Level | Pressure | Flow | Temperature | Liquid Analysis | Registration | Systems Components | Services | Solutions

Technical Information

CNGmass DCI

Coriolis mass flow measuring system
For fueling with compressed natural gas (CNG)

Applications
The Coriolis measuring principle works independently of the physical fluid properties.

- Specially designed flowmeter for fueling vehicles with CNG (compressed natural gas)
- Fluid temperature up to +150 °C (+302 °F)
- Process pressures up to 350 bar (5080 psi)
- Mass flow measurement up to 150 kg/min (330,75 lb/min)

Approvals for hazardous area:
- ATEX, NEC/CEC, NEPSI

Connection to common control systems:
- MODBUS RS485

Your benefits
CNGmass DCI allows you record multiple process variables (mass/density/temperature) simultaneously during operation for diverse process conditions.

The **transmitter concept** comprises:
- FieldCare for local operation and diagnosis
- Very low energy consumption

The **Promass sensors**, tried and tested in over 100000 applications, offer:
- Space-saving and compact design
- Insensitivity to vibrations thanks to balanced twin-tube measuring system
- Easy installation without taking inlet or outlet runs into account

TI098D/06/en/10.09
71096461

Endress+Hauser
People for Process Automation

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Function and system design

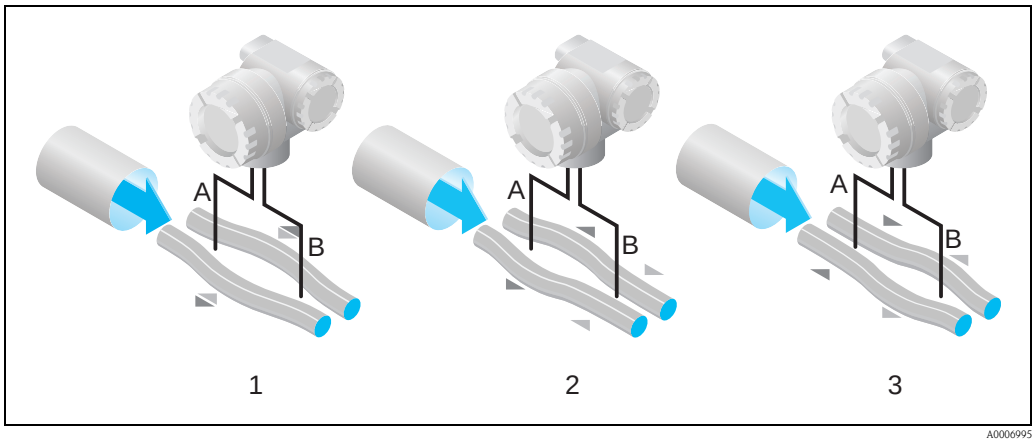
Measuring principle

The measuring principle is based on the controlled generation of Coriolis forces. These forces always occur in a system where translational (linear) and rotational movements are superimposed simultaneously.

$F_C = 2 \cdot \Delta m\ (v \cdot \omega)$
F_C = Coriolis force
Δm = moving mass
ω = rotational velocity
v = radial velocity in rotating or oscillating system

The size of the Coriolis force depends on the moving mass Δm, its velocity v in the system, and thus the mass flow. Instead of a constant rotational velocity ω, the sensor uses oscillation.

In the sensor, two parallel measuring tubes containing flowing fluid oscillate in antiphase, acting like a tuning fork. The Coriolis forces produced at the measuring tubes cause a phase shift in the tube oscillations (see illustration):
- At zero flow, in other words when the fluid is at a standstill, the two tubes oscillate in phase (1).
- Mass flow causes deceleration of the tube oscillation at the inlet (2) and acceleration at the outlet (3).



The phase difference (A-B) increases with increasing mass flow. Electrodynamic sensors register the tube oscillations at the inlet and outlet. System balance is ensured by the antiphase oscillation of the two measuring tubes. The measuring principle works independently of temperature, pressure, viscosity, conductivity and flow profile.

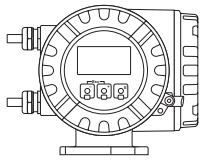
Density measurement
The measuring tubes are always excited at their resonance frequency. A change in the mass and thus the density of the oscillating system (comprising measuring tubes and fluid) results in a corresponding, automatic adjustment in the exciter frequency. Resonance frequency is thus a function of fluid density. The microprocessor utilizes this relationship to obtain a density signal.

Temperature measurement
To make calculations to compensate for temperature effects, the temperature of the measuring tubes is measured. This signal corresponds to the process temperature and is also available as an output signal.

Measuring system

The measuring system consists of a transmitter and a sensor. Two versions are available:
- Compact version: transmitter and sensor form a single mechanical unit.
- Remote version: transmitter and sensor are installed separately.

Transmitter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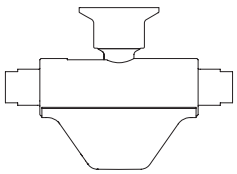
- Four-line liquid-crystal display
- Configuration via Touch Control, HART, MODBUS RS485, FieldCare
- Application-specific Quick Setup
- Mass, density, volume and temperature measurement as well as variables calculated from these data (e.g. fluid concentrations)

Sensor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- Sensor for fluid temperatures up to 150 °C (302 °F)
- Nominal diameter range DN 8 to 25 (3/8 to 1")
- Stainless steel measuring tubes

Input

Measured variable

- Mass flow (proportional to the phase difference between two sensors mounted on the measuring tube which record differences in the pipe oscillation geometry during flow)
- Volume flow (measured from the mass flow and density)
- Fluid density (proportional to the resonance frequency of the measuring tube)
- Fluid temperature (measured with temperature sensors)

Measuring ranges

Measuring ranges for Compressed Natural Gas (CNG), non-custody transfer operation.

DN		Range for full scale values (liquids) $\dot{m}_{min(F)}$ to $\dot{m}_{max(F)}$	
[mm]	[inch]	[kg/min]	[lb/min]
8	3/8"	0 to 150	0 to 330
15	½"		
25	1"		

Note!
The values of the corresponding custody transfer certificate apply for custody transfer operation.

Operable flow range

1:100

Input signal

Status input (auxiliary input)

U = 3 to 30 V DC, R_i = 3 kΩ, galvanically isolated.
Switching level: 3 to 30 V DC, polarity-independent.
Configurable for: totalizer reset, positive zero return, error message reset, start zero point adjustment.

