Dattus™ Basic fM2 & fM3

Commercial & Industrial Gas Meters

Applications

The Dattus meter is a highly accurate solid-state gas meter suited for commercial & industrial gas measurement applications for flow rates from 1,000 to 56,000 actual cubic feet per hour (acfh). With no moving parts, the Dattus meter is ideal for applications where continuous gas flow to the customer is required.

Features

- Static Measurement Technology
- Gas Volume Totalizing
- Data Logging Available
- Fixed-factor Pressure Correction
- Configurable Pulse Outputs
- Capacity Sizes from 1M through 56M
- Field Upgrading of Meter Capacity Without Service Interruption
- 8-11 Years Battery Life (Average Usage)
- Configurable Index Orientation
- Modbus Communication

fM2

fM3

Fluidic Operation Principle

Description

The operation of the Dattus meter, (see figure 1 on the right), is based on the fluidic oscillation principle. The measurement unit is comprised of three functional elements:

▶ **Flow conditioner**
▶ **Jet nozzle formation**
▶ **Fluidic oscillator chamber**

Gas enters (1) the meter and divides into two separate flow paths (2) these two flows recombine (3) as they exit the flow conditioner and enter the fluidic oscillation chamber through the nozzle. The process of dividing the flows eliminates upstream disturbances and creates well–conditioned flow.
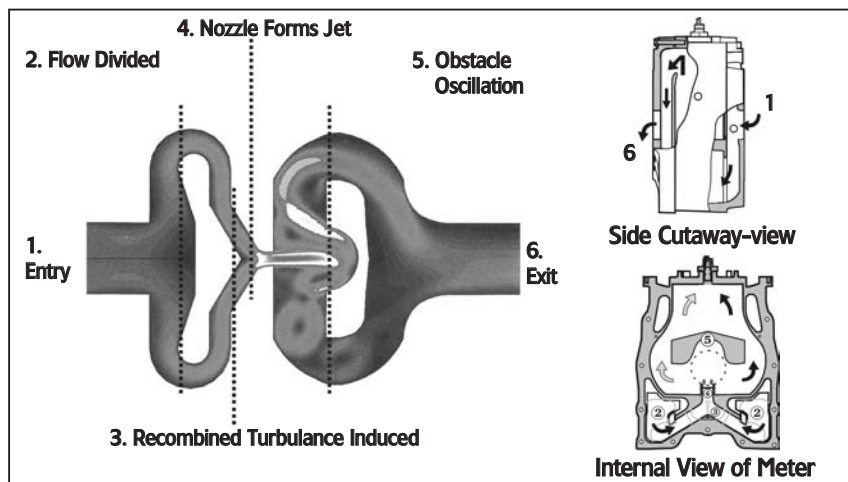

Figure 1

In the fluidic oscillation chamber, a jet is formed (4) as the gas enters through the nozzle. The jet then starts oscillating back and forth (5). Thermal sensors, located just after the nozzle, detect a temperature variance as the gas jet passes from one side to the other. The volume of gas passed through the meter is obtained by counting the number of oscillations detected by the sensors.

Advantages

Operational −

   Safety − Because the Dattus uses solid–state technology (no moving parts), the meter cannot "lock up" or stop gas flow. This may be necessary in some applications such as hospitals, schools, or other applications where continuous gas service may be critical.

   Robustness − The Dattus meter may be subjected to flow rates many times its rated capacity without any damage to the meter, only an alarm displayed letting the user know the meter was in an "overflow" condition. The Dattus will measure normally once the flow is within its operating range. Reduced failures due to contamination in the gas.

   Application − Without mechanical elements impeding gas flow, the meter performs very well in applications where slam–shut or slam–open equipment is used. The Dattus does not create pulsations that can affect pressure regulator performance.

   Ease of Installation − Having completely aligned flanges is not necessary, nor is leveling of the meter. Neither torsion on the meter case or a non–level setting will affect meter performance.

