Bronkhorst®

SN MNNNNNNNNA
ES-NNNC-AAA-AA-N-A AA-AAA-N-AAA
N ml/min
N bar
N °C
P tested: N bar
He leak tested -MkII-

The label shown is for illustration purposes only and may vary on actual products.

PIN 1&6 — M12 connector (Page 3-3) — # #

PIN 5 — M12 connector (Page 2-3) — # # #

Additional I/O — M8 connector / PIN 2 — M8 connector (Page 3-3) — # — # # #
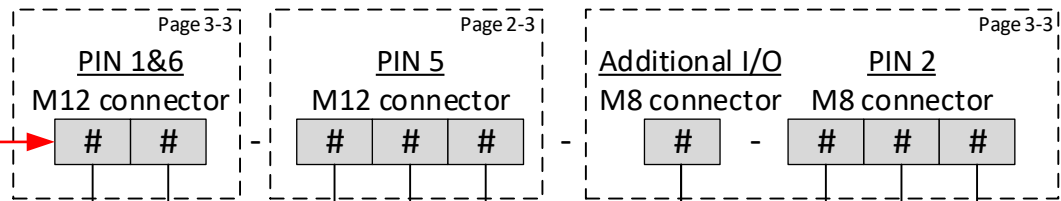
Controller mode	Code
Controller disabled (meter only)	0
Controller enabled, analog setpoint	A
Controller enabled, digital setpoint	D

Integrated Comm. Mode	Code
RS232 – ProPar (default)	A
RS485 – FLOW-BUS	B
RS485 – Modbus RTU	C
RS485 – Modbus ASCII	D

Code	Type	Code	Range	Code	Linked parameter
0	Disabled	0	0 Vdc	0	-
A	Voltage output	0	0-5 Vdc	A	Alarm
		1	0-10 Vdc	B	Batch counter
		9	Custom	C	Control mode
B	Current output	0	0-20 mAdc	D	Density
		1	4-20 mAdc	E	Measure
		2	3.8-20.8 mAdc	F	Frequency
		9	Custom	I	IO switch status
C	Digital output	0	Remote parameter	P	Pressure
		1	Min alarm	S	Setpoint
		2	Max alarm	T	Temperature
		3	Min/max alarm	V	Controller output
		4	Counter limit reached	Z	Custom
		5	Enabled by setpoint		
		9	Custom		
D	Frequency output	9	Custom		
E	PWM output	9	Custom		
F	Pulse output	9	Custom		
G	Voltage input *only on Pin 5	0	0-5 Vdc	C	Control mode
		1	0-10 Vdc	E	Measure (external sensor)
		9	Custom	I	IO switch status
H	Current input *only on Pin 5	0	0-20 mAdc	N	Calibration mode
		1	4-20 mAdc	R	Reset
		9	Custom	S	Setpoint
I	Digital input	1	Counter reset	V	Actuator (Valve)
		2	Alarm reset	Z	Custom
		3	Close Valve		
		4	Counter reset/disable		
		5	Auto Zero		
		8	Purge Valve		
		9	Custom		

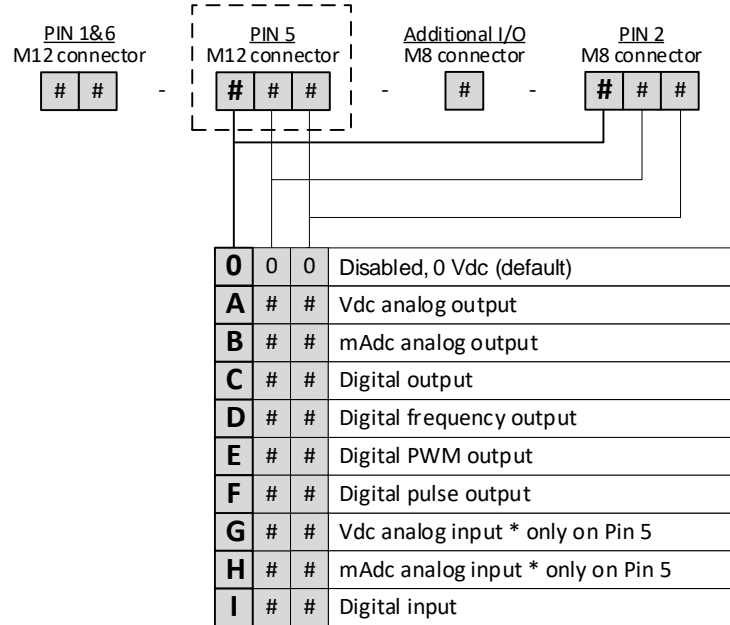| Code	Additional I/O connector (M8)
1	Actuator output enabled (default)