Output

Output signal

Current output

Active/passive selectable, galvanically isolated, time constant selectable (0.05 to 100 s), full scale value selectable, temperature coefficient: typically 0.005% o.f.s. / °C, resolution: 0.5 µA

- Active: 0/4 to 20 mA, $R_L < 700\ \Omega$, $R_L \geq 250\ \Omega$ (HART)
- Passive: 4 to 20 mA; supply voltage V_S 18 to 30 V DC; $R_i \geq 150\ \Omega$

o.f.s. = of full scale value

Pulse/frequency output

Active/passive can be selected, galvanically isolated

- Active: 24 V DC, 25 mA (max. 250 mA during 20 ms), $R_L > 100\ \Omega$
- Passive: open collector, 30 V DC, 250 mA
- Frequency output: end frequency 2 to 10000 Hz (f_{max} = 12500 Hz), on/off ratio 1:1, pulse width max. 2 s
- Pulse output: pulse value and pulse polarity selectable, pulse width configurable (0.05 to 2000 ms)

MODBUS RS485

- MODBUS device type: slave
- Address range: 1 to 247
- Functions codes supported: 03, 04, 06, 08, 16, 23
- Broadcast: supported with the function codes 06, 16, 23
- Physical interface: RS485 in accordance with standard EIA/TIA-485
- Baud rates supported: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 Baud
- Transmission mode: RTU or ASCII
- Response times:
  Direct data access = typically 25 to 50 ms
  Auto-scan buffer (data range) = typically 3 to 5 ms
- Possible output combinations → Operating Instructions (BA138D/06, BA140D/06)

Signal on alarm

Current output
Failsafe mode selectable (for example, according to NAMUR Recommendation NE 43)

Pulse/frequency output
Failsafe mode selectable

Relay output
De-energized in the event of fault or power supply failure

MODBUS RS485
If an error occurs, the value NaN (not a number) is output for the process variables.

Switching output

Relay output
Normally closed (NC or break) or normally open (NO or make) contacts available (factory setting: relay 1 = normally open), max. 30 V / 0.5 A AC; 60 V / 0.1 A DC, galvanically isolated.

Load

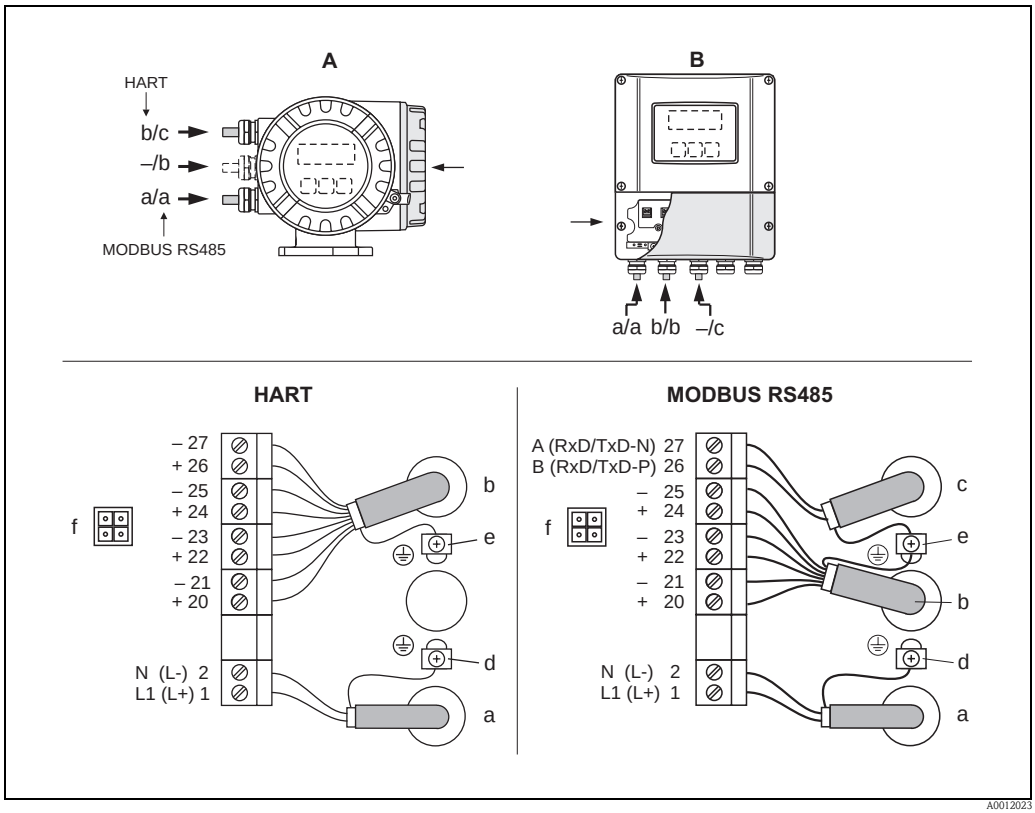
→ "Output signal"

Galvanic isolation

All circuits for inputs, outputs, and power supply are galvanically isolated from each other.

Power supply

Electrical connection, measuring unit



Connecting the transmitter, cable cross-section: max. 2.5 mm² (14 AWG)

A View A (field housing)
B View B (wall-mount housing)

a Cable for power supply: 85 to 260 V AC, 20 to 55 V AC, 16 to 62 V DC
- *Terminal No. 1: L1 for AC, L+ for DC*
- *Terminal No. 2: NN for AC, L- for DC*

b Signal cable: terminal assignment → 8

c Fieldbus cable
- *Terminal No. 26: B (RxD/TxD-P)*
- *Terminal No. 27: A (RxD/TxD-N)*

d Ground terminal for protective ground

e Ground terminal, signal cable shield / fieldbus cable shield
Observe the following:
- *the shielding and grounding of the fieldbus cable → Operating Instructions (BA138D/06, BA140D/06)*
- *that the stripped and twisted lengths of cable shield to the ground terminal are as short as possible*

f Service adapter for connecting service interface FXA193 (Fieldcheck, FieldCare)

Electrical connection, terminal assignment

Electrical values of the inputs/ outputs → Operating Instructions (BA138D/06, BA140D/06).

