

Pressure Transmitter

Suitable for the oxygen measurement industry

M20FL



Application

- Pharmaceutical industry
- Aerospace industry
- Chemical industry
- Metallurgy
- Energy

Introduction

M20 pressure transmitter is dedicated to oxygen pressure measurement, filled with Fluorinated® oil, highly integrated electrical structure, full digital temperature compensation and calibration, exquisite materials, good electromagnetic compatibility design. It is highly cost-effective while achieving high reliability.

Micro Sensor proceed the degrease and cleaning for Oxygen-use following ISO15001/ASMT G-93 standards and procedures. It is widely used in the medical and pharmaceutical industries, specializing in solving measurement problem such as gas pressure in medical oxygen generating equipment and oxygen storage tanks.

Specification

- Pressure Type: Gauge, Absolute, Positive/Negative
- Pressure Range: 0kPa ~ 25kPa to 0MPa ~ 25MPa
- Electrical Connection:
 - Angular Connector DIN 175301-803A
 - Circular Aviation Plug M12×1(4pin) IEC 61076-2-101
 - Cable Φ5.0mm 5×0.12mm² Polyurethane
- Accuracy: ±0.25%FS (@25℃)
±0.5%FS (@25℃)
- Process Connection: M20×1.5 ISO 9974-2
G1/4A ISO 1179-2
NPT1/4 ANSI/ASME B1.20.1
R1/4 ISO 7
Other threads available on request
- Output: 4mA ~ 20mA DC
0V~ 5V DC
1V~ 5V DC
0V~ 10V DC
0.5V~ 4.5V DC
- Structure Specification: Full welded, molecular sieve
- Medium: Oxygen

Pressure Range

Gauge Pressure G							
Unit	Pressure Range	Overpressure	Code	Unit	Pressure Range	Overpressure	Code
kPa	0 ~ 25	50	343	mbar	0 ~ 250	500	543
	0 ~ 40	100	344		0 ~ 400	1000	544
	0 ~ 60	100	345		0 ~ 600	1000	545
	0 ~ 100	200	351		0 ~ 1000	2000	551
	0 ~ 160	300	352		0 ~ 1600	3000	552
	0 ~ 250	500	353		0 ~ 2500	5000	553
	0 ~ 400	1000	354		0 ~ 4000	10000	554
	0 ~ 600	1000	355		0 ~ 6000	10000	555
MPa	0 ~ 0.25	0.5	123	bar	0 ~ 2.5	5	233
	0 ~ 0.4	1	124		0 ~ 4	10	234
	0 ~ 0.6	1	125		0 ~ 6	10	235
	0 ~ 1	2	131		0 ~ 10	20	241
	0 ~ 1.6	3	132		0 ~ 16	30	242
	0 ~ 2.5	5	133		0 ~ 25	50	243
	0 ~ 4	10	134		0 ~ 40	100	244
	0 ~ 6	10	135		0 ~ 60	100	245
	0 ~ 10	15	141		0 ~ 100	150	251
	0 ~ 16	30	142		0 ~ 160	300	252
0 ~ 25	37.5	143	0 ~ 250	375	253		
psi	0 ~ 5	10	835				
	0 ~ 10	15	841				
	0 ~ 15	20	842				
	0 ~ 30	45	844				
	0 ~ 60	150	845				
	0 ~ 100	150	851				
	0 ~ 160	300	852				
	0 ~ 200	300	853				
	0 ~ 300	450	854				
	0 ~ 600	1500	855				
	0 ~ 1000	1500	861				
	0 ~ 1500	2000	862				
	0 ~ 2000	3000	863				
0 ~ 3000	4500	864					