Preset Table

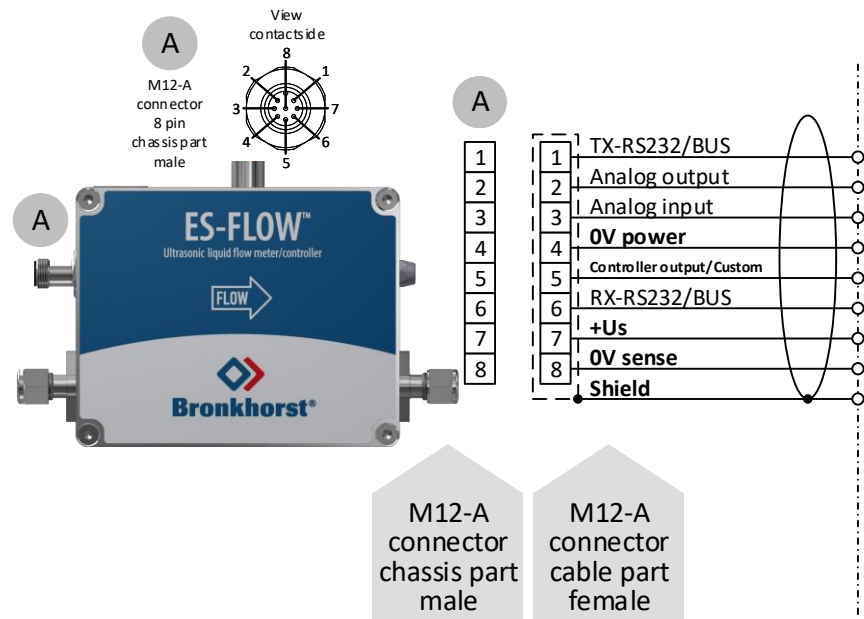| Type	Range	Par	Configurable input/output (PIN 5 M12 / PIN 2 M8)
0	0	0	Disabled, 0 Vdc (default)
A	1	V	0-10 Vdc output, controller
B	1	V	4-20 mAdc output, controller
B	2	V	3.8-20.8 mAdc output (TEIP11/Badger), controller
C	3	A	Digital output, min/max alarm
C	4	A	Digital output, counter limit reached
C	5	S	Digital output, enabled by setpoint (for shut-off)
C	0	I	Digital output, high/low switch via remote parameter
D	9	E	Digital frequency output, measure
F	9	B	Digital pulse output, batch counter
I	3	C	Digital input, controller mode valve close
I	8	C	Digital input, controller mode valve purge
I	1	R	Digital input, reset counter
I	2	R	Digital input, reset alarm

Other settings on request.

Check next page for Hook-up diagrams

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Doc.nr.: 9.16.260A
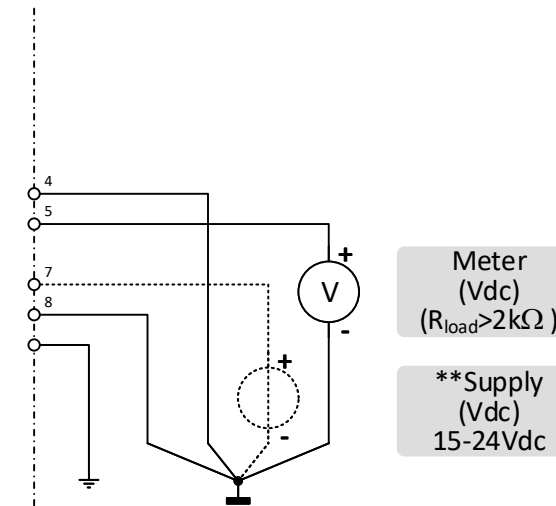Date : 22-06-2021