	Terminal No. (inputs/outputs)			
Order version	**20 (+) / 21 (-)**	**22 (+) / 23 (-)**	**24 (+) / 25 (-)**	**26 (+) / 27 (–)**
Fixed communication boards (permanent assignment)				
8DF**–**********S	–	–	Frequency output, Ex i, passive	Current output, Ex i, active, HART
8DF**–**********T	–	–	Frequency output, Ex i, passive	Current output, Ex i, active, HART
8DF**–**********Q	–	–	Status input	MODBUS RS485
Flexible communication boards				
8DF**–**********D	Status input	Relay output	Frequency output	Current output, HART
8DF**–**********M	Status input	Frequency output 2	Frequency output 1	Current output, HART
8DF**–**********N	Current output	Frequency output	Status input	MODBUS RS485
8DF**–**********1	Relay output	Frequency output 2	Frequency output 1	Current output, HART
8DF**–**********2	Relay output	Current output 2	Frequency output	Current output 1, HART
8DF**–**********7	Relay output 2	Relay output 1	Status input	MODBUS RS485

Supply voltage

85 to 260 V AC, 45 to 65 Hz
20 to 55 V AC, 45 to 65 Hz
16 to 62 V DC

Cable entries

Power supply and signal cables (inputs/outputs):
- Cable entry M20 × 1.5 (8 to 12 mm / 0.31 to 0.47")
- Threads for cable entries, ½" NPT, G ½"

Connecting cable for remote version:
- Cable entry M20 × 1.5 (8 to 12 mm / 0.31 to 0.47")
- Threads for cable entries, ½" NPT, G ½"

Cable specifications

Each compatible cable, with a temperature specification at least 20 °C (68 °F) higher than the ambient temperature prevailing in the application. We recommend using a cable with a temperature specification of +80 °C (+176 °F).

MODBUS RS485
Characteristic impedance: 120 W
Cable capacitance: < 30 pF/m (< 9.2 pF/ft)
Core cross-section: > 0.34 mm² (AWG 22)
Cable type: twisted pairs
Loop-resistance: ≤ 110 Ω/km (≤ 0.034 Ω/ft)
Shielding: copper braided shielding or braided shielding and foil shielding

Power consumption

AC: < 15 VA (including sensor)
DC: < 15 W (including sensor)

Switch-on current
- max. 13.5 A (< 50 ms) at 24 V DC
- max. 3 A (< 5 ms) at 260 V AC

Power supply failure

Lasting min. 1 power cycle:
- EEPROM or HistoROM T-DAT saves measuring system data if power supply fails.
- HistoROM/S-DAT: exchangeable data storage chip which stores the data of the sensor (nominal diameter, serial number, calibration factor, zero point etc.)

Potential equalization

No measures necessary.
For explosion-protected equipment → separate Ex-documentation supplied

Performance characteristics

Reference operating conditions

Error limits following ISO/DIS 11631:
- 15 to 45 °C (59 to 113 °F)
- 2 to 6 bar (30 to 87 psi)
- Calibration systems as per national norms
- Zero point calibrated under operating conditions
- Field density calibrated (or special density calibration)

Maximum measured error

Mass flow

±0.50% of the quantity filled in typical CNG fueling

Repeatability

Mass flow

±0.25% of the quantity filled in typical CNG fueling

Influence of medium temperature

When there is a difference between the temperature for zero point adjustment and the process temperature, the typical measured error is ±0.0003% of the full scale value / °C.

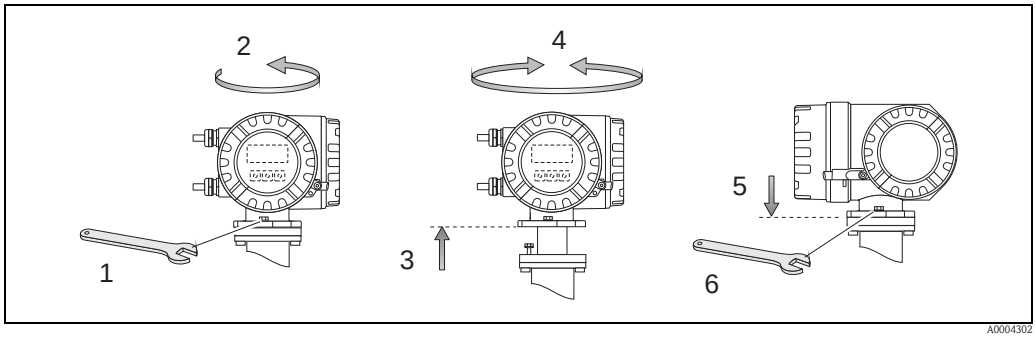
Influence of medium pressure

The following section shows the effect on accuracy of mass flow due to a difference between calibration pressure and process pressure is negligible.

Operating conditions: Installation

Installation instructions

Note the following points:
- No special measures such as supports are necessary. The housing absorbs external forces.
- The high oscillation frequency of the measuring tubes ensures that the correct operation of the measuring system is not influenced by pipe vibrations.
- No special precautions need to be taken for fittings which create turbulence (valves, elbows, T-pieces etc.).

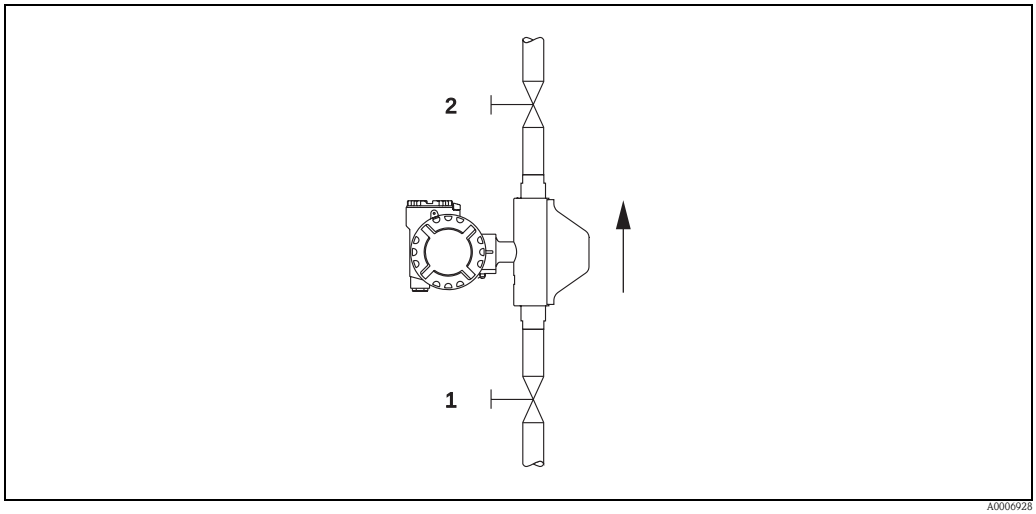


Turning the transmitter housing

Zero point adjustment

All measuring devices are calibrated with state-of-the-art technology. The zero point obtained in this way is printed on the nameplate. Calibration takes place under reference operating conditions (→ 🖹 9). Therefore, a zero point adjustment is generally **not** required!