Absolute Pressure A							
Unit	Pressure Range	Overpressure	Code	Unit	Pressure Range	Overpressure	Code
kPa	0 ~ 25	50	343	mbar	0 ~ 250	500	543
	0 ~ 40	100	344		0 ~ 400	1000	544
	0 ~ 60	100	345		0 ~ 600	1000	545
	0 ~ 100	200	351		0 ~ 1000	2000	551
	0 ~ 160	300	352		0 ~ 1600	3000	552
	0 ~ 250	500	353		0 ~ 2500	5000	553
	0 ~ 400	1000	354		0 ~ 4000	10000	554
	0 ~ 600	1000	355		0 ~ 6000	10000	555
MPa	0 ~ 0.25	0.5	123	bar	0 ~ 2.5	5	233
	0 ~ 0.4	1	124		0 ~ 4	10	234
	0 ~ 0.6	1	125		0 ~ 6	10	235
	0 ~ 1	2	131		0 ~ 10	20	241
	0 ~ 1.6	3	132		0 ~ 16	30	242
	0 ~ 2.5	5	133		0 ~ 25	50	243
psi	0 ~ 10	15	841				
	0 ~ 15	20	842				
	0 ~ 30	45	844				
	0 ~ 60	150	845				
	0 ~ 100	150	851				
	0 ~ 160	300	852				
	0 ~ 200	300	853				
	0 ~ 300	450	854				

Pressure Range

Positive/Negative Pressure N						
Unit	Pressure Range	Overpressure	Code	Pressure Range	Overpressure	Code
kPa	-5 ~ + 20	±30	3A5	-50 ~ + 50	100	3AE
	-5 ~ + 25	±50	3A7	-60 ~ 0	100	315
	-15 ~ + 15	±30	3A6	-100 ~ 0	150	321
	-20 ~ + 20	±30	3A8	-100 ~ + 60	150	322
	-25 ~ 0	±50	313	-100 ~ + 150	300	323
	-25 ~ + 25	±50	3AA	-100 ~ + 300	500	324
	-30 ~ + 30	±50	3AC	-100 ~ + 500	1000	325
	-40 ~ 0	±100	314	-100 ~ + 900	2000	331
MPa	-0.015 ~ + 0.015	±0.03	1A6	-0.1 ~ 0	0.15	121
	-0.02 ~ + 0.02	±0.03	1A8	-0.1 ~ + 0.06	0.15	122
	-0.025 ~ 0	±0.05	113	-0.1 ~ + 0.15	0.3	123
	-0.025 ~ + 0.025	±0.05	1AA	-0.1 ~ + 0.3	0.5	124
	-0.03 ~ + 0.03	±0.05	1AC	-0.1 ~ + 0.5	1	125
	-0.04 ~ 0	±0.1	114	-0.1 ~ + 0.9	2	131
	-0.05 ~ + 0.05	0.1	1AE	-0.1 ~ + 1.5	3	132
	-0.06 ~ 0	0.1	115	-0.1 ~ + 2.4	5	133
mbar	-50 ~ + 200	±300	5A5	-500 ~ + 500	1000	5AE
	-50 ~ + 250	±500	5A7	-600 ~ 0	1000	515
	-150 ~ + 150	±300	5A6	-1000 ~ 0	1500	521
	-200 ~ + 200	±300	5A8	-1000 ~ + 600	1500	522
	-250 ~ 0	±500	513	-1000 ~ + 1500	3000	523
	-250 ~ + 250	±500	5AA	-1000 ~ + 3000	5000	524
	-300 ~ + 300	±500	5AC	-1000 ~ + 5000	10000	525
	-400 ~ 0	±1000	514	-1000 ~ + 9000	20000	531
bar	-0.15 ~ + 0.15	±0.3	2A6	-1 ~ 0	1.5	221
	-0.2 ~ + 0.2	±0.3	2A8	-1 ~ + 0.6	1.5	222
	-0.25 ~ 0	±0.5	213	-1 ~ + 1.5	3	223
	-0.25 ~ + 0.25	±0.5	2AA	-1 ~ + 3	5	224
	-0.3 ~ + 0.3	±0.5	2AC	-1 ~ + 5	10	225
	-0.4 ~ 0	±1	214	-1 ~ + 9	20	231
	-0.5 ~ + 0.5	1	2AE	-1 ~ + 15	30	232
	-0.6 ~ 0	1	215	-1 ~ + 24	50	233
psi	-30 inHg ~ 0	20	821			
	-30 inHg ~ +15	20	822			
	-30 inHg ~ +30	45	823			
	-30 inHg ~ +60	150	825			
	-30 inHg ~ +100	150	826			
	-30 inHg ~ +160	300	831			
	-30 inHg ~ +200	300	832			
	-30 inHg ~ +300	450	833			

If the pressure range you need is not in the table, please kindly contact us, or refer to the Pressure Unit Conversion Table.