Optional bus and IO configurations

ES-FLOW 1xxC
Hook-up diagram

PIN 5 M12 / IO HOOK-UP DIAGRAMS

IO OPTIONS PIN 5 M12 / PIN 2 M8

PIN 1&6 M12 connector | PIN 5 M12 connector | Additional I/O M8 connector | PIN 2 M8 connector

- # # # - # - # #

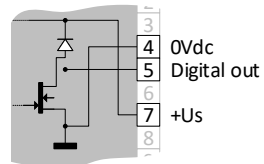|			
0	0	0	Disabled, 0 Vdc (default)
A	#	#	Vdc analog output
B	#	#	mAdc analog output
C	#	#	Digital output
D	#	#	Digital frequency output
E	#	#	Digital PWM output
F	#	#	Digital pulse output
G	#	#	Vdc analog input * only on Pin 5
H	#	#	mAdc analog input * only on Pin 5
I	#	#	Digital input

POWER SUPPLY WARNING

⚠ ** Do not power the instrument simultaneously from two different power sources (e.g. bus connection and Plug-in Power Supply). Doing so will damage the printed circuit board irreparably.
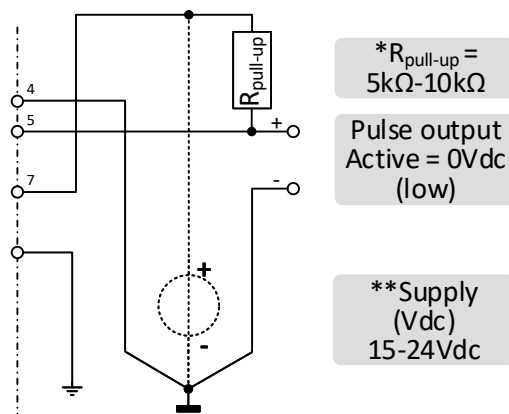
PIN CONNECTIONS M12

View contactside

A

M12-A connector 8 pin chassis part male

A

1	TX-RS232/BUS
2	Analog output
3	Analog input
4	0V power
5	Controller output/Custom
6	RX-RS232/BUS
7	+Us
8	0V sense
	Shield

M12-A connector chassis part male

M12-A connector cable part female

⚠ When connecting the system to other devices, be sure that the integrity of the shielding is not affected. Do not use unshielded wire terminals.
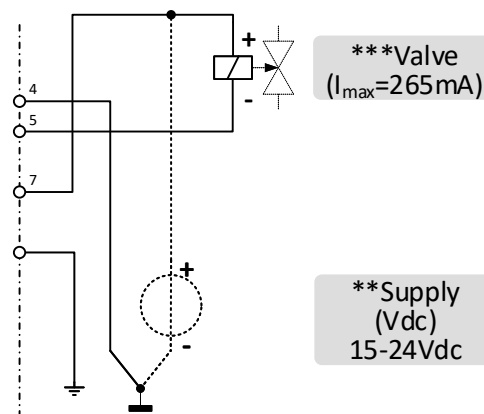
A	0	#	0-5 Vdc analog output
	1	#	0-10 Vdc analog output
	9	#	custom Vdc analog output

Meter (Vdc)
(R_{load}>2kΩ)

**Supply (Vdc) 15-24Vdc

Note:
0V power (PIN 4) and 0V sense (PIN 8) should be seperately connected to the 0Vdc terminal at the power supply for long cable compensation

B	0	#	0-20 mAdc analog output
	1	#	4-20 mAdc analog output
	2	#	3.8-20.8 mAdc output
	9	#	Custom mAdc analog output

Meter (mAdc)
(R_{load}<375Ω)

**Supply (Vdc) 15-24Vdc

Note:
In analog mode with 'mAdc' signals 0V sense (PIN 8) does not need to be connected. The instrument's operation will not be effected in case 0Vdc sense is already hooked-up

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Internal setup digital output

3
4 0Vdc
5 Digital out
6
7 +Us
8

C	#	#	Digital output
D	#	#	Digital frequency output
E	#	#	Digital PWM output
F	#	#	Digital pulse output

*$R_{pull-up}$ = 5kΩ-10kΩ

Pulse output Active = 0Vdc (low)

**Supply (Vdc) 15-24Vdc

Pulse Output

Note: *
Use Rpull-up (between 5kΩ and 10 kΩ) to create 15-24Vdc at PIN 5

***Valve (I_{max}=265mA)

**Supply (Vdc) 15-24Vdc

Shut-off Valve

Note: ***
For 15Vdc supply the minimal Load is 60 Ω, for 24Vdc supply the minimal load is 90 Ω

