

Special Documentation

FLWSIC500

Class I, Division 2

Described product

Product name: FLOWSIC500

Manufacturer

Endress+Hauser SICK GmbH+Co. KG
 Bergener Ring 27
 01458 Ottendorf-Okrilla
 Germany

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Original document

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Warning symbols



Hazard (general)

Warning levels / signal words

DANGER

Risk or hazardous situation which *will* result in severe personal injury or death.

WARNING

Risk or hazardous situation which *could* result in severe personal injury or death.

CAUTION

Hazard or unsafe practice which *could* result in less severe or minor injuries.

NOTICE

Hazards which *could* result in property damage

Information symbols



Information on product characteristics related to protection against explosions (general)



Important technical information for this product

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FLOWSIC500

1 Important Information

About this document
For your safety

1.1

About this document

This document is an addendum to the currently valid Operating Instructions FLOWSIC500 and may only be used in conjunction with them.

This document applies to FLOWSIC500 with Ex classification Class I, Division 2, Groups A, B, C, and/or D, T4 (see type plate → p. 9, Fig. 3).

Special instructions for FLOWSIC500 in this document overwrite related general information in the FLOWSIC500 Operating Instructions

1.2

For your safety**NOTICE:**

- ▶ Read the Operating Instructions carefully before using the FLOWSIC500.
- ▶ Observe all safety and warning notes!

FLOWSIC500

2 Class I Division 2

Product identification
Operation in potentially explosive atmospheres
Product description
Electrical Installation

2.1 **Product identification**

Make sure this document is valid for your FLOW SIC500:

- Check the type code, position 20 “Ex certification” on the type plate (→ Fig. 2) of your FLOW SIC500.

The FLOW SIC500 with Ex certification “4” Class I, Division 2, Groups A, B, C, and/or D, T4 is described in this document.

Fig. 1 Type code

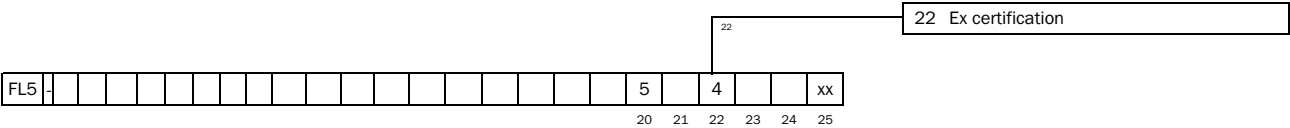
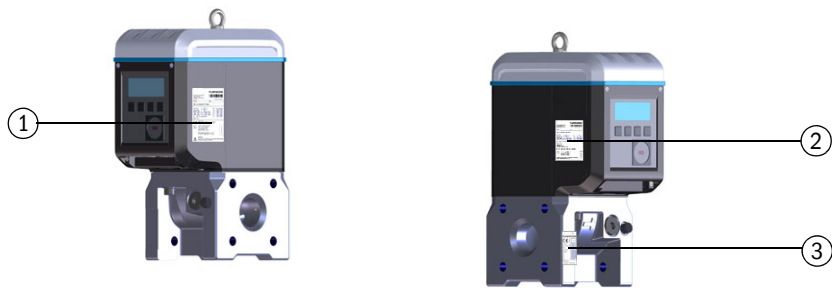


Fig. 2 Location of type plates

Marking according to CSA



- 1 Type plate, metrological parameters (metrology)
- 2 Type plate, electrical parameters (electronics)
- 3 Type plate, Pressure Equipment Directive

Fig. 3 Type plate electrical parameters (examples)
 Externally powered version

Made in Germany Endress+Hauser 	
FLOWSIC500 Endress+Hauser SICK GmbH+Co. KG Bergener Ring 27, 01458 Ottendorf-Okrilla, Germany	
Type code	FL5-2G01D1E1A2x2A1DA33A1B1F
Serial no.	12345678
Part no.	1234567
	
Power supply Class 2/ SELV U_{nom} 5.5...28.8 V DC=	
I_{max} 100 mA	
Material Aluminum Diameter 3.445"	
Max. weight 40.3 lb (incl. adapter)	
Q_{min}	88 cft/h
Q_r	1400 cft/h
Q_{max}	14000 cft/h
T_a	-40...+158 °F
T_r	-40...+158 °F
For value P_s and C_p see display.	
GAS METER SIZE-100 TEC: DE-15-MI002-PTB001 M2, E2, MPE 1.0 %	
VOLUME CONVERSION DEVICE TEC: DE-15-MI002-PTB003 MPE 0.5% EN12405-1 at reference conditions more info: press key	
  	
Date 2024-12	
 ID: 7 EHS24 0803 2100	
 Only use with: ADAPTER SIZE-100!	