Pressure Unit Conversion Table ISO 31-3

Standard Unit	Pa(N/m ²)	kPa	MPa	bar	mbar
1 Pa(N/m ²)	1	0.001	0.000001	0.00001	0.01
1 kPa	1000	1	0.001	0.01	10
1 MPa	1000000	1000	1	10	10000
1 bar	100000	100	0.1	1	1000
1 mbar	100	0.1	0.0001	0.001	1
1 mmH ₂ O	9.807	0.009807	0.000009807	0.00009807	0.09807
1 kg/cm ²	98070	98.07	0.0981	0.9807	980.7
1 atm	101300	101.3	0.1013	1.013	1013
1 mmHg	133.3	0.1333	0.001333	0.001333	1.333
1 psi	6895	6.895	0.006895	0.0689	68.948
Standard Unit	mmH ₂ O	kg/cm ²	atm	mmHg	psi
1 Pa(N/m ²)	0.102	0.0000102	0.000009869	0.007501	0.000145
1 kPa	101.9716	0.0102	0.009869	7.501	0.145
1 MPa	101972	10.2	9.869	7501	145.038
1 bar	10197	1.02	0.9869	750.1	14.5038
1 mbar	10.1972	0.00102	0.0009869	0.7501	0.0145
1 mmH ₂ O	1	0.0001	0.00009678	0.0734	0.001422
1 kg/cm ²	10000	1	0.9678	734.2	14.224
1 atm	10330	1.033	1	760.1	14.68
1 mmHg	13.62	0.001362	0.001316	1	0.0193
1 psi	704.3	0.0703	0.068	51.71	1

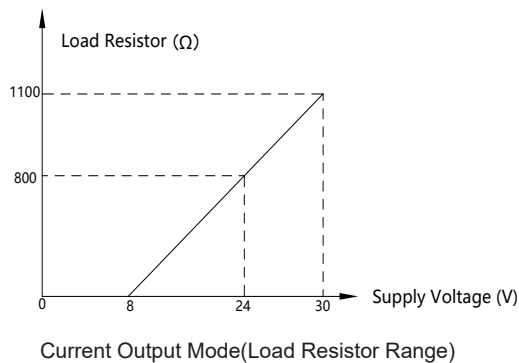
Output Signal

Type	Output	Code
Current (2-wire)	4 mA ~ 20mA DC	1
Voltage (3-wire)	0V ~ 5V DC	2
	1V ~ 5V DC	3
	0V ~ 10V DC	4
	0.5V ~ 4.5V DC	5
Ratio Voltage (3-wire)	0.5V ~ 4.5V DC	6

Load(Ω)

Current(2-wire) : ≤ (Power Supply-8V)/0.02 A

Voltage(3-wire) : >10 k



Power Supply

Output	Power Supply	Voltage Effect	Output Ripple
4mA ~ 20mA DC	8V ~ 30V DC	±0.1%FS	≤1%
0V ~ 5V DC	8V ~ 30V DC		
1V ~ 5V DC	8V ~ 30V DC		
0V ~ 10V DC	14V ~ 30V DC		
0.5V ~ 4.5V DC	8V ~ 30V DC		
0.5V ~ 4.5V DC	(5±0.5) V DC Ratio		

