel flow sensor model is a simple and reliable device designed for use with any type of solid-free liquids. The sensor is capable of measuring flows from 0.15 m/s (0.5 ft/s) producing a highly repeatable output frequency signal. Extremely solid construction and consolidated technology ensure exceptional returns, with zero or very little maintenance. Dedicated electronics with push-pull output are available for safe connection to any type of digital instrument/PLC input. The family of specially designed adapters reduces installation times in pipes of all materials and sizes, from DN15 to DN600 (0.5-24").

## PADDLEWHEEL FLOW SENSOR

### APPLICATIONS

- Water treatment and regeneration
- Industrial wastewater treatment and recovery
- Finishing of fabrics
- Water distribution
- Processing and manufacturing industry
- Filtration systems
- Chemical production
- Liquid dispensing systems
- cooling monitoring
- Heat exchangers
- Swimming pools
- Pump protection

### MAIN CHARACTERISTICS

- Sensor body in C-PVC, PVDF or stainless steel
- Two lengths, for pipes from DN15 up to DN600
- Simple insertion system
- IP65 or IP68 protection class
- Measurement range over 50:1
- High chemical resistance
- Battery powered models
- Push-pull output for connection to PLC

### TECHNICAL DATA

<b>General information</b>	<b>Pipe size range:</b> Compatible sensors]:from DN15 to DN600 (0.5-24") For more details, refer to the Installation Adapters section
	<b>Flow range:</b> from 0.15 to 8 m/s (0.5-25 ft/s)
	<b>Linearity:</b> ±0.75% of full scale
	<b>Repeatability:</b> ±0.5% of full scale
	<b>Minimum Reynolds number required:</b> 4500
	<b>Protection class:</b> IP68 or IP65
	<b>Materials in contact with liquids:</b> – Sensor body: C-PVC, PVDF or AISI 316L stainless steel – O-ring: EPDM or FKM – Rotor: ECTFE (Halar®) – Shaft: Ceramic (Al <sub>2</sub> O <sub>3</sub> ) / AISI 316 Stainless Steel (for metal sensors) – Bearings: Ceramic (Al <sub>2</sub> O <sub>3</sub> ) / absent (for metal sensors)
<b>Specific data for F3.00.H</b>	<b>Supply voltage:</b> from 5 to 24 VDC ±10% regulated
	<b>Supply current:</b> < 30 mA at 24 VDC
	<b>Output signal:</b> – Square wave – Frequency: 45 Hz for nominal m/s (13.7 Hz for nominal ft/s) – type: NPN Open collector transistor – Output current: max 10 mA
	<b>Cable length:</b> 8 m standard, max 300 m

<b>Specific data for F3.00.C</b>	<b>Supply voltage:</b> from 3 to 5 VDC regulated or 3.6 V lithium battery
	<b>Supply current:</b> < 10 mA max
	<b>Output signal:</b> – Square wave – Frequency: 45 Hz for nominal m/s (13.7 Hz for nominal ft/s) – Min input impedance: 100 kΩ
	<b>Cable length:</b> 8 m standard, max 16 m
<b>Specific data for F3.00.P</b>	<b>Supply voltage:</b> from 12 to 24 VDC ±10% regulated
	<b>Supply current:</b> < 30 mA at 24 VDC
	<b>Output signal:</b> – Square wave: – Frequency: 45 Hz for nominal m/s (13.7 Hz for nominal ft/s) – Type: push-pull (for connection to NPN and PNP inputs) – Output current: max 20 mA
	<b>Cable length:</b> standard 8m (26.4ft), max 300m (990ft)
<b>Standards &amp; Approvals</b>	Manufactured under ISO 9001 Manufactured under ISO 14001 CE RoHS Compliance EAC