Maintenance − Because the Dattus meter doesn't have any rotating or moving parts, there are no associated maintenance requirements, such as oil changes that may be required for other meter types. Batteries are the only regular maintenance item required for Dattus, (8–11 years typical, depending on meter configuration)

Differential − The differential pressure across the meter is related to the flow rate through the meter and does not change during the life of the meter. The accuracy of the meter is not affected by the differential. Differential testing may be used to verify the accuracy of the Dattus meter.

Feature Details

▶ Pulse Outputs

- 4 pulse output channels
- Form A type
- Selectable Between Uncorrected Volume, Corrected Volume (Fixed Factor Pressure), or Alarm Outputs
- Programmable volume pulse weights
- Programmable pulse width (0.010 seconds to 1.75 seconds) or use 50% duty cycle
- Compatibility with most AMR devices and volume correctors

▶ Data Logging

- Data logging/Audit trail is an available option.
- 3100 records are available that can be allocated between hourly, daily, and monthly logs.
- In addition, a high frequency logger is available (up to 500 records), with a selectable logging intervals between 30 seconds and 30 minutes
- Items logged include uncorrected volume, corrected volume (fixed pressure), and maximum flow rate during interval.
- Data accessible via the Dattus PC Link software or exportable to Microsoft® Excel

▶ Event Logging

- 512 event records in a circular log
- 62 items in a last occurrence log
- Records both user and system events
- User events – Records who, what, and when for configurations changes, as well as the old and new values.
- System events – Time & Date stamp of alarms
- May be accessed via PC Link software or exported to Microsoft® Excel.

▶ Modbus Communications

- Dattus can communicate via Modbus RTU protocol. It is designed to be compatible with SCADA and other equipment that communicates via Modbus

▶ LCD

- Uncorrected volume or fixed pressure corrected volume displayable.
- Programmable Display (4,5, or 6 Digits)
- Flow indicator – rolling icons on the LCD that move proportional to the flow rate through meter.
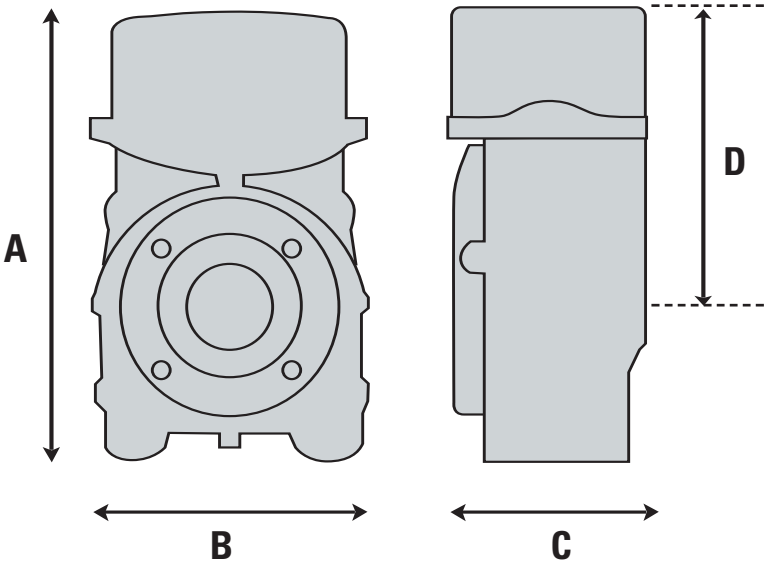- Alarm indications for battery, overflow, or sensor alarms.

▶ Upgradeability

- The Dattus flow rate can be field converted to a larger flow rate capacity within the same model size (i.e. fM2 or fM3).
- Conversion is accomplished with a simple software key (e.g. For example a Dattus 2M could be field converted to a 5M if customer load demands it).
- No shutting the customer down or putting on bypass, no re-piping, etc.
- Data logging can also be enabled via software key.