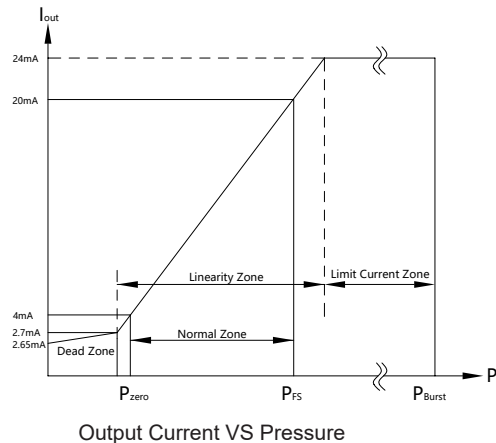
The power supply of the pressure transmitter should be the electrical connection that meets the standard of the 9.3 part of UL/EN/IEC 61010-1, UL/EN/IEC 60950-1 LPS or UL 1310/UL 1585(NEC or CEC) Class 2 standard requirement.

If the pressure transmitter is used in where the altitude is higher than 2000m, the power supply should be workable normally under the certain condition.

Total Current Consumption

Current(2-wire): Signal current, 23 mA(max.)

Voltage(3-wire): <8 mA



Accuracy

Conform To IEC 61298-2		
Accuracy	≤±0.25%FS	≤±0.5%FS
Nonlinearity(BFSL)	≤±0.2%FS	≤±0.25%FS
Code	3	4
Conform To JJG 882 (Chinese National Metrological Verification Regulations)		
Accuracy Class	0.25	0.5
Max. Error	≤±0.25%FS	≤±0.5%FS
Code	7	8

Note:

0.25%FS is available in the following ranges:
Upper Range Limit ≥ 100 kPa (G), ≥ 250 kPa (A), ≥ 200 kPa (N)

Total error band: 0 °C ~ 50 °C ±0.75%FS(max.)
-10 °C ~ 80 °C ±1.25%FS(max.)

Note:

Total error band includes nonlinearity, hysteresis, repeatability, temperature effect, zero and span thermal error.

Specification

Hysteresis: ≤0.1%FS

Repeatability: ≤0.1%FS

Overpressure: See Table "Pressure Range"

Long-term Stability: ≤±0.1%FS/year(typ.)
≤±0.2%FS/year(max.)

Response Time

Fluid Viscosity (<100 cSt): <4 ms

Gas: <35 ms

Environment Condition

Item	Temp. Range
Medium Temp.	-30°C ~ 85°C
Environment Temp.	-30°C ~ 85°C
Storage Temp.	-40°C ~ 100°C

When the pressure transmitter is working normally, the measured medium should not be solid or semisolid;
The selected process connection sealing element will have limit on temp. range(please check the "Sealing Element").

Operation Condition

Protection Class

IP65,IP67 IEC 60529

Atmospheric Pressure

86kPa ~ 106kPa

Vibration Environment

10g(@10Hz~2000Hz) IEC 60068-2-6

Shock Resistance

100g/11ms IEC 60068-2-27

Service Life

Within Measuring Range: >10 million times load cycle

Position Influence

≤±0.1%FS

Reference Condition IEC 61298-1

Temperature

15°C ~ 25°C

Relative Humidity

45% ~ 75%

Power Supply

(24±0.24)V DC; (5±0.05)V DC

Installation Direction

Pressure Port should be vertically downward

Electromagnetic Compatibility

Code	Test Item	Standard	Test Condition	Performance Class
1	Electrostatic Discharge Immunity	GB/T 17626.2/IEC 61000-4-2	6kV(Contact), 8kV(Air)	B
2	Radio-frequency Field	GB/T 17626.3/IEC 61000-4-3	10V/m;80MHz ~ 6GHz; 80%AM(1kHz)	A
3	Power Frequency Magnetic Field	GB/T 17626.8/IEC 61000-4-8	Stable sustained magnetic field strength50Hz,60Hz,100A/m	A
4	Immunity of Electrical Fast Pulse Group	GB/T 17626.4/IEC 61000-4-4	±2kV; 5/50 Tr/Tk ns, 5kHz	B
5	Surge Immunity	GB/T 17626.5/IEC 61000-4-5	±2kV; 1.2/50(8/20) Tr/Th us	B
6	RF Induction Conduction Anti-harassment	GB/T 17626.6/IEC 61000-4-6	10V(150kHz ~ 80MHz); 80%AM(1kHz)	A

Note: Level A means that the performance is normal within the limit of technical specification.