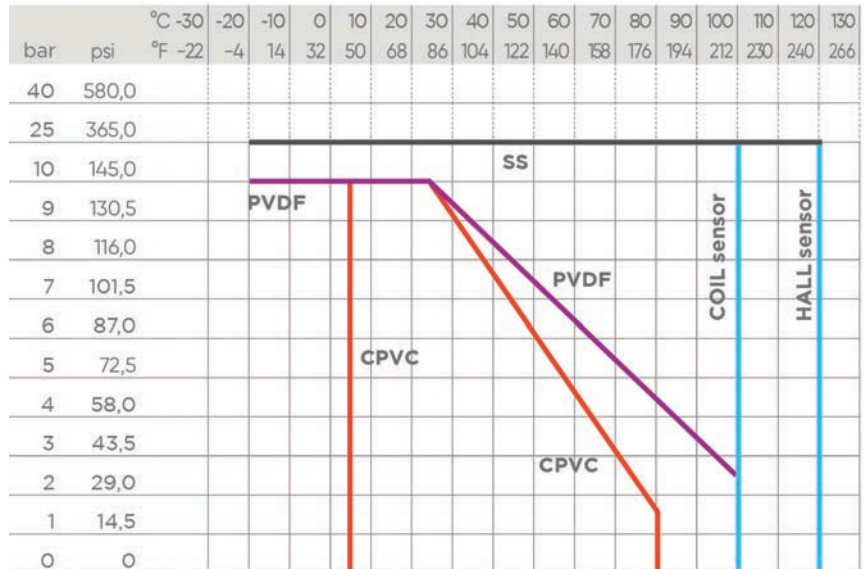
## MAX OPERATING PRESSURE/ TEMPERATURE (25-YEAR DURATION)

### F3.00.H or F3.00.P sensor

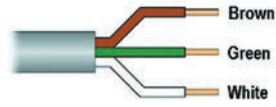
- C-PVC body:
  - 10 bar (145 psi) at 25°C (77°F)
  - 1.5 bar (22 psi) at 80°C (176°F)
- PVDF body:
  - 10 bar (145 psi) at 25°C (77°F)
  - 2.5 bar (36 psi) at 100°C (212°F)
- Stainless steel body:
  - 25 bar (363 psi) at 120°C (248°F)

### F3.00.C sensor

- C-PVC body:
  - 10 bar (145 psi) at 25°C (77°F)
  - 1.5 bar (22 psi) at 80°C (176°F)
- PVDF body:
  - 10 bar (145 psi) at 25°C (77°F)
  - 2.5 bar (36 psi) at 100°C (212°F)
- Stainless steel body:
  - 25 bar (363 psi) at 100°C (212°F)



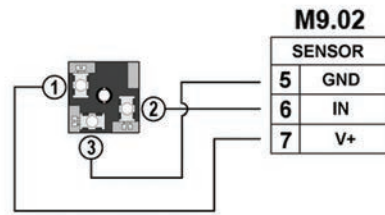
## F3.00.H IP68 SENSOR ELECTRICAL CONNECTIONS



**M9.02**

SENSOR	
5	GND
6	IN
7	V+

## F3.00.H IP65 SENSOR ELECTRICAL CONNECTIONS



**M9.02**

SENSOR	
5	GND
6	IN
7	V+

## ELECTRICAL CONNECTIONS OF F3.00.H TO OTHER INDICATORS

	M9.00	M9.50	M9.03 input 1	M9.03 input 2	M9.07	M9.08	M9.10
GND	7	30	30	16	16	16	37
FREQ	8	28	28	14	14	14	36
V+	9	27	27	13	13	13	35

# PRODUCT CODES



## F3.00.H.XX

Paddlewheel Flow Sensor (Remote version)