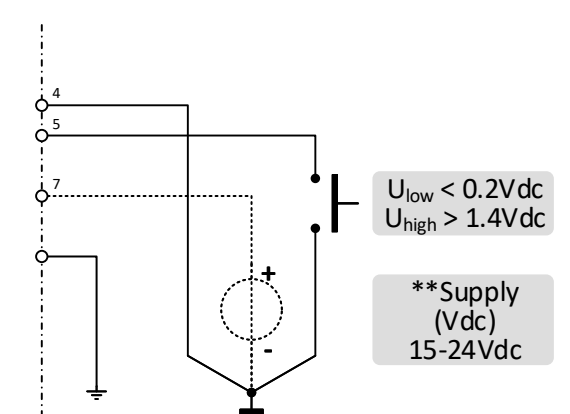| G	0	#	0-5 Vdc analog input
	1	#	0-10 Vdc analog input
	9	#	custom Vdc analog input

Source (Vdc)

**Supply (Vdc) 15-24Vdc
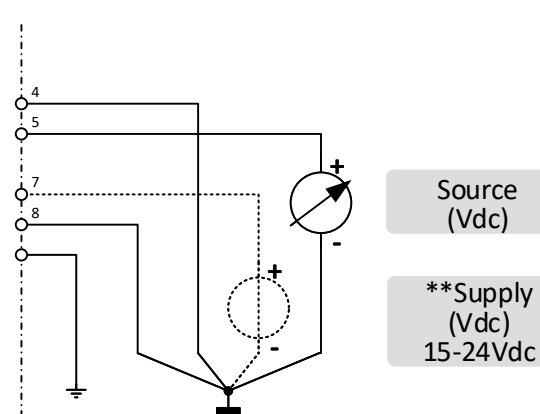
Note:
0V power (PIN 4) and 0V sense (PIN 8) should be seperately connected to the 0V terminal at the power supply. (Impedance = 250kΩ)

H	0	#	0-20 mAdc analog input
	1	#	4-20 mAdc analog input
	9	#	Custom mAdc analog input
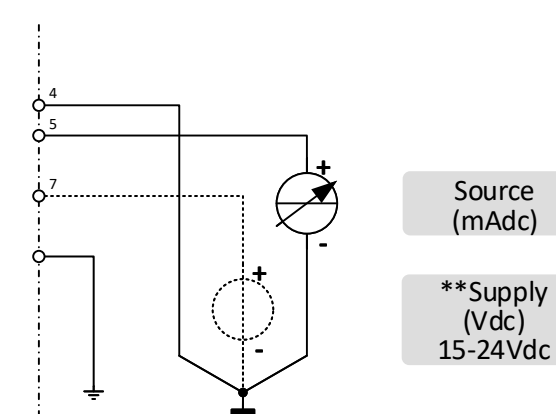
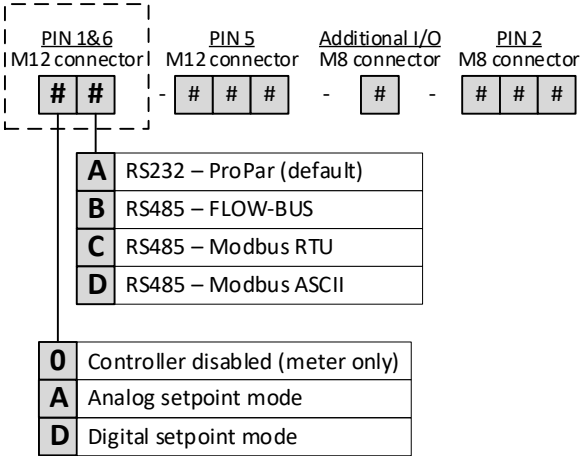Source (mAdc)

**Supply (Vdc) 15-24Vdc

Note:
In analog mode with 'mAdc' signals 0V sense (PIN 8) does not need to be connected. The instrument's operation will not be effected in case 0Vdc sense is already hooked-up. (Impedance = 250Ω)

