

CRITERION D500 Product specifications

Digital/Analog communication model

Model	D512MG						D522MG						Model	
Specification	H		M		L		H		M		L		Specification	
Gas	Configurable												Gas	
Full scale	100SCCM - 10SLM		50SCCM - 5SLM		10SCCM - 1SLM		10 - 50SLM		5 - 30SLM		1 - 7.5SLM		Full scale	
Operating inlet pressure	350 - 750 kPa(A), Configurable		240 - 450 kPa(A), Configurable		110 - 350 kPa(A), Configurable		350 - 750 kPa(A), Configurable		240 - 450 kPa(A), Configurable		110 - 350 kPa(A), Configurable		Operating inlet pressure	
Operating differential pressure	≥ 350 kPa(D)		≥ 240 kPa(D)		≥ 110 kPa(D)		≥ 350 kPa(D)		≥ 240 kPa(D)		≥ 110 kPa(D)		Operating differential pressure	
Operating downstream pressure	≤ 13.3 kPa(A)	≤ 53.3 kPa(A)	≤ 13.3 kPa(A)	≤ 53.3 kPa(A)	≤ 13.3 kPa(A)	≤ 53.3 kPa(A)	≤ 53.3 kPa(A)	≤ 53.3 kPa(A)	≤ 53.3 kPa(A)	≤ 13.3 kPa(A)	≤ 53.3 kPa(A)	≤ 13.3 kPa(A)	Operating downstream pressure	
Control range	0.2 - 100% F.S. for digital control 2 - 100% F.S. for analog control	0.5 - 100% F.S. for digital control 2 - 100% F.S. for analog control	0.5 - 100% F.S. for digital control 2 - 100% F.S. for analog control	1 - 100% F.S. for digital control 2 - 100% F.S. for analog control	2 - 100% F.S.	5 - 100% F.S.	0.5 - 100% F.S. for digital control 2 - 100% F.S. for analog control	1 - 100% F.S. for digital control 2 - 100% F.S. for analog control	1 - 100% F.S. for digital control 2 - 100% F.S. for analog control	5 - 100% F.S.			Control range	
Flow rate accuracy at 25°C	±1% S.P. (5 - 100% F.S.) ±0.05% F.S. (0.2 - 5% F.S.) +±0.2%F.S. for analog control	±1% S.P. (10 - 100% F.S.) ±0.1% F.S. (0.5 - 10% F.S.) +±0.2%F.S. for analog control	±1% S.P. (10 - 100% F.S.) ±0.1% F.S. (0.5 - 10% F.S.) +±0.2%F.S. for analog control	±1% S.P. (20 - 100% F.S.) ±0.2% F.S. (1 - 20% F.S.) +±0.2%F.S. for analog control	±1% S.P. (50 - 100% F.S.) ±0.5% F.S. (2 - 50% F.S.) +±0.2%F.S. for analog control	±1% F.S. (5 - 100% F.S.) +±0.2%F.S. for analog control	±1% S.P. (10 - 100% F.S.) ±0.1% F.S. (0.5 - 10% F.S.) +±0.2%F.S. for analog control	±1% S.P. (20 - 100% F.S.) ±0.2% F.S. (1 - 20% F.S.) +±0.2%F.S. for analog control	±1% S.P. (50 - 100% F.S.) ±0.5% F.S. (2 - 50% F.S.) +±0.2%F.S. for analog control	±1% S.P. (20 - 100% F.S.) ±0.2% F.S. (1 - 20% F.S.) +±0.2%F.S. for analog control	±1% S.P. (50 - 100% F.S.) ±0.5% F.S. (2 - 50% F.S.) +±0.2%F.S. for analog control	±1% F.S. (5 - 100% F.S.) +±0.2%F.S. for analog control	±1% F.S. (5 - 100% F.S.) +±0.2%F.S. for analog control	Flow rate accuracy at 25°C *1
Temperature error from 25°C	±0.05% S.P. / °C (5 - 100% F.S.) ±0.0025% F.S. / °C (0.2 - 5% F.S.) +±0.01%F.S. / °C for analog control	±0.05% S.P. / °C (10 - 100% F.S.) ±0.005% F.S. / °C (0.5 - 10% F.S.) +±0.01%F.S. / °C for analog control	±0.05% S.P. / °C (10 - 100% F.S.) ±0.005% F.S. / °C (0.5 - 10% F.S.) +±0.01%F.S. / °C for analog control	±0.05% S.P. / °C (20 - 100% F.S.) ±0.01% F.S. / °C (1 - 20% F.S.) +±0.01%F.S. / °C for analog control	±0.05% S.P. / °C (50 - 100% F.S.) ±0.025% F.S. / °C (2 - 50% F.S.) +±0.01%F.S. / °C for analog control	±0.05% F.S. / °C (5 - 100% F.S.) +±0.01%F.S. / °C for analog control	±0.05% S.P. / °C (10 - 100% F.S.) ±0.01% F.S. / °C (1 - 20% F.S.) +±0.01%F.S. / °C for analog control	±0.05% S.P. / °C (20 - 100% F.S.) ±0.025% F.S. / °C (2 - 50% F.S.) +±0.01%F.S. / °C for analog control	±0.05% S.P. / °C (50 - 100% F.S.) ±0.025% F.S. / °C (2 - 50% F.S.) +±0.01%F.S. / °C for analog control	±0.05% S.P. / °C (20 - 100% F.S.) ±0.025% F.S. / °C (2 - 50% F.S.) +±0.01%F.S. / °C for analog control	±0.05% S.P. / °C (50 - 100% F.S.) ±0.025% F.S. / °C (2 - 50% F.S.) +±0.01%F.S. / °C for analog control	±0.05% F.S. / °C (5 - 100% F.S.) +±0.01%F.S. / °C for analog control	±0.05% F.S. / °C (5 - 100% F.S.) +±0.01%F.S. / °C for analog control	Temperature error from 25°C
Offset / Span stability	±0.5% F.S. / year		±1% F.S. / year		±5% F.S. / year		±0.5% F.S. / year		±1% F.S. / year		±5% F.S. / year		Offset / Span stability	
Repeatability	±0.3% S.P. (5 - 100% F.S.) ±0.015% F.S. (0.2 - 5% F.S.)	±0.3% S.P. (10 - 100% F.S.) ±0.03% F.S. (0.5 - 10% F.S.)	±0.3% S.P. (10 - 100% F.S.) ±0.03% F.S. (0.5 - 10% F.S.)	±0.3% S.P. (20 - 100% F.S.) ±0.06% F.S. (1 - 20% F.S.)	±0.3% S.P. (50 - 100% F.S.) ±0.15% F.S. (2 - 50% F.S.)	±0.3% F.S. (5 - 100% F.S.)	±0.3% S.P. (10 - 100% F.S.) ±0.03% F.S. (0.5 - 10% F.S.)	±0.3% S.P. (20 - 100% F.S.) ±0.06% F.S. (1 - 20% F.S.)	±0.3% S.P. (50 - 100% F.S.) ±0.15% F.S. (2 - 50% F.S.)	±0.3% S.P. (20 - 100% F.S.) ±0.06% F.S. (1 - 20% F.S.)	±0.3% S.P. (50 - 100% F.S.) ±0.15% F.S. (2 - 50% F.S.)	±0.3% F.S. (5 - 100% F.S.)	±0.3% F.S. (5 - 100% F.S.)	Repeatability *1
Valve type	Normally Close / Piezo Actuator												Valve type	
Settling time for step up *1	≤ 0.8 sec		≤ 0.8 sec		≤ 1 sec		≤ 0.8 sec		≤ 0.8 sec		≤ 1 sec		Settling time for step up *2	
Valve sheet leak	< 0.2 %F.S.		< 0.5 %F.S.		< 2 %F.S.		< 0.5 %F.S.		< 1 %F.S.		< 5 %F.S.		Valve sheet leak	
Proof pressure	1000 kPa(A)												Proof pressure	
Leak integrity	≤ 5×10 ⁻¹² Pa·m ³ /s (He)												Leak integrity	
Wetted material	SUS-316L, Ni-Alloy												Wetted material	
Standard fitting *2	1/4 inch VCR equivalent, 1.125 inch IGS												Standard fitting *3	
Operating temperature	15 - 45 °C												Operating temperature	
Storage temperature	0 - 80 °C												Storage temperature	
Installation orientation	Attitude Insensitive												Installation orientation	
Inlet pressure accuracy	±10 kPa (0 - 1000 kPa(A)) for digital signal ±17 kPa (0 - 700 kPa(A)) for analog signal						±10 kPa (0 - 1000 kPa(A)) for digital signal ±17 kPa (0 - 700 kPa(A)) for analog signal						Inlet pressure accuracy	
Temperature accuracy	±1 °C (15 - 45 °C)												Temperature accuracy	
Warming up operation	≥ 30 minutes												Warming up operation	
Control interface	Analog:D-Subminiature 9-pin, Digital:RS-485 F-Net Protocol												Control interface	
Power supply	+15 V ± 5 %, 200 mA as maximum, -15 V ± 5 %, 150 mA as maximum												Power supply	