Construction

Measurement Unit:	Cast aluminum A356T6
External Cover:	ASA (Acrylonitrile Styrene Acrylate)
Index Housing:	UV stabilized polycarbonate

▶ **Dattus Dimensions (Inches)**

Model	A	B	C	D	Thread Depth
fM2	16.5"	10.6"	6.75"	10.0"	1.00"
fM3	23.7"	16.5"	9.5"	15.2"	1.00"

Model	Flange Type	Bolt Pattern Diameter*
fM2	ANSI 125 2"	4.75"
fM2	ANSI 125 3"	6.00"
fM3	ANSI 125 4"	7.50"

Note: Flanges receive 1–3/4" x 5/8" –11 UNC 2B Bolts

Meter Specifications – fM2

Dattus fM Meter	Flange Size	Units	fM2 1M	fM2 1.5M	fM2 2M	fM2 3M	fM2 5M	fM2 7M	fM2 11M
Rated Capacity	–	acfh (m³)	1000 (28.3)	1500 (42.5)	2000 (56.6)	3000 (85.0)	5000 (141.6)	7000 (198.2)	11000 (311.5)
Maximum Capacity*	–	acfh (m³)	1250 (35.4)	1875 (53.1)	2500 (70.8)	3750 (106.2)	6250 (177.0)	8750 (247.8)	13750 (389.4)
MAOP	–	psig (bar)	150 (10.3)	150 (10.3)	150 (10.3)	150 (10.3)	150 (10.3)	150 (10.3)	150 (10.3)
Dynamic Range +/- 1%	–	ratio	17:1	25:1	33:1	50:1	83:1	116:1	183:1
Dynamic Range +/- 2%	–	ratio	45:1	68:1	91:1	136:1	227:1	318:1	500:1
Flow Rate, 0.5" w.c. (1.24 mbar), Gas	2" FL	acfh (m³)	**	**	**	2457 (69.6)	2457 (69.6)	2457 (69.6)	2457 (69.6)
	3" FL	acfh (m³)	**	**	**	2750 (77.9)	2750 (77.9)	2750 (77.9)	2750 (77.9)
Flow Rate, 1.0" w.c. (2.49 mbar), Gas	2" FL	acfh (m³)	**	**	**	**	3481 (98.6)	3481 (98.6)	3481 (98.6)
	3" FL	acfh (m³)	**	**	**	**	3871 (109.6)	3871 (109.6)	3871 (109.6)
Flow Rate, 2.0" w.c. (4.98 mbar), Gas	2" FL	acfh (m³)	**	**	**	**	4918 (139)	4918 (139)	4918 (139)
	3" FL	acfh (m³)	**	**	**	**	5535 (157)	5535 (157)	5535 (157)
Pressure Drop at Rated Capacity	2" FL	in. w.c. (mbar)	0.09 (0.22)	0.19 (0.47)	0.33 (0.82)	0.75 (1.87)	2.06 (5.1)	3.89 (9.7)	9.25 (23)
	3" FL	in. w.c. (mbar)	0.05 (0.12)	0.14 (0.35)	0.26 (0.65)	0.61 (1.52)	1.64 (4.1)	3.14 (7.8)	7.55 (18.8)
Flange Connection size	–	inches	2" or 3"	2" or 3"	2" or 3"	2" or 3"	2" or 3"	2" or 3"	2" or 3"
Flange to Flange Dimensions	–	inches	6 3/4	6 3/4	6 3/4	6 3/4	6 3/4	6 3/4	6 3/4
Weight	–	lbs. (kg)	37 (16.8)	37 (16.8)	37 (16.8)	37 (16.8)	37 (16.8)	37 (16.8)	37 (16.8)
Shipping Weight	–	lbs. (kg)	42 (19.1)	42 (19.1)	42 (19.1)	42 (19.1)	42 (19.1)	42 (19.1)	42 (19.1)

* The Dattus fM2 may be run at up to 25% over its rated capacity and still maintain accurate measurement
** Flow rate at stated pressure drop is higher than the rated capacity of meter