Made in Germany Endress+Hauser 	
FLOWSIC500 Endress+Hauser SICK GmbH+Co. KG Bergener Ring 27, 01458 Ottendorf-Okrilla, Germany	
Type code	FL5-2G01D1E1A2x2A1DA33A1B1F
Serial no.	12345678
Part no.	1234567
	
 Cl. I, Div. 2, Groups A, B, C, D, T4 Class I, Zone 2, IIC T4 Gc	
IP66 Type 3R	
C US CSA13CA2566240	
 WARNING-EXPLOSION HAZARD: Substitution of components may impair suitability for Class I, Division 2. Do not connect while circuit is live unless area is known to be non hazardous.	
 AVERTISSEMENT-RISQUE D'EXPLOSION: La substitution de composants peut nuire à la Class I, Division 2. Ne pas se connecter lorsque le circuit est sous tension a moins que la zone ne soit reconnue non dangereuse.	
 Sensor	
 Sensor	
(1) PWR+ (1) PWR+ (2) Data+ (2) Data+ (3) GND (3) GND (4) Data- (4) Data-	
	

Battery-powered version

Made in Germany Endress+Hauser 	
FLOWSIC500 Endress+Hauser SICK GmbH+Co. KG Bergener Ring 27, 01458 Ottendorf-Okrilla, Germany	
Type code	FL5-2G01D1E1A2x2A1DA33A1B1F
Serial no.	12345678
Part no.	1234567
	
Powered by battery pack inside. External power supply not allowed!	
Material Aluminum Diameter 3.445"	
Max. weight 40.3 lb (incl. adapter)	
Q_{min}	88 cft/h
Q_r	1400 cft/h
Q_{max}	14000 cft/h
T_a	-40...+158 °F
T_r	-40...+158 °F
For value P_s and C_p see display.	
GAS METER SIZE-100 TEC: DE-15-MI002-PTB001 M2, E2, MPE 1.0 %	
VOLUME CONVERSION DEVICE TEC: DE-15-MI002-PTB003 MPE 0.5% EN12405-1 at reference conditions more info: press key	
  	
Date 2024-12	
 ID: 7 EHS24 0803 2100	
 Only use with: ADAPTER SIZE-100!	

Made in Germany Endress+Hauser 	
FLOWSIC500 Endress+Hauser SICK GmbH+Co. KG Bergener Ring 27, 01458 Ottendorf-Okrilla, Germany	
Type code	FL5-2G01D1E1A2x2A1DA33A1B1F
Serial no.	12345678
Part no.	1234567
	
 Cl. I, Div. 2, Groups A, B, C, D, T4 Class I, Zone 2, IIC T4 Gc	
IP66 Type 3R	
C US CSA13CA2566240	
 WARNING-EXPLOSION HAZARD: Substitution of components may impair suitability for Class I, Division 2. Do not connect while circuit is live unless area is known to be non hazardous.	
 AVERTISSEMENT-RISQUE D'EXPLOSION: La substitution de composants peut nuire à la Class I, Division 2. Ne pas se connecter lorsque le circuit est sous tension a moins que la zone ne soit reconnue non dangereuse.	
 Sensor	
 Sensor	
(1) PWR+ (1) PWR+ (2) Data+ (2) Data+ (3) GND (3) GND (4) Data- (4) Data-	
	

2.2

Operation in potentially explosive atmospheres



The FLOWSIC500 is suitable for use in potentially explosive atmospheres:
 Class I, Division 2, Groups A, B, C, and/or D, T4.