Level B means that during testing, function or performance is temporarily reduced or lost, but can recover by itself, and the actual operation status, storage and data remain unchanged.

Material

Wetted Part

Stainless Steel 316L

Sealing Element

FKM(Default model)/EPDM/Cuprum

Non-wetted Part

Stainless Steel 316L,Nylon

Pressure Transmission Medium

Silicone Oil

Process Connection

Standard	Pressure Port	Code
ISO 7	R1/4	10
	R3/8	11
	R1/2	12
ISO 1179-1	G1/4 Female	20
ISO 1179-2	G1/4 A	30
	G3/8 A	31
	G1/2 A	32
ISO 9974-2	M12×1.5	40
	M14×1.5	41
	M20×1.5	42
ANSI/ASME B1.20.1	NPT1/4	51
	NPT1/2	52
	NPT1/4 Female	54
	NPT1/2 Female	55

Defaulted leading hole is of $\Phi 4\text{mm}$;

Electrical Connection

Item	Protection	Cable	Length	Code
Angular Connector DIN 175301-803A	IP65			
• With assorted connector				1
Circular Aviation Connector M12×1(4pin)IEC 61076-2-101	IP65/IP67*			
• Without assorted connector				3
• Straight connector integrated with cable		MS903	2m	4
• Right-angle plug harness		MS904	2m	5
Cable	IP67		1.5m	6

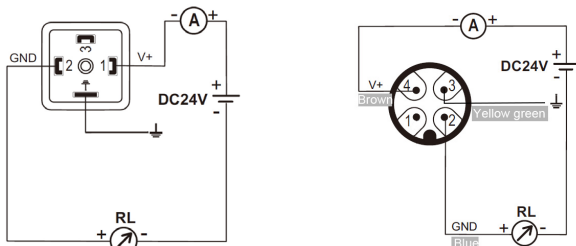
Note: Circular Aviation Connector M12×1: $\leq 2.5\text{MPa}$ IP65
 $> 2.5\text{MPa}$ IP67

With Reverse Polarity Protection(Except for ratiometric output)

V+ vs GND

Wiring

2-wire 4mA ~ 20mA Output



Note: The wire color is for reference only.

Version

Version Code	Description
S	Fixed code for corporate internal use

Electrical Definition

DIN 175301-803 A Angular Connector				
	Definition	Code	2-wire	3-wire
	V+	V+	1	1
	V-	GND	2	2
	Output	VOUT	-	3
	Grounding			\perp

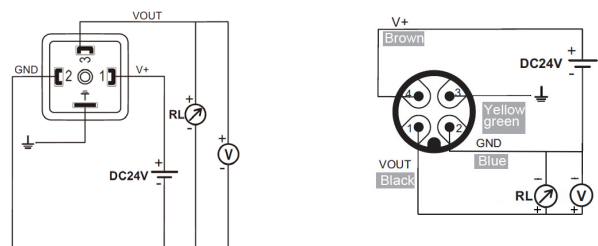
M12×1(4pin) Circular Aviation Connector				
	Definition	Code	2-wire	3-wire
	V+	V+	4	4
	V-	GND	2	2
	Output	VOUT	-	1
	Grounding			3

M12×1 Straight Connector Integrated with Cable (MS903)			
	Definition	Code	Line color
	V+	V+	Brown
	V-	GND	Blue
	Output	VOUT	Black
	Grounding		Yellow green

M12×1 Right-angle plug harness (MS904)			
	Definition	Code	Line color
	V+	V+	Brown
	V-	GND	Blue
	Output	VOUT	Black
	Grounding		Yellow green

Cable			
	Definition	Code	Line color
	V+	V+	Red
	V-	GND	Black
	Output	VOUT	White
	Grounding		Green