Code	Version	Power supply	Length	Main Wetted Materials	Enclosure	Flow Rate Range	Weight (gr.)
F3.00.H.01	Hall	5 - 24 VDC	L0	C-PVC EPDM	IP68	From 0,15 to 8 m/s*	250
F3.00.H.02	Hall	5 - 24 VDC	L0	C-PVC FKM	IP68	From 0,15 to 8 m/s*	250
F3.00.H.03	Hall	5 - 24 VDC	L1	C-PVC EPDM	IP68	From 0,15 to 8 m/s*	300
F3.00.H.04	Hall	5 - 24 VDC	L1	C-PVC FKM	IP68	From 0,15 to 8 m/s*	300
F3.00.H.05	Hall	5 - 24 VDC	L0	PVDF EPDM	IP68	From 0,15 to 8 m/s*	250
F3.00.H.06	Hall	5 - 24 VDC	L0	PVDF FKM	IP68	From 0,15 to 8 m/s*	250
F3.00.H.07	Hall	5 - 24 VDC	L1	PVDF EPDM	IP68	From 0,15 to 8 m/s*	300
F3.00.H.08	Hall	5 - 24 VDC	L1	PVDF FKM	IP68	From 0,15 to 8 m/s*	300
F3.00.H.09	Hall	5 - 24 VDC	L0	316L SS EPDM	IP68	From 0,15 to 8 m/s*	600
F3.00.H.10	Hall	5 - 24 VDC	L0	316L SS FKM	IP68	From 0,15 to 8 m/s*	600
F3.00.H.11	Hall	5 - 24 VDC	L1	316L SS EPDM	IP68	From 0,15 to 8 m/s*	650
F3.00.H.12	Hall	5 - 24 VDC	L1	316L SS FKM	IP68	From 0,15 to 8 m/s*	650
F3.00.H.13	Hall	5 - 24 VDC	L0	C-PVC EPDM	IP65	From 0,15 to 8 m/s*	250
F3.00.H.14	Hall	5 - 24 VDC	L0	C-PVC FKM	IP65	From 0,15 to 8 m/s*	250
F3.00.H.15	Hall	5 - 24 VDC	L1	C-PVC EPDM	IP65	From 0,15 to 8 m/s*	300
F3.00.H.16	Hall	5 - 24 VDC	L1	C-PVC FKM	IP65	From 0,15 to 8 m/s*	300
F3.00.H.17	Hall	5 - 24 VDC	L0	PVDF EPDM	IP65	From 0,15 to 8 m/s*	250
F3.00.H.18	Hall	5 - 24 VDC	L0	PVDF FKM	IP65	From 0,15 to 8 m/s*	250
F3.00.H.19	Hall	5 - 24 VDC	L1	PVDF EPDM	IP65	From 0,15 to 8 m/s*	300
F3.00.H.20	Hall	5 - 24 VDC	L1	PVDF FKM	IP65	From 0,15 to 8 m/s*	300
F3.00.H.21	Hall	5 - 24 VDC	L0	316L SS EPDM	IP65	From 0,15 to 8 m/s*	600
F3.00.H.22	Hall	5 - 24 VDC	L0	316L SS FKM	IP65	From 0,15 to 8 m/s*	600
F3.00.H.23	Hall	5 - 24 VDC	L1	316L SS EPDM	IP65	From 0,15 to 8 m/s*	650
F3.00.H.24	Hall	5 - 24 VDC	L1	316L SS FKM	IP65	From 0,15 to 8 m/s*	650

\* from 0,15 to 8 m/s = (0,5-25 feet/s)



## F3.00.C.XX

Paddlewheel Flow Sensor (Remote version for Battery powered monitor M9.20)