*1 This is settling time of flow rate output for calibration gas: N₂. This is in accordance with E17-1011 of the SEMI standards.
*2 IGS: Integrated Gas System

*1 Flow rate accuracy and repeatability of MR/MG numbers of 14 and 15 guarantee the calibration gas: N₂. *2 This is settling time of flow rate output for calibration gas: N₂. This is in accordance with E17-1011 of the SEMI standards.
*3 IGS: Integrated Gas System

DeviceNet™ communication model EtherCAT® communication model

Model	D514MG *3 D517MG *4						D524MG *4 D527MG *5						Model	
Specification	H		M		L		H		M		L		Specification	
Gas	Configurable												Gas	
Full Scale	100SCCM - 10SLM		50SCCM - 5SLM		10SCCM - 1SLM		10 - 50SLM		5 - 30SLM		1 - 7.5SLM		Full scale	
Operating inlet pressure	350 - 750 kPa(A), Configurable		240 - 450 kPa(A), Configurable		110 - 350 kPa(A), Configurable		350 - 750 kPa(A), Configurable		240 - 450 kPa(A), Configurable		110 - 350 kPa(A), Configurable		Operating inlet pressure	
Operating differential pressure	≥ 350 kPa(D)		≥ 240 kPa(D)		≥ 110 kPa(D)		≥ 350 kPa(D)		≥ 240 kPa(D)		≥ 110 kPa(D)		Operating differential pressure	
Operating downstream pressure	13.3 ≤ 13.3 kPa(A)	≤ 53.3 kPa(A)	≤ 13.3 kPa(A)	≤ 53.3 kPa(A)	≤ 13.3 kPa(A)	≤ 53.3 kPa(A)	≤ 53.3 kPa(A)	≤ 53.3 kPa(A)	≤ 53.3 kPa(A)	≤ 13.3 kPa(A)	≤ 53.3 kPa(A)	≤ 13.3 kPa(A)	Operating downstream pressure	
Control range	0.2 - 100% F.S.	0.5 - 100% F.S.	0.5 - 100% F.S.	1 - 100% F.S.	2 - 100% F.S.	5 - 100% F.S.	0.5 - 100% F.S.	1 - 100% F.S.	1 - 100% F.S.	5 - 100% F.S.			Control range	
Flow rate accuracy at 25°C	±1% S.P. (5 - 100% F.S.) ±0.05% F.S. (0.2 - 5% F.S.)	±1% S.P. (10 - 100% F.S.) ±0.1% F.S. (0.5 - 10% F.S.)	±1% S.P. (10 - 100% F.S.) ±0.1% F.S. (0.5 - 10% F.S.)	±1% S.P. (20 - 100% F.S.) ±0.2% F.S. (1 - 20% F.S.)	±1% S.P. (50 - 100% F.S.) ±0.5% F.S. (2 - 50% F.S.)	±1% F.S. (5 - 100% F.S.)	±1% S.P. (10 - 100% F.S.) ±0.1% F.S. (0.5 - 10% F.S.)	±1% S.P. (20 - 100% F.S.) ±0.2% F.S. (1 - 20% F.S.)	±1% S.P. (50 - 100% F.S.) ±0.5% F.S. (2 - 50% F.S.)	±1% S.P. (50 - 100% F.S.) ±0.5% F.S. (2 - 50% F.S.)	±1% F.S. (5 - 100% F.S.)	±1% F.S. (5 - 100% F.S.)	Flow rate accuracy at 25°C *1	
Temperature error from 25°C	±0.05% S.P. / °C (5 - 100% F.S.) ±0.0025% F.S. / °C (0.2 - 5% F.S.)	±0.05% S.P. / °C (10 - 100% F.S.) ±0.005% F.S. / °C (0.5 - 10% F.S.)	±0.05% S.P. / °C (10 - 100% F.S.) ±0.005% F.S. / °C (0.5 - 10% F.S.)	±0.05% S.P. / °C (20 - 100% F.S.) ±0.01% F.S. / °C (1 - 20% F.S.)	±0.05% S.P. / °C (50 - 100% F.S.) ±0.025% F.S. / °C (2 - 50% F.S.)	±0.05% F.S. / °C (5 - 100% F.S.)	±0.05% S.P. / °C (10 - 100% F.S.) ±0.005% F.S. / °C (0.5 - 10% F.S.)	±0.05% S.P. / °C (20 - 100% F.S.) ±0.01% F.S. / °C (1 - 20% F.S.)	±0.05% S.P. / °C (50 - 100% F.S.) ±0.025% F.S. / °C (2 - 50% F.S.)	±0.05% S.P. / °C (50 - 100% F.S.) ±0.025% F.S. / °C (2 - 50% F.S.)	±0.05% F.S. / °C (5 - 100% F.S.)	±0.05% F.S. / °C (5 - 100% F.S.)	Temperature error from 25°C	