If you want to carry out a zero point adjustment, note the following points before doing so:
- The calibration can be carried out under stable pressure conditions only.
- The zero point adjustment is carried out a zero flow. This can be achieved, for example, with shutoff valves upstream and/or downstream of the sensor or by using existing valves and gates.
  - Normal operation → valves 1 and 2 open
  - Zero point adjustment *with* process pressure → valve 1 open / valve 2 closed
  - Zero point adjustment *without* process pressure → Valve 1 closed / valve 2 open
- A zero point adjustment is **not** possible if the SECURITY function is enabled or if an error message is pending.



Zero point adjustment and shutoff valves

Remote version connection length

Max. 20 m (max. 66 ft)

Operating conditions: Environment

Ambient temperature range

Sensor and transmitter:
- Standard: –20 to +60 °C (–4 to +140 °F)
- Optional: –40 to +60 °C (–40 to +140 °F)

Note!
- Install the device in a shady location. Avoid direct sunlight, particularly in warm climatic regions.
- At ambient temperatures below –20 °C (–4 °F), the readability of the display may be impaired.

Storage temperature

–40 to +80 °C (–40 to +176 °F), preferably +20 °C (+68 °F)

Degree of protection

Standard: IP 67 (NEMA 4X) for transmitter and sensor

Shock resistance

In accordance with IEC 68-2-31

Vibration resistance

In accordance with IEC 68-2-31

Electromagnetic compatibility (EMC)

As per IEC/EN 61326

Operating conditions: Process

Medium temperature range

–50 to +150 °C (–58 to +302 °F)

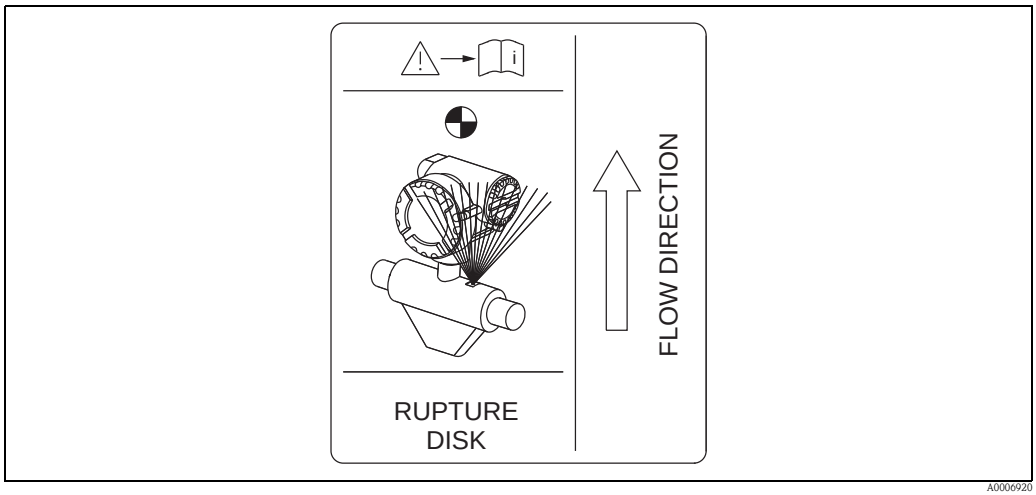
Medium pressure range (nominal pressure)

Max. 350 bar (max. 5080 psi)

Rupture disk in the sensor housing

Triggering pressure in the housing 10 to 15 bar (145 to 218 psi)

The position of the rupture disk is indicated by an adhesive label on top of the disk. If the rupture disk is triggered, the adhesive label is damaged and can thus be visually monitored.



Additional sign regarding the position of the rupture disk (RUPTURE DISK)

Limiting flow

→ 📄 5, "Measuring range"

Custody transfer measurement

CNGmass DCI is flowmeter that is suitable for custody transfer measurement.

Suitability for custody transfer measurement, approval by the Standards Authorities, repeated calibration due to legal metrology controls

Only once it has been approved by the authority for legal metrology controls may the measuring device be regarded as verified and used for applications subject to legal metrology controls. The associated seal on the measuring device ensures this status.

Caution!
Only flowmeters verified by the Standards Authorities may be used for invoicing in applications subject to legal metrology controls. Country-specific requirements and regulations (such as the German Calibration Law) must be observed.

Approval for custody transfer

The following guidelines for the custody transfer process were developed in accordance with the following authorities for legal metrology controls:

- **PTB**, Germany
- **NMi**, The Netherlands
- **METAS**, Switzerland
- **BEV**, Austria
- **NTEP**, USA
- **MC**, Canada

Special features of working in the custody transfer mode

Switching on the power supply in custody transfer mode

If the measuring device is started in custody transfer mode, for example after a power outage, system error No. 271 "POWER BRK. DOWN" flashes on the local display.
The fault message can be acknowledged or reset using the "Enter" key or by means of the status input configured accordingly.

Note!
It is not mandatory to reset the fault message for correct operation.