Code	Version	Power supply	Length	Main Wetted Materials	Enclosure	Flow Rate Range	Weight (gr.)
F3.00.C.01	Coil	3 - 5 VDC	L0	C-PVC EPDM	IP68	From 0,15 to 8 m/s*	250
F3.00.C.02	Coil	3 - 5 VDC	L0	C-PVC FKM	IP68	From 0,15 to 8 m/s*	250
F3.00.C.03	Coil	3 - 5 VDC	L1	C-PVC EPDM	IP68	From 0,15 to 8 m/s*	300
F3.00.C.04	Coil	3 - 5 VDC	L1	C-PVC FKM	IP68	From 0,15 to 8 m/s*	300
F3.00.C.05	Coil	3 - 5 VDC	L0	PVDF EPDM	IP68	From 0,15 to 8 m/s*	250
F3.00.C.06	Coil	3 - 5 VDC	L0	PVDF FKM	IP68	From 0,15 to 8 m/s*	250
F3.00.C.07	Coil	3 - 5 VDC	L1	PVDF EPDM	IP68	From 0,15 to 8 m/s*	300
F3.00.C.08	Coil	3 - 5 VDC	L1	PVDF FKM	IP68	From 0,15 to 8 m/s*	300
F3.00.C.09	Coil	3 - 5 VDC	L0	316L SS EPDM	IP68	From 0,15 to 8 m/s*	600
F3.00.C.10	Coil	3 - 5 VDC	L0	316L SS FKM	IP68	From 0,15 to 8 m/s*	600
F3.00.C.11	Coil	3 - 5 VDC	L1	316L SS EPDM	IP68	From 0,15 to 8 m/s*	650
F3.00.C.12	Coil	3 - 5 VDC	L1	316L SS FKM	IP68	From 0,15 to 8 m/s*	650
F3.00.C.13	Coil	3 - 5 VDC	L0	C-PVC EPDM	IP65	From 0,15 to 8 m/s*	250
F3.00.C.14	Coil	3 - 5 VDC	L0	C-PVC FKM	IP65	From 0,15 to 8 m/s*	250
F3.00.C.15	Coil	3 - 5 VDC	L1	C-PVC EPDM	IP65	From 0,15 to 8 m/s*	300
F3.00.C.16	Coil	3 - 5 VDC	L1	C-PVC FKM	IP65	From 0,15 to 8 m/s*	300
F3.00.C.17	Coil	3 - 5 VDC	L0	PVDF EPDM	IP65	From 0,15 to 8 m/s*	250
F3.00.C.18	Coil	3 - 5 VDC	L0	PVDF FKM	IP65	From 0,15 to 8 m/s*	250
F3.00.C.19	Coil	3 - 5 VDC	L1	PVDF EPDM	IP65	From 0,15 to 8 m/s*	300
F3.00.C.20	Coil	3 - 5 VDC	L1	PVDF FKM	IP65	From 0,15 to 8 m/s*	300
F3.00.C.21	Coil	3 - 5 VDC	L0	316L SS EPDM	IP65	From 0,15 to 8 m/s*	600
F3.00.C.22	Coil	3 - 5 VDC	L0	316L SS FKM	IP65	From 0,15 to 8 m/s*	600
F3.00.C.23	Coil	3 - 5 VDC	L1	316L SS EPDM	IP65	From 0,15 to 8 m/s*	650
F3.00.C.24	Coil	3 - 5 VDC	L1	316L SS FKM	IP65	From 0,15 to 8 m/s*	650

\* from 0,15 to 8 m/s = (0,5-25 feet/s)



## F3.00.P.XX

Paddlewheel Flow Sensor (for direct connection to PLC)