2.3

Product description

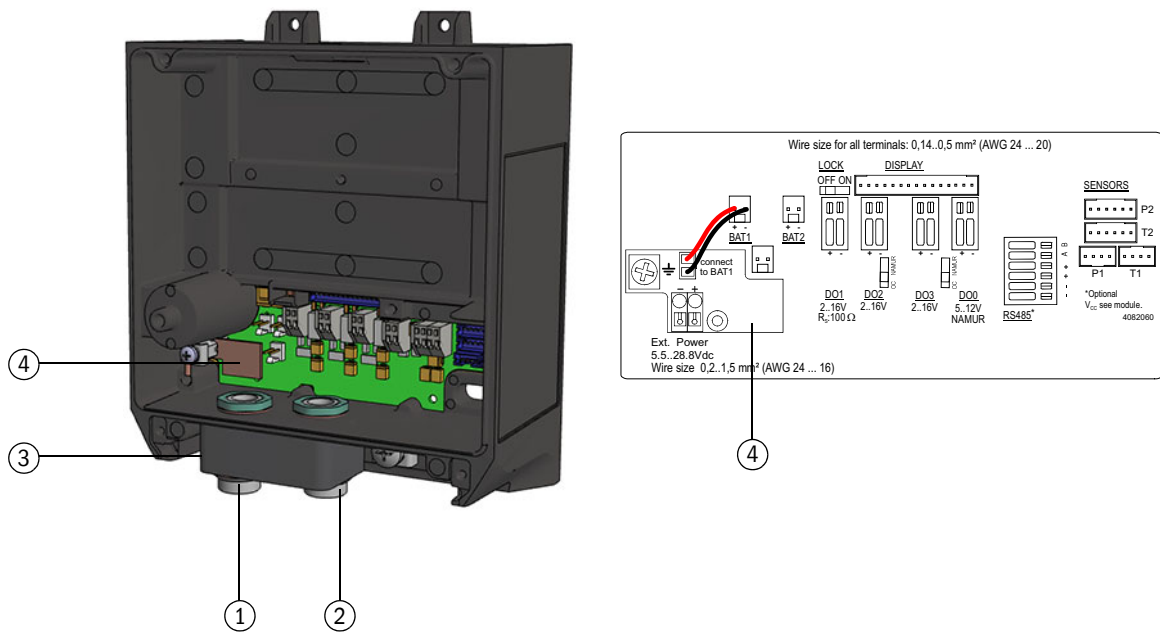
Instead of the two M12 connectors, the Class I, Division 2 version of the FLOWSIC500 is equipped with 1/2" NPT thread adapter in order to provide wiring methods according to the NEC (USA) and CEC (Canada).

An additional circuit board is installed in the terminal compartment for the externally powered meter configuration.

Additional M8 connectors for connection of external pressure and temperature sensors are optionally available (see Operating Instructions FLOWSIC500, §3.5).

Fig. 4

FLOWSIC500 Class I, Division 2



- 1 Gable entry 1 - 1/2" NPT
- 2 Cable entry 2 - 1/2" NPT
- 3 Thread adapter
- 4 Additional circuit board for externally powered meter configuration of FLOWSIC500 Class I, Division 2

2.4 Electrical Installation

2.4.1 Safety



WARNING:

Do not change internal switch settings, or connect or disconnect unless power has been removed, or the area is known to be non-hazardous.



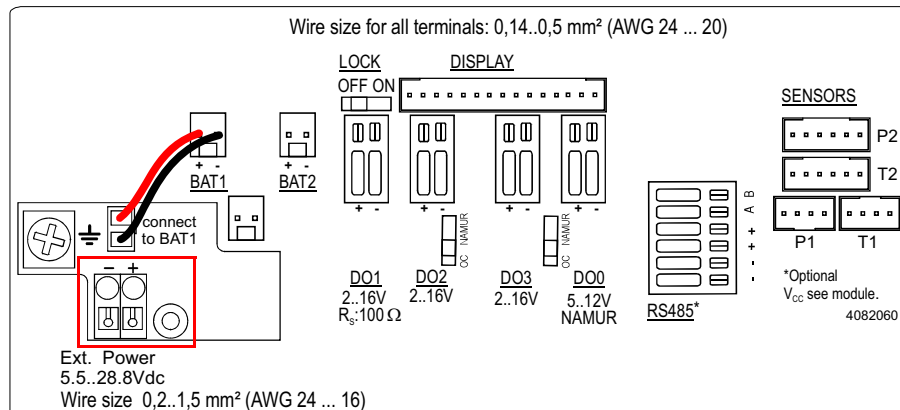
AVERTISSEMENT:

Ne modifiez pas les paramètres du commutateur interne, ou connectez ou déconnectez-le, sauf si l'alimentation a été coupée ou si la zone est réputée non dangereuse.