Definition of terms

Terms used in the subject area "suitability for custody transfer measurement for liquids other than water"

Verify	Inspection of a measuring system to determine the measured error from the "true" value with subsequent system sealing. Verification can only be carried out on site by the authority for legal metrology controls responsible.
Suitable for custody transfer measurement	A measuring system or a part of the system, for example counters or accessory equipment, has the (type) "approval for national verification" of a (national) approval center.
Verified	The measuring system has been inspected and sealed on site by a representative of the authority for legal metrology controls. This must be arranged by the facility's owner-operator.
Repair	Upon request, the authority responsible can give companies that repair verified measuring devices (repairers) the authority to mark repaired devices (repairer mark) if they have the equipment necessary for repair and adjustment and have properly trained specialist staff. Endress+Hauser is authorized to carry out repair work on verified measuring devices.
Adjust	Adjustment on site (zero point, density) under operating conditions. Is performed by the facility's owner-operator.
Calibrate	Determine and save correction values for the individual measuring device to get as close as possible to the "real" value with the measured value.
Quantity convertor	Unit for automatically converting the measured value determined to another variable (pressure, temperature, density etc.) or nonvolatile saved conversion values for the fluid.
Measured error	(Also known as limit of permissible error, error limit or inaccuracy). Relative measurement error, derived from the quotient (measured value – "true" measured value) : "true" measured value in percent.
Measuring system	Measuring device that includes the counter and all the ancillary equipment and additional devices.
Reapproval	Verified measuring devices can be reapproved if they observe the applicable limits of error in legal metrology and meet any other requirements which applied when they were initially verified. The authority responsible provides you with information as to how long the verification is valid.
Q_{min}	Minimum flow as of which the counter must observe the error limits.
Q_{max}	Maximum flow of the counter while observing the error limits.
Stamp points	To be provided on all parts of the measuring system which cannot otherwise be protected against any alteration (=falsification) to measured value determination and processing. Lead stamping is preferably used, but adhesive seals are also permitted. They may only be affixed by an authorized party, namely authority for legal metrology controls or service team with field service mark.
Counter	Device for measuring, saving and displaying the variables subject to mandatory verification (mass, volume, density etc.).
Additional devices	Equipment that does not have a direct effect on the measurement but which is needed to ensure correct measuring or make it easier (e.g. gas display units, filters, pumps etc.).
Ancillary equipment	Equipment used for direct further processing of the measurement result (e.g. printers, quantity convertors, price calculators, pre-set devices etc.).

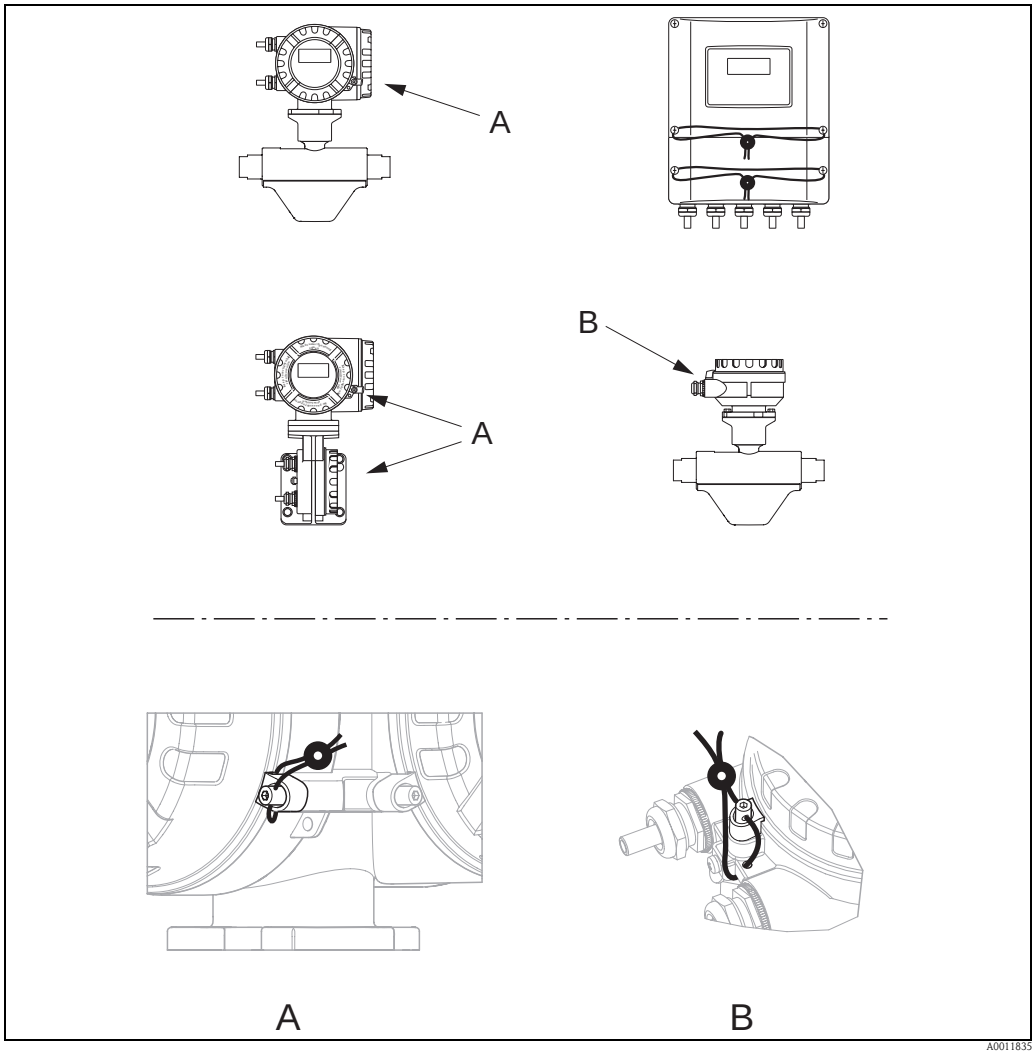
Verification process

Setting up custody transfer mode

The measuring device has to be operational and not set to custody transfer mode.

1. Configure the functions important for custody transfer measurement, such as the output configuration, custody transfer variable and the measuring mode.
   – In the "CUSTODY TRANSFER" block (function block Z; functions Z001 to Z008), the outputs relevant for custody transfer measurement can be set to custody transfer and the current custody transfer status can be displayed.
   – In the "OUTPUTS" block (function block E), the custody transfer variables can be assigned to the existing outputs.
   – In the "INPUTS" block (function block F), a switching behavior is assigned to the input.
   For NTEP and MC only: The "CUSTODY TRANSFER" block is hidden. All relevant outputs are set to custody transfer.

   Note!
   Please refer to the separate "Description of Device Parameters" manual for a detailed description of the functions.
2. Once all the functions relevant to custody transfer have been configured, the custody transfer code is entered in the "ACCESS CODE (2020)" cell.
   Custody transfer code: 8400
   The functions are locked once you enter the custody transfer code. These functions are marked with a keyhole symbol (Ⓛ) in the separate "Description of Device Parameters" manual.
3. The lead stamping of the device (→).
4. The device is suitable for custody transfer measurement. The flow measurement may now be used in applications subject to legal metrology controls.