Code	Version	Power supply	Length	Main Wetted Materials	Enclosure	Flow Rate Range	Weight (gr.)
F3.00.P.01	Push-Pull	12 - 24 VDC	L0	C-PVC EPDM	IP68	From 0,15 to 8 m/s*	250
F3.00.P.02	Push-Pull	12 - 24 VDC	L0	C-PVC FKM	IP68	From 0,15 to 8 m/s*	250
F3.00.P.03	Push-Pull	12 - 24 VDC	L1	C-PVC EPDM	IP68	From 0,15 to 8 m/s*	300
F3.00.P.04	Push-Pull	12 - 24 VDC	L1	C-PVC FKM	IP68	From 0,15 to 8 m/s*	300
F3.00.P.05	Push-Pull	12 - 24 VDC	L0	PVDF EPDM	IP68	From 0,15 to 8 m/s*	250
F3.00.P.06	Push-Pull	12 - 24 VDC	L0	PVDF FKM	IP68	From 0,15 to 8 m/s*	250
F3.00.P.07	Push-Pull	12 - 24 VDC	L1	PVDF EPDM	IP68	From 0,15 to 8 m/s*	300
F3.00.P.08	Push-Pull	12 - 24 VDC	L1	PVDF FKM	IP68	From 0,15 to 8 m/s*	300
F3.00.P.09	Push-Pull	12 - 24 VDC	L0	316L SS EPDM	IP68	From 0,15 to 8 m/s*	600
F3.00.P.10	Push-Pull	12 - 24 VDC	L0	316L SS FKM	IP68	From 0,15 to 8 m/s*	600
F3.00.P.11	Push-Pull	12 - 24 VDC	L1	316L SS EPDM	IP68	From 0,15 to 8 m/s*	650
F3.00.P.12	Push-Pull	12 - 24 VDC	L1	316L SS FKM	IP68	From 0,15 to 8 m/s*	650
F3.00.P.13	Push-Pull	12 - 24 VDC	L0	C-PVC EPDM	IP65	From 0,15 to 8 m/s*	250
F3.00.P.14	Push-Pull	12 - 24 VDC	L0	C-PVC FKM	IP65	From 0,15 to 8 m/s*	250
F3.00.P.15	Push-Pull	12 - 24 VDC	L1	C-PVC EPDM	IP65	From 0,15 to 8 m/s*	300
F3.00.P.16	Push-Pull	12 - 24 VDC	L1	C-PVC FKM	IP65	From 0,15 to 8 m/s*	300
F3.00.P.17	Push-Pull	12 - 24 VDC	L0	PVDF EPDM	IP65	From 0,15 to 8 m/s*	250
F3.00.P.18	Push-Pull	12 - 24 VDC	L0	PVDF FKM	IP65	From 0,15 to 8 m/s*	250
F3.00.P.19	Push-Pull	12 - 24 VDC	L1	PVDF EPDM	IP65	From 0,15 to 8 m/s*	300
F3.00.P.20	Push-Pull	12 - 24 VDC	L1	PVDF FKM	IP65	From 0,15 to 8 m/s*	300
F3.00.P.21	Push-Pull	12 - 24 VDC	L0	316L SS EPDM	IP65	From 0,15 to 8 m/s*	600
F3.00.P.22	Push-Pull	12 - 24 VDC	L0	316L SS FKM	IP65	From 0,15 to 8 m/s*	600
F3.00.P.23	Push-Pull	12 - 24 VDC	L1	316L SS EPDM	IP65	From 0,15 to 8 m/s*	650
F3.00.P.24	Push-Pull	12 - 24 VDC	L1	316L SS FKM	IP65	From 0,15 to 8 m/s*	650

\* from 0,15 to 8 m/s = (0,5-25 feet/s)