I	#	#	Digital input

U_{low} < 0.2Vdc
U_{high} > 1.4Vdc

**Supply (Vdc) 15-24Vdc

Bronkhorst®

Doc.nr.: 9.16.260A

Date : 22-06-2021

Optional bus and IO configurations

ES-FLOW 1xxC
Hook-up diagram

PIN 1&6, RS232/RS485 HOOK-UP DIAGRAMS

PIN 1&6 BUS OPTIONS

PIN 1&6 M12 connector	PIN 5 M12 connector	Additional I/O M8 connector	PIN 2 M8 connector
# #	- # # #	- #	- # # #

A	RS232 – ProPar (default)
B	RS485 – FLOW-BUS
C	RS485 – Modbus RTU
D	RS485 – Modbus ASCII

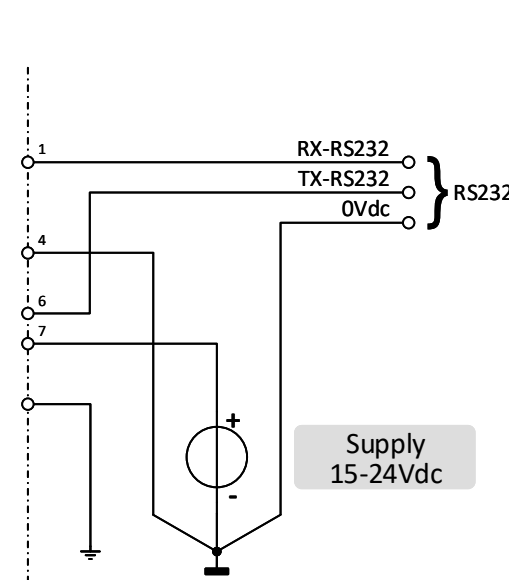| 0	Controller disabled (meter only)
A	Analog setpoint mode
D	Digital setpoint mode

Note:
When the instrument is configured for analog sepoint mode it is not possible to give a setpoint via FLOW-BUS or Modbus input on the M12 connector.
To configure the instrument for digital operation, change parameter 'control mode'. See doc.nr. 9.17.145 for more details.

PIN CONNECTIONS M12
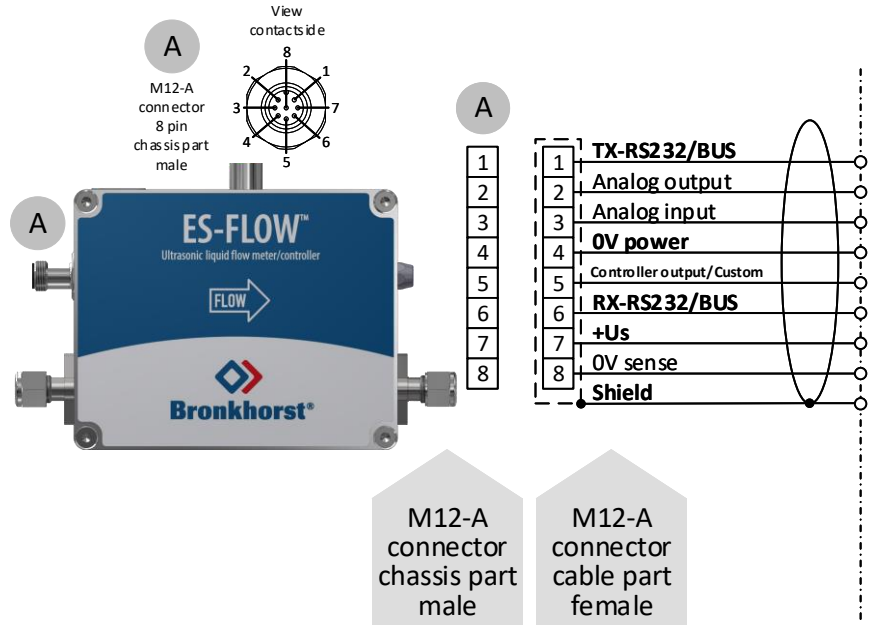
A
M12-A connector 8 pin chassis part male
View contactside

ES-FLOW™
Ultrasonic liquid flow meter/controller
FLOW
Bronkhorst®

A

1	TX-RS232/BUS
2	Analog output
3	Analog input
4	**0V power**
5	Controller output/Custom
6	RX-RS232/BUS
7	**+Us**
8	0V sense
	Shield