Examples of how to seal the various device versions.

Disabling custody transfer mode

The measuring device has to be operational and already set to custody transfer mode.

1. Disconnect the device from the operating voltage.
2. Remove the custody transfer seals.

Warning!
In the case of explosion-protected equipment, observe a cooling or discharge time of 10 minutes before opening the device.

3. Open the cover of the transmitter housing electronics compartment.
   For detailed information on the procedure to be followed for the compact/wall-mount version
   → Operating Instructions (BA138D/06, BA140D/06).
4. Remove the S-DAT
5. Reconnect the device to the power supply.
6. The device runs through the startup cycle.
   After startup, the error message "#031 SENSOR HW-DAT" is displayed.

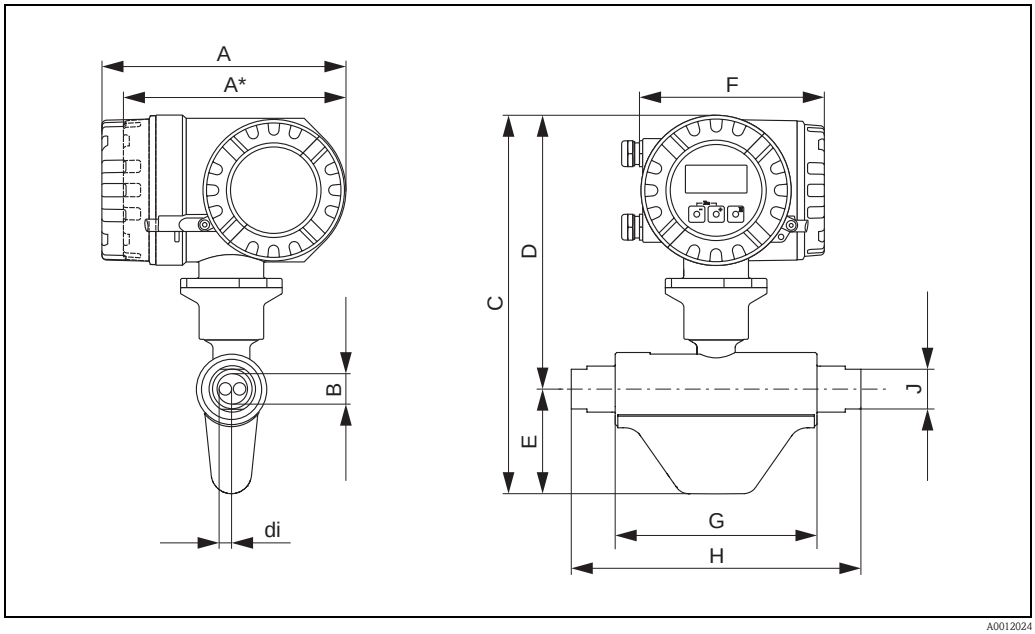
   Note!
   This error message appears because the S-DAT has been removed.
   This does not have any effect on the subsequent steps.
7. Disconnect the device from the power supply again.
8. Reinsert the S-DAT.
9. Screw the covers of the electronics compartment and the display module back on.
10. Reconnect the device to the power supply.
11. The device runs through the startup cycle.
    During startup, the message "CUSTODY TRANSFER NO" appears on the display.
12. The device is now operational and is not in custody transfer mode.

Note!
To set the device back to custody transfer mode, proceed as described on → 15.

Mechanical construction

Design, dimensions

Compact version field housing (non-hazardous area and II2G / Zone 1)



Dimensions in SI units

DN	A	A*	B	C	D	E	F	G	H	J	di
8	227	207	G½"	350	252	98	168	150	214	32	3.87
15	227	207	G¾"	352	252	100	168	193	267	41	6.23
25	227	207	G1"	357	252	105	168	244	316	46	8.80

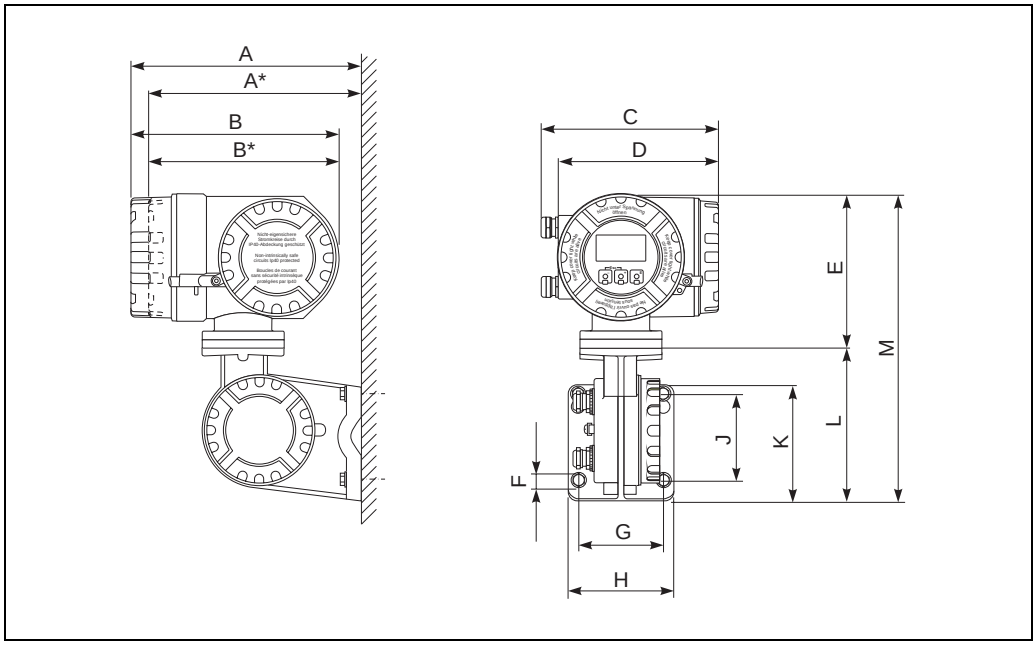
* Blind version (without local display)
All dimensions in [mm]