- In case of a battery powered meter configuration, connect the batteries as described in the Operating Instructions FLOWSIC500, §3.4.10 "Battery operation". Connection with an additional external power supply is not allowed.
- An additional circuit board is installed in case of an externally powered meter configuration. Connect the external power supply to the circuit board according to → Fig. 5 (connection: Ext. Power).
- Install in accordance with the CEC, part 1 or NEC500/NEC505. Keep unused cable entries closed with the supplied blind plugs.

Fig. 5

Connection for external power supply



2.4.2 Operating parameters and terminal assignment

2.4.2.1 Cable entry 1 – terminal assignment for configuration F, G, H, I, J, K, L

**WARNING:**

No external power supply may be connected in case of a battery powered meter configuration.

Table 1 Terminal assignment for battery-powered meter configuration F, G, H, I, J, K, L

Terminal assignment	Function/signal	Operating parameters
DO_1-	Diagnosis warning, Pulse output in test mode and for configuration K, $f_{\max} = 2 \text{ kHz at } 120\% Q_{\max}$	Passive, not electrically isolated Max. 16 V Max. 100 mA $R_{\text{on}} < 110 \Omega$ $R_{\text{off}} > 1 \text{ M}\Omega$
DO_1+		

Table 2 Terminal assignment for externally powered meter configuration F, G, H, I, J, K, L

Terminal assignment	Function/signal	Operating parameters
PWR-	Voltage supply	Rated input voltage 5.5 ... 28.8 V dc, 100 mA, Class 2 / SELV
PWR+		
DO_1-	Diagnosis warning, Pulse output in test mode and for configuration K, $f_{\max} = 2 \text{ kHz at } 120\% Q_{\max}$	Passive, not electrically isolated Max. 16 V Max. 100 mA $R_{\text{on}} < 110 \Omega$ $R_{\text{off}} > 1 \text{ M}\Omega$
DO_1+		

2.4.2.2 Cable entry 1 – terminal assignment for configuration M

**WARNING:**

No external power supply may be connected in case of a battery powered meter configuration.

Table 3 Terminal assignment for battery-powered meter configuration M

Terminal assignment	Function/signal	Operating parameters
DO_0-	HF pulses $f_{\max}$ configurable to 2 kHz at 120% $Q_{\max}$	NAMUR, electrically isolated, optically isolated Rated input voltage 8.2 V $I_{\text{on}} = 3.4 \text{ mA}$ $I_{\text{off}} = 0.7 \text{ mA}$
DO_0+		

Table 4 Terminal assignment for externally powered meter configuration M

Terminal assignment	Function/signal	Operating parameters
PWR-	Voltage supply	Rated input voltage 5.5 ... 28.8 V dc, 100 mA, Class 2 / SELV
PWR+		
DO_0-	HF pulses $f_{\max}$ configurable to 2 kHz at 120% $Q_{\max}$	NAMUR, electrically isolated, optically isolated Rated input voltage 8.2 V $I_{\text{on}} = 3.4 \text{ mA}$ $I_{\text{off}} = 0.7 \text{ mA}$
DO_0+		

2.4.2.3 Cable entry 1 – terminal assignment for configuration N



WARNING:

No external power supply may be connected in case of a battery powered meter configuration.

Table 5 Terminal assignment for battery-powered meter configuration N

Terminal assignment	Function/signal	Operating parameters
DO_2-	LF pulses $f_{\max}$ configurable to 100 Hz at 120% $Q_{\max}$	Passive, electrically isolated, configurable as: OC (Open Collector)*: Max. 16 V Rated current 20 mA or NAMUR: Rated input voltage 8.2 V $I_{\text{on}} = 3.4 \text{ mA}$ $I_{\text{off}} = 0.7 \text{ mA}$
DO_2+		