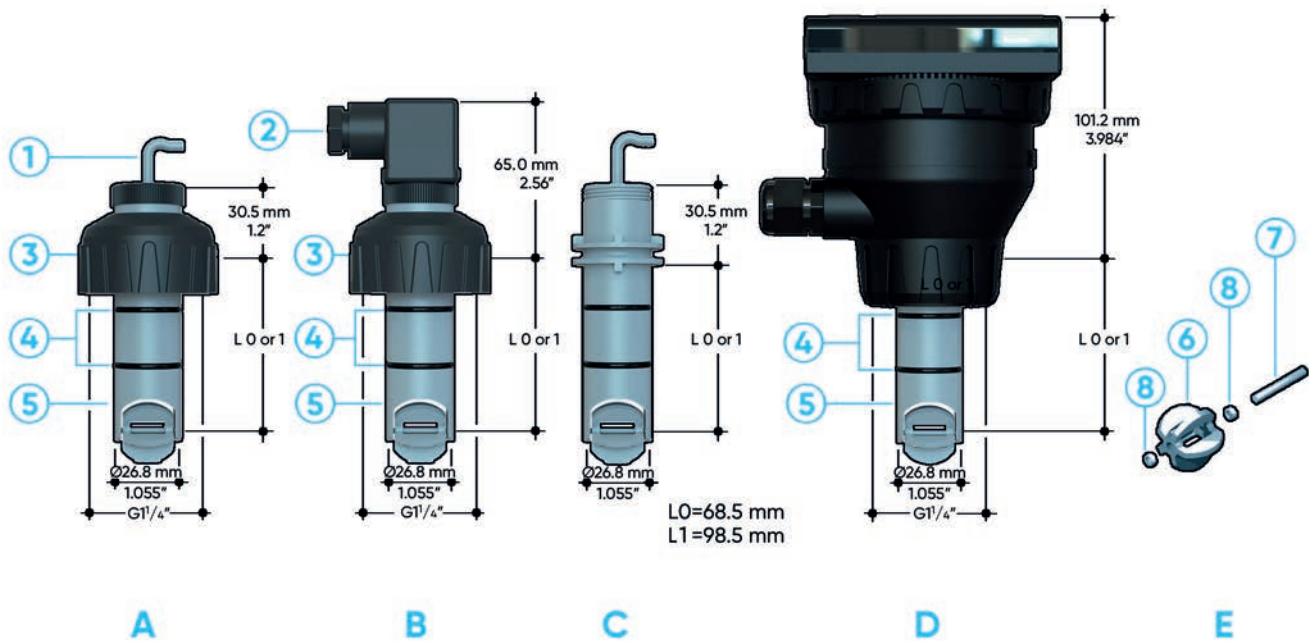
## F3.01.H.XX

Paddlewheel Flow Sensor (Compact version)

Code	Version	Power supply	Length	Main Wetted Materials	Enclosure	Flow Rate Range	Weight (gr.)
F3.01.H.01	Hall	5 - 24 VDC	L0	C-PVC EPDM	IP68	From 0,15 to 8 m/s*	250
F3.01.H.02	Hall	5 - 24 VDC	L0	C-PVC FKM	IP68	From 0,15 to 8 m/s*	250
F3.01.H.03	Hall	5 - 24 VDC	L1	C-PVC EPDM	IP68	From 0,15 to 8 m/s*	300
F3.01.H.04	Hall	5 - 24 VDC	L1	C-PVC FKM	IP68	From 0,15 to 8 m/s*	300
F3.01.H.05	Hall	5 - 24 VDC	L0	PVDF EPDM	IP68	From 0,15 to 8 m/s*	250
F3.01.H.06	Hall	5 - 24 VDC	L0	PVDF FKM	IP68	From 0,15 to 8 m/s*	250
F3.01.H.07	Hall	5 - 24 VDC	L1	PVDF EPDM	IP68	From 0,15 to 8 m/s*	300
F3.01.H.08	Hall	5 - 24 VDC	L1	PVDF FKM	IP68	From 0,15 to 8 m/s*	300
F3.01.H.09	Hall	5 - 24 VDC	L0	316L SS EPDM	IP68	From 0,15 to 8 m/s*	600
F3.01.H.10	Hall	5 - 24 VDC	L0	316L SS FKM	IP68	From 0,15 to 8 m/s*	600
F3.01.H.11	Hall	5 - 24 VDC	L1	316L SS EPDM	IP68	From 0,15 to 8 m/s*	650
F3.01.H.12	Hall	5 - 24 VDC	L1	316L SS FKM	IP68	From 0,15 to 8 m/s*	650

\* from 0,15 to 8 m/s = (0,5-25 feet/s)

# TECHNICAL DRAWINGS



- |  |  |  |
|--|--|--|
| <p><b>A</b> F3.00 IP68 Remote Sensor</p> <p><b>B</b> F3.00 IP65 Remote Sensor</p> <p><b>C</b> F3.01 Compact Sensor</p> <p><b>D</b> F3.01 Compact Sensor + Transmitter (sold separately)</p> <p><b>E</b> Paddlewheel system</p> <p><b>1</b> Electrical cable: 8 m. (26.4 ft) standard</p> | <p><b>2</b> 4 pole cable plug according to DIN 43650-B/ISO 6952</p> <p><b>3</b> U-PVC cap for installation into fittings (SS 316L for metal sensor)</p> <p><b>4</b> O-Ring seals available in EPDM or FPM</p> <p><b>5</b> C-PVC, PVDF or Stainless Steel sensor body</p> | <p><b>6</b> ECTFE Halar® (registered trademark of Ausimont-Solvay) Open-cell rotor</p> <p><b>7</b> Ceramic shaft (SS 316L for metal sensor)</p> <p><b>8</b> Ceramic bearings (none for metal sensor)</p> |
|--|--|--|