Offset / Span stability	±0.5% F.S. / year		±1% F.S. / year		±5% F.S. / year		±0.5% F.S. / year		±1% F.S. / year		±5% F.S. / year		Offset / Span stability	
Repeatability	±0.3% S.P. (5 - 100% F.S.) ±0.015% F.S. (0.2 - 5% F.S.)	±0.3% S.P. (10 - 100% F.S.) ±0.03% F.S. (0.5 - 10% F.S.)	±0.3% S.P. (10 - 100% F.S.) ±0.03% F.S. (0.5 - 10% F.S.)	±0.3% S.P. (20 - 100% F.S.) ±0.06% F.S. (1 - 20% F.S.)	±0.3% S.P. (50 - 100% F.S.) ±0.15% F.S. (2 - 50% F.S.)	±0.3% F.S. (5 - 100% F.S.)	±0.3% S.P. (10 - 100% F.S.) ±0.03% F.S. (0.5 - 10% F.S.)	±0.3% S.P. (20 - 100% F.S.) ±0.06% F.S. (1 - 20% F.S.)	±0.3% S.P. (50 - 100% F.S.) ±0.15% F.S. (2 - 50% F.S.)	±0.3% S.P. (20 - 100% F.S.) ±0.06% F.S. (1 - 20% F.S.)	±0.3% S.P. (50 - 100% F.S.) ±0.15% F.S. (2 - 50% F.S.)	±0.3% F.S. (5 - 100% F.S.)	±0.3% F.S. (5 - 100% F.S.)	Repeatability *1
Valve type	Normally Close / Piezo Actuator												Valve type	
Settling time for step up *1	≤ 0.8 sec		≤ 0.8 sec		≤ 1 sec		≤ 0.8 sec		≤ 0.8 sec		≤ 1 sec		Settling time for step up *2	
Valve sheet leak	< 0.2 %F.S.		< 0.5 %F.S.		< 2 %F.S.		< 0.5 %F.S.		< 1 %F.S.		< 5 %F.S.		Valve sheet leak	
Proof pressure	1000 kPa(A)												Proof pressure	
Leak integrity	≤ 5×10 ⁻¹² Pa·m ³ /s (He)												Leak integrity	
Wetted material	SUS-316L, Ni-Alloy												Wetted material	
Standard fitting *2	1/4 inch VCR equivalent, 1.125 inch IGS												Standard fitting *3	
Operating temperature	15 - 45 °C												Operating temperature	
Storage temperature	0 - 80 °C												Storage temperature	
Installation orientation	Attitude Insensitive												Installation orientation	
Inlet pressure accuracy	±10 kPa (0 - 1000 kPa(A))												Inlet pressure accuracy	
Temperature accuracy	±1 °C (15 - 45 °C)												Temperature accuracy	
Warming up operation	≥ 30 minutes												Warming up operation	
Control interface	DeviceNet™ Protocol *3 EtherCAT® Protocol *4						DeviceNet™ Protocol *4 EtherCAT® Protocol *5						Control interface	
Power supply	DC24V 5.7VA, Applicable for ODVA standard *3 24VDC±4V 6.2VA *4												Power supply	

*1 This is settling time of flow rate output for calibration gas: N₂. This is in accordance with E17-1011 of the SEMI standards.
*2 IGS: Integrated Gas System *3 DeviceNet™ communication model *4 EtherCAT® communication model

*1 Flow rate accuracy and repeatability of MR/MG numbers of 14 and 15 guarantee the calibration gas: N₂. *2 This is settling time of flow rate output for calibration gas: N₂. This is in accordance with E17-1011 of the SEMI standards.
*3 IGS: Integrated Gas System *4 DeviceNet™ communication model *5 EtherCAT® communication model