Table 6 Terminal assignment for externally powered meter configuration N

Terminal assignment	Function/signal	Operating parameters
PWR-	Voltage supply	Rated input voltage 5.5 ... 28.8 V dc, 100 mA, Class 2 / SELV
PWR+		
DO_2-	LF pulses $f_{\max}$ configurable to 100 Hz at 120% $Q_{\max}$	Passive, electrically isolated, configurable as: OC (Open Collector)*: Max. 16 V Rated current 20 mA or NAMUR: Rated input voltage 8.2 V $I_{\text{on}} = 3.4 \text{ mA}$ $I_{\text{off}} = 0.7 \text{ mA}$
DO_2+		

* Standard configuration

2.4.2.4

Cable entry 2: Signal output

Table 7

Terminal assignment for cable entry 2

Terminal assignment	Function/signal	Operating parameters
Terminal assignment configuration 1: LF pulses and malfunction (electrically isolated), type code I/O: F		
DO_2+	LF pulses	Passive, electrically isolated, configurable as: OC (Open Collector)*: Max. 16 V Rated current 20 mA or NAMUR: Rated input voltage 8.2 V $I_{on} = 3.4 \text{ mA}$ $I_{off} = 0.7 \text{ mA}$
DO_2-	f_{max} configurable to 100 Hz at 120% Q_{max}	
DO_3-	Malfunction	
DO_3+		
Terminal assignment configuration 2: HF pulses and malfunction (electrically isolated), type code I/O: G		
DO_0+	HF pulses	NAMUR, electrically isolated, optically isolated Rated input voltage 8.2 V $I_{on} = 3.4 \text{ mA}$ $I_{off} = 0.7 \text{ mA}$
DO_0-	f_{max} configurable to 2 kHz at 120% Q_{max}	
DO_3-	Malfunction	Passive, electrically isolated, configurable as OC (Open Collector)* or NAMUR, see Configuration 1 for operating parameters
DO_3+		
Pin assignment configuration 3: Encoder and LF pulses (electrically isolated), type code I/O: H		
DO_0+	Encoder log	NAMUR, electrically isolated, optically isolated Rated input voltage 8.2 V $I_{on} = 3.4 \text{ mA}$ $I_{off} = 0.7 \text{ mA}$
DO_0-		
DO_3-	LF pulses	Passive, electrically isolated, configurable as OC (Open Collector)* or NAMUR, see Configuration 1 for operating parameters
DO_3+		
Terminal assignment configuration 4: RS485 module (external feed), standard version: Type code I/O: J, low voltage version: Type code I/O: I		
PWR+	RS485 module (externally powered)	Electrically isolated Standard version: Rated input voltage 4 ... 16 V dc Low voltage version: Rated input voltage 2.7 ... 5 V dc
Data A		
PWR-		
Data B		
Terminal assignment configuration 5: Encoder and HF pulses (not electrically isolated), type code I/O: K		
Output of HF pulses via DO_1, → p. 12, §2.4.2.1.		
DO_0+	Encoder log	NAMUR, electrically isolated, optically isolated Rated input voltage 8.2 V $I_{on} = 3.4 \text{ mA}$ $I_{off} = 0.7 \text{ mA}$
DO_0-		
DO_3-	Malfunction	Passive, electrically isolated, configurable as OC (Open Collector)* or NAMUR, see Configuration 1 for operating parameters
DO_3+		

Table 7 Terminal assignment for cable entry 2

Terminal assignment	Function/signal	Operating parameters
Terminal assignment configuration 6: LF pulses and malfunction (electrically isolated), type code I/O: L		
DO_2+	LF pulses	Passive, electrically isolated, configurable as: OC (Open Collector)*: Max. 16 V Rated current 20 mA or NAMUR: Rated input voltage 8.2 V $I_{on} = 3.4 \text{ mA}$ $I_{off} = 0.7 \text{ mA}$
DO_2-	f_{max} configurable to 100 Hz at 120% Q_{max}	
DO_3-	LF pulses	
DO_3+	f_{max} configurable to 100 Hz at 120% Q_{max}	
Terminal assignment configuration 7: RS485 module + HF pulses, type code I/O: M		
Output of HF pulses via DO_0, → p. 12, §2.4.2.2		
PWR+	RS485 module (externally powered)	Electrically isolated
Data A		Standard version: Rated input voltage $U_b = 4 \dots 16 \text{ V dc}$
PWR-		Low voltage version: Rated input voltage 2.7 ... 5 V dc
Data B		
Terminal assignment configuration 8: RS485 module + LF pulses, type code I/O: N		
Output of LF pulses via DO_2, → p. 13, §2.4.2.3		
PWR+	RS485 module (externally powered)	Electrically isolated
Data A		Standard version: Rated input voltage $U_b = 4 \dots 16 \text{ V dc}$
PWR-		Low voltage version: Rated input voltage 2.7 ... 5 V dc
Data B		