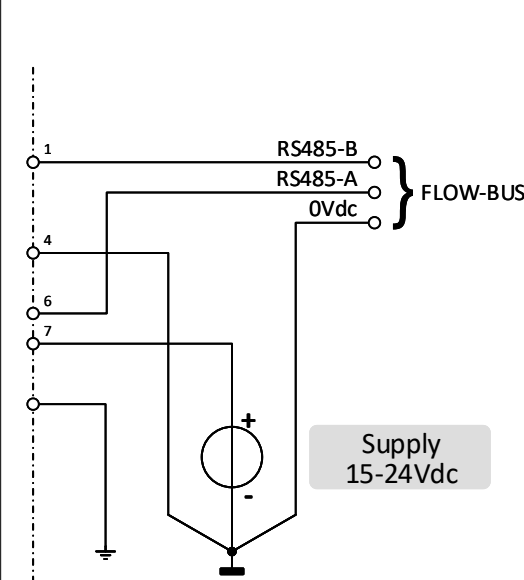M12-A connector chassis part male

M12-A connector cable part female

⚠ When connecting the system to other devices, be sure that the integrity of the shielding is not affected. Do not use unshielded wire terminals.
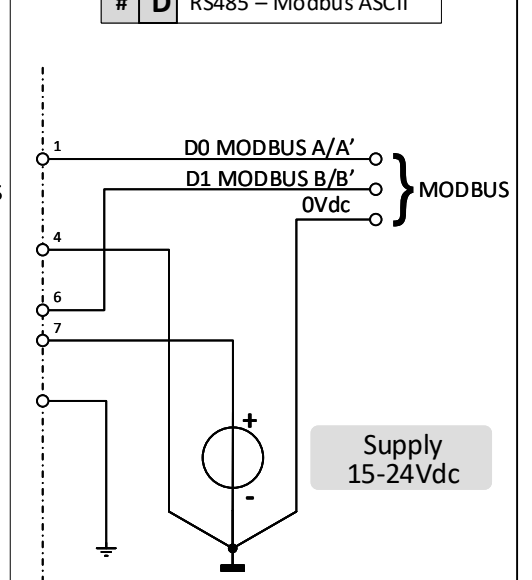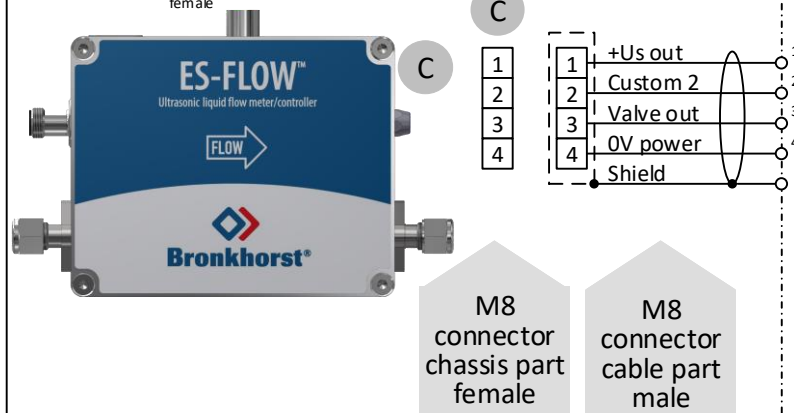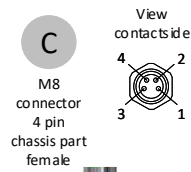
A RS232 – ProPar (default)

RX-RS232
TX-RS232
0Vdc
} RS232

Supply 15-24Vdc

B RS485 – FLOW-BUS

RS485-B
RS485-A
0Vdc
} FLOW-BUS

Supply 15-24Vdc

C RS485 – Modbus RTU
D RS485 – Modbus ASCII

D0 MODBUS A/A'
D1 MODBUS B/B'
0Vdc
} MODBUS

Supply 15-24Vdc

Additional actuator connector, HOOK-UP DIAGRAMS

actuator PIN CONNECTIONS M8
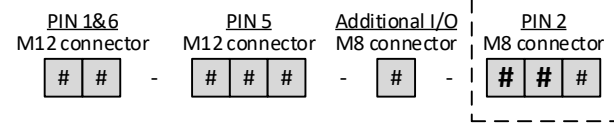
PIN 1&6 M12 connector	PIN 5 M12 connector	Additional I/O M8 connector	PIN 2 M8 connector
# #	- # # #	- #	- # # #