Dimensions in US units

DN	A	A*	B	C	D	E	F	G	H	J	di
3/8"	8.94	8.15	G½"	13.78	9.92	3.86	6.61	5.91	8.43	1.26	0.15
½"	8.94	8.15	G¾"	13.86	9.92	3.94	6.61	7.60	10.51	1.61	0.25
1"	8.94	8.15	G1"	14.06	9.92	4.13	6.61	9.61	12.44	1.81	0.35

* Blind version (without local display)
All dimensions in [inch]

Remote version of transmitter, connection housing (II2G / Zone 1)



Dimensions in SI units

A	A*	B	B*	C	D	E	F	G	H	J	K	L	M
265	242	240	217	206	186	178	∅ 8.6 (M8)	100	130	100	144	170	355

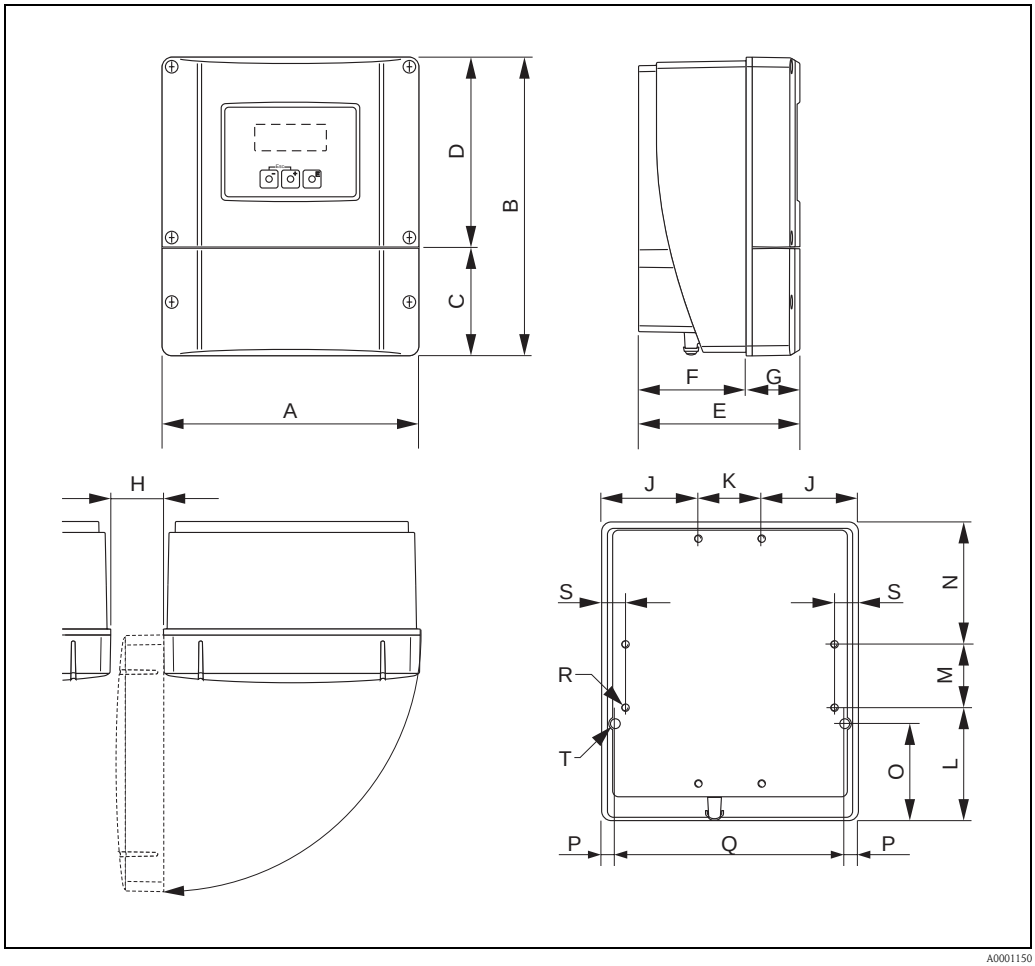
* Blind version (without local display)
All dimensions in [mm]

Dimensions in US units

A	A*	B	B*	C	D	E	F	G	H	J	K	L	M
10.4	9.53	9.45	8.54	8.11	7.32	7.01	∅ 8.6 (M8)	3.94	5.12	3.94	5.67	6.69	13.9

* Blind version (without local display)
All dimensions in [inch]

Remote version of transmitter, wall-mount housing (non-hazardous area)



Dimensions in SI units

A	B	C	D	E	F	G	H	J	K
215	250	90.5	159.5	135	90	45	> 50	81	53
L	M	N	O	P	Q	R	S	T [1]	
95	53	102	81.5	11.5	192	8 × M5	20	2 × ∅ 6.5	

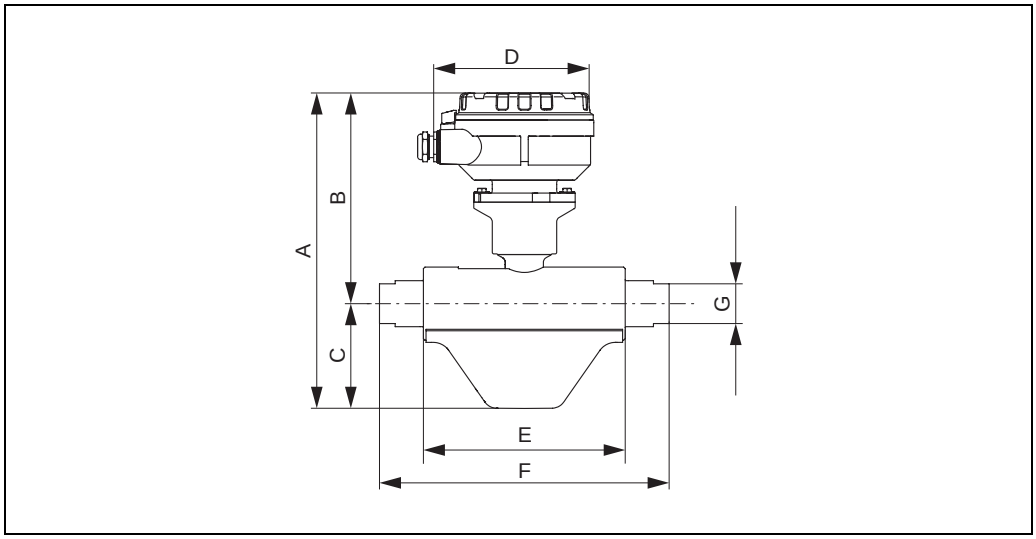
[1] Securing screw for wall mounting: M6 (screw head max. 10.5 mm)
All dimensions in [mm]