* Standard configuration

2.5

Annex

Fig. 6

Type code

1	Device type
FL5	FLOWSIC500
2	Nominal size adapter
X	Replacement meter only
1	DN 50 / 2"
2	DN 80 / 3"
3	DN100 / 4"
D	DN150 / 6", adapter 4"
3	Flange-flange dimension adapter
X	Replacement meter only
A	50 mm
B	171 mm
E	241 mm
G	300 mm
L	450 mm
4	Pressure rating / flange standard
01	PN16 / EN1092-1
02	Class 150 / ASME B16.5
5	Mating surface
A	Flat face, smooth finish
B	Raised face, smooth finish
C	Form A / DIN EN 1092-1
D	Form B1 / DIN EN 1092-1
6	Connection p-sensor
X	Replacement meter only
1	Plug NPT 1/4"
2	Plug G1/4"
3	Compression fitting 1/4"
4	Compression fitting D6
7	Connection T-sensor
X	Replacement meter only
A	without
E	2x G 1/2" plug
8	Material adapter/gas meter
1	Aluminum / aluminum
9	Material certification adapter/gas meter
A	3.1 / 3.1
10	Surface adapter/gas meter
1	Shot-peened / SICK standard
11	Reserve
X	-
12	Nominal size gas meter
1	DN 50 / 2"
2	DN 80 / 3"
3	DN100 / 4"
C	DN150 / 6"
13	Flow direction
A	Left - right
B	Right - left
14	Transducer
1	Type 1: 300 kHz
15	Maximum flow rate
A	Qmax 65 m³/h
B	Qmax 100 m³/h
C	Qmax 160 m³/h
D	Qmax 250 m³/h
E	Qmax 400 m³/h
F	Qmax 650 m³/h
G	Qmax 1000 m³/h
16	Measuring span
1	1:50
2	1:100
3	1:160
4	1:200
9	1:250

17	Sensoric for volume correction
A	-
B	T-Sensor external
C	T-Sensor internal
D	p/T-Sensoren external
E	p/T-Sensoren internal
18	Gas temperature/ambient temperature
1	-25 °C ... +60 °C / -25 °C ... +60 °C
3	-40 °C ... +70 °C / -40 °C ... +70 °C
19	Pressure range p-Sensor
A	-
B	absolute 0,8 ... 5,2 bar
C	absolute 2,0 ... 10,0 bar
D	absolute 4,0 ... 20,0 bar
F	relative 0 ... 4,0 bar / 0 ... 58,0 PSI
G	relative 0 ... 10,0 bar / 0 ... 145,0 PSI
H	relative 0 ... 25,0 bar / 0 ... 362,6 PSI
20	Cable connection
5	Cable entries, NPT
21	Power supply
B	External with backup battery
C	Autarkic with battery pack (5 years)
22	EX certification
4	CSA Class 1 Div 2, Groups A, B, C, and/or D, T4
23	I/O (Interface configurations)
A	Impulse LF + Status (not galvanically isolated)
B	Impulse HF (galvanically isolated)
C	Encoder
D	RS485 (externally powered)
E	Encoder + Impulse (not galvanically isolated)
F	Impulse LF + Status (galvanically isolated)
G	Impulse HF + Status (galvanically isolated)
H	Encoder + Impulse LF (galvanically isolated)
I	RS485 Modul - battery powered (external)
J	RS485 Modul - line powered (external)
K	Encoder + Impulse HF (not galvanically isolated)
L	2 x LF-Impulses (galvanically isolated)
M	RS485 Module - line powered (external) + Impulse HF
N	RS485 Module - line powered (external) + Impulse LF
24	Conformity
2	PED
3	MID, PED
25	Customized solution
XX	-

8030463/AE00/V2-1/2026-01

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