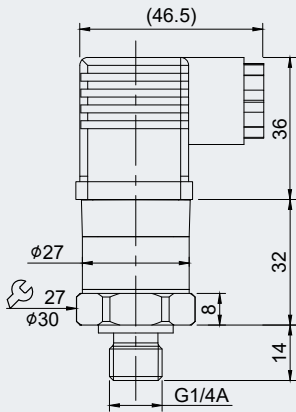
3-wire Voltage Output



Dimension

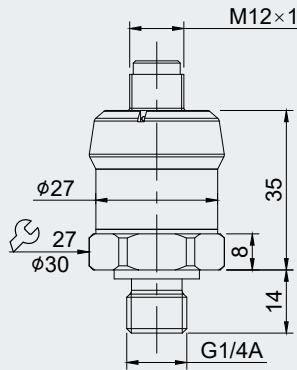
Overall Dimension(Take G1/4A pressure port as an example. unit: mm)

Angular Connector A Type



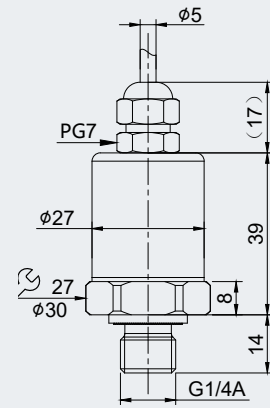
Weight: ≤135g

M12×1(4-pin) Plug Type



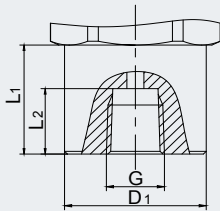
Weight: ≤95g

Cable Type

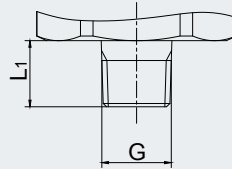


Weight: ≤160g

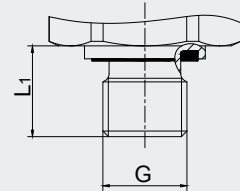
Process Connection(Unit: mm)



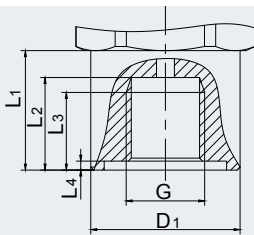
G	D1	L1	L2	Standard
NPT1/4	φ25	20	14	ANSI/ASME B1.20.1
NPT1/2	φ25	25	19	



G	L1	Standard
NPT1/4	13	ANSI/ASME B1.20.1
NPT1/2	19	
R1/4	13	ISO 7
R3/8	15	
R1/2	19	



G	L1	Standard
G1/4 A	14	ISO 1179-2
G3/8 A	14.5	
G1/2 A	17	
M12×1.5	14	ISO 9974-2
M14×1.5	14	
M20×1.5	16.5	



G	D1	L1	L2	L3	Standard
G1/4	φ25	20	15.5	13	ISO 1179-1

Order Information

Model	Pressure Type	Range	Output	Accuracy	Process Connection	Electrical Connection	Version Code
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Example:

M20FL	Gauge	0MPa ~ 2.5MPa	4mA ~ 20mA	0.5	G1/4 A	Angular Connector	S
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Code Example:

M20FL	G	133	1	8	30	1	S
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Optional Accessories

Cable Model	Specification	Cross sectional area of conductor	Material	Weight	Color
MS903	M12×1 Straight Connector 4 core Length 2m	4×0.3mm ²	TPUR	≤90g	Matte Black
MS904	M12×1 Angle Plug 4 core Length 2m	4×0.3mm ²	TPUR	≤95g	Matte Black

- 1.If a metrological verification certificate (calibration certificate) of the ordered product is required, or there is any other special requirements, please kindly consult with our company;
2. The application temperature range of fluororubber O-ring sealing is -20℃ ~250℃ , when application temperature <-20℃ , EPDM O-ring is needed.

MICROSENSOR

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