Dimensions in US units

A	B	C	D	E	F	G	H	J	K
8.46	9.84	3.56	6.27	5.31	3.54	1.77	> 1.97	3.18	2.08
L	M	N	O	P	Q	R	S	T [1]	
3.74	2.08	4.01	3.20	0.45	7.55	8 × M5	0.79	2 × ∅ 0.26	

[1] Securing screw for wall mounting: M6 (screw head max. 0.41")
All dimensions in [inch]

Remote version of sensor, connection housing (non-hazardous area and II2G / Zone 1)



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Dimensions in SI units

DN	A	B	C	D	E	F	G
8	350	252	98	144	150	214	32
15	352	252	100	144	193	267	41
25	357	252	105	144	244	316	46

All dimensions in [mm]

Dimensions in US units

DN	A	B	C	D	E	F	G
3/8"	13.78	9.92	3.86	5.67	5.91	8.43	1.26
½"	13.86	9.92	3.94	5.67	7.60	10.51	1.61
1"	14.06	9.92	4.13	5.67	9.61	12.44	1.81

All dimensions in [inch]

Weight

DN in mm (inch)	8 (3/8")	15 (½")	25 (1")
Weight in kg	8.9	10.8	11.8
Weight in lb	19.6	23.8	26.0

Material

Transmitter housing:

Powder coated die-cast aluminum

Housing of sensor/secondary containment:

Acid-resistant and alkali-resistant external surface, stainless steel 1.4301/304

Process connections

Stainless steel 1.4404/316

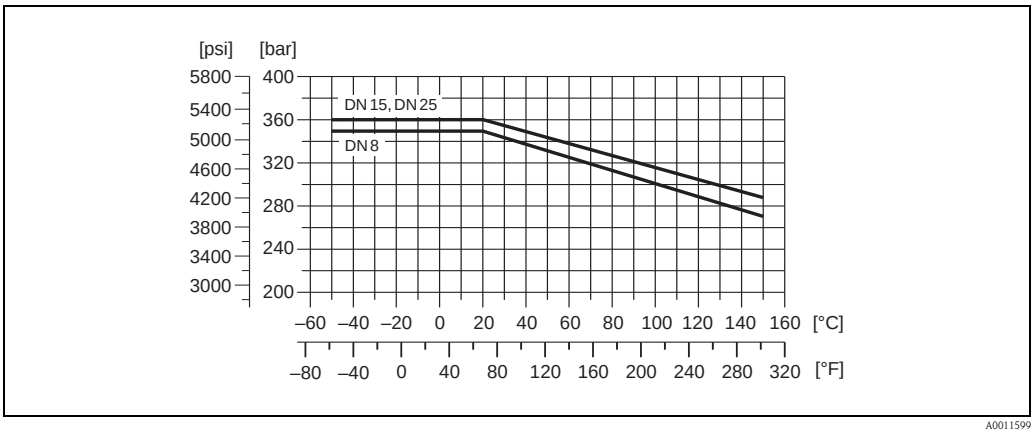
Measuring tubes:

Stainless steel 1.4435/316L

Material load diagram

CNGmass DCI process connections

Connection material: 1.4404/316



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Process connections

Cylindrical internal thread BSP (G) in accordance with ISO 228-1 with sealing surfaces in accordance with DIN 3852-2/ISO 1179-1:

- G ½" for DN 08 (3/8")
- G ¾" for DN 15 (½")
- G 1" for DN 25 (1")

Note!
Sealed with profile seal in accordance with DIN 3869 or copper disk or steel seal disk with plastic lip.

Human interface

Display elements

- Liquid crystal display: illuminated, four lines with 16 characters per line
- Selectable display of different measured values and status variables
- 3 totalizers
- At ambient temperatures below –20 °C (–4 °F), the readability of the display may be impaired.

Operating elements

- Local operation with three optical sensors (−/+/ E)
- Application specific Quick Setup menus for straightforward commissioning

Language groups

Language groups available for operation in different countries:
- Western Europe and America (WEA): English, German, Spanish, Italian, French, Dutch and Portuguese
- Eastern Europe/Scandinavia (EES): English, Russian, Polish, Norwegian, Finnish, Swedish, Czech
- South and East Asia (SEA): English, Japanese, Indonesian
- China (CN): English, Chinese

Note!
You can change the language group via the operating program FieldCare.

Remote operation

Operation via HART or MODBUS protocol.

Certificates and approvals

CE mark

The measuring system is in conformity with the statutory requirements of the EC Directives. Endress+Hauser confirms successful testing of the device by affixing to it the CE mark.

C-tick mark

The measuring system meets the EMC requirements of the Australian Communications and Media Authority (ACMA).

Ex approval

Information about currently available Ex versions (ATEX, NEC/CEC etc.) can be supplied by your Endress+Hauser sales center on request. All explosion protection data are given in a separate Ex documentation, which is available upon request.

Pressure device approval

Measuring devices with a nominal diameter smaller than or equal to DN 25 (1") correspond to Article 3 (3) of the EC Directive 97/23/EC (Pressure Equipment Directive) and have been designed and manufactured according to good engineering practice.

Other standards and guidelines

- EN 60529
  Degrees of protection by housing (IP code)
- EN 61010-1
  Safety requirements for electrical equipment for measurement, control and laboratory use
- IEC/EN 61326
  Electromagnetic compatibility (EMC requirements)

Ordering information

The Endress +Hauser service organization can provide detailed ordering information and information on the order code.

Accessories

Various accessories, which can be ordered separately from Endress+Hauser, are available for the transmitter and the sensor.

Note!
Detailed information on the order codes in question can be obtained from your Endress+Hauser service organization.

Documentation

- ❑ Flow measurement (FA005D/06)
- ❑ Operating Instructions (BA138D/06)
- ❑ Operating Instructions MODBUS RS485 (BA140D/06)
- ❑ Description of Device Parameters (GP001D/06)
- ❑ Description of Device Parameters MODBUS RS485 (GP003D/06)
- ❑ Ex-Supplementary documentation: ATEX (II2G) (XA135D/06)
- ❑ Ex-Supplementary documentation: NEC/CEC (XA137D/06)
- ❑ Ex-Supplementary documentation: NEPSI (XA138D/06)

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