C
M8 connector 4 pin chassis part female
View contactside

ES-FLOW™
Ultrasonic liquid flow meter/controller
FLOW
Bronkhorst®

C

1	+Us out
2	Custom 2
3	Valve out
4	0V power
	Shield

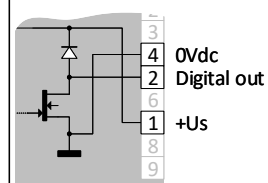M8 connector chassis part female

M8 connector cable part male

⚠ When connecting the system to other devices, be sure that the integrity of the shielding is not affected. Do not use unshielded wire terminals.
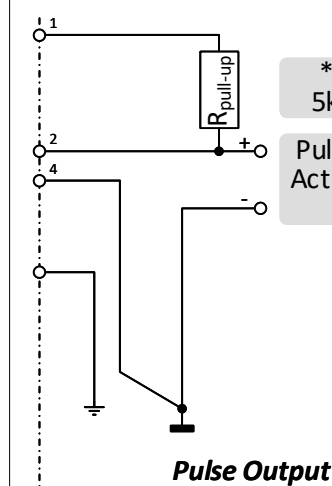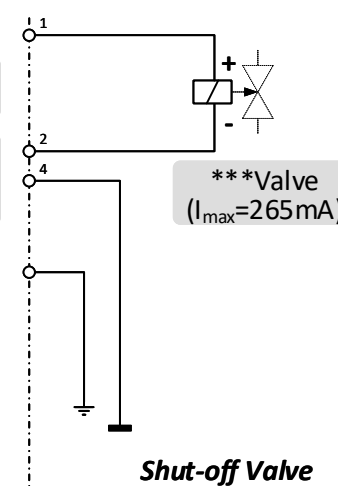
Bronkhorst (proportional) valve connection

Valve (I$_{max}$=265mA)

Internal setup digital output

4	0Vdc
2	Digital out
1	+Us

C	#	#	Digital output
D	#	#	Digital frequency output
E	#	#	Digital PWM output
F	#	#	Digital pulse output

*R$_{pull-up}$ = 5kΩ-10kΩ
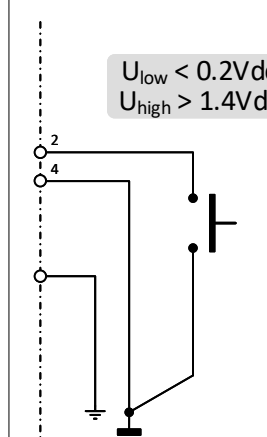
Pulse output Active = 0Vdc (low)

Pulse Output

Note: *
Use Rpull-up (between 5kΩ and 10 kΩ) to create 15-24Vdc at PIN 5

***Valve (I$_{max}$=265mA)

Shut-off Valve

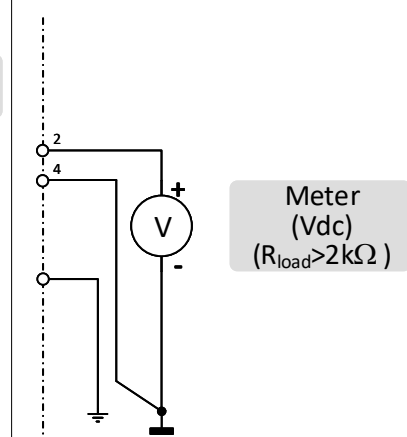Note: ***
For 15Vdc supply the minimal Load is 60 Ω, for 24Vdc supply the minimal load is 90 Ω

I	#	#	Digital input

U$_{low}$ < 0.2Vdc
U$_{high}$ > 1.4Vdc

A	0	#	0-5 Vdc analog output
	1	#	0-10 Vdc analog output
	9	#	custom Vdc analog output

Meter (Vdc) (R$_{load}$>2kΩ)

Note:
This output has no long cable compensation

B	0	#	0-20 mAdc analog output
	1	#	4-20 mAdc analog output
	2	#	3.8-20.8 mAdc output
	9	#	Custom mAdc analog output

Meter (mAdc) (R$_{load}$<375Ω)