Meter Sizing – fM2

Meter Size	fM2 1M	fM2 1.5M	fM2 2M	fM2 3M	fM2 5M	fM2 7M	fM2 11M
Rated Capacity acfh (m3/h)	1000 (28.3)	1500 (42.5)	2000 (56.6)	3000 (85.0)	5000 (141.6)	7000 (198.2)	11000 (311.5)
Meter Pressure psig (Bar)	Metering Capacity in MSCFH (m³/h)						
1 (0.07)	1.1 (30.2)	1.6 (45.4)	2.1 (60.5)	3.2 (90.7)	5.3 (151.2)	7.5 (211.7)	11.7 (332.6)
2 (0.14)	1.1 (32.2)	1.7 (48.2)	2.3 (64.3)	3.4 (96.5)	5.7 (160.8)	8.0 (225.1)	12.5 (353.8)
3 (0.21)	1.2 (34.1)	1.8 (51.1)	2.4 (68.2)	3.6 (102.3)	6.0 (170.4)	8.4 (238.6)	13.2 (374.9)
5 (0.34)	1.3 (37.9)	2.0 (56.9)	2.7 (75.9)	4.0 (113.8)	6.7 (189.6)	9.4 (265.5)	14.7 (417.2)
10 (0.69)	1.7 (47.5)	2.5 (71.3)	3.4 (95.1)	5.0 (142.6)	8.4 (237.7)	11.8 (332.8)	18.5 (523.0)
15 (1.03)	2.0 (57.2)	3.0 (85.7)	4.0 (114.3)	6.1 (171.5)	10.1 (285.8)	14.1 (400.1)	22.2 (628.7)
20 (1.38)	2.4 (66.8)	3.5 (100.1)	4.7 (133.5)	7.1 (200.3)	11.8 (333.8)	16.5 (467.4)	25.9 (734.4)
25 (1.72)	2.7 (76.4)	4.0 (114.6)	5.4 (152.8)	8.1 (229.1)	13.5 (381.9)	18.9 (534.6)	29.7 (840.2)
45 (3.10)	4.1 (114.8)	6.1 (172.2)	8.1 (229.7)	12.2 (344.5)	20.3 (574.1)	28.4 (803.8)	44.6 (1263.1)
60 (4.13)	5.1 (143.7)	7.6 (215.5)	10.1 (287.3)	15.2 (431.0)	25.4 (718.3)	35.5 (1005.6)	55.8 (1580.3)
90 (6.20)	7.1 (201.3)	10.7 (302.0)	14.2 (402.7)	21.3 (604.0)	35.5 (1006.7)	49.8 (1409.4)	78.2 (2214.7)
100 (6.89)	7.8 (220.6)	11.7 (330.8)	15.6 (441.1)	23.4 (661.7)	38.9 (1102.8)	54.5 (1543.9)	85.7 (2426.2)
150 (10.3)	11.2 (316.7)	16.8 (475.0)	22.4 (633.4)	33.5 (950.0)	55.9 (1583.4)	78.3 (2216.8)	123.0 (3483.5)

Meter Specifications – fM3

Dattus fM Meter	Units	fM3 7M	fM3 11M	fM3 16M	fM3 23M	fM3 38M	fM3 56M
Rated Capacity	acfh (m³)	7000 (198.2)	11000 (311.5)	16000 (453)	23000 (651.3)	38000 (1076)	56000 (1585)
Maximum Capacity*	acfh (m³)	8750 (247.8)	13750 (389.4)	20000 (566.3)	28750 (814.1)	47500 (1345)	57000 (1614)
MAOP	psig (bar)	175 (12.1)	175 (12.1)	175 (12.1)	175 (12.1)	175 (12.1)	175 (12.1)
Dynamic Range +/- 1%	ratio	70:1	110:1	160:1	230:1	380:1	560:1
Dynamic Range +/- 2%	ratio	117:1	183:1	267:1	383:1	633:1	933:1
Flow Rate, 0.5" w.c. (1.24 mbar), Gas	acfh (m³)	6650 (188)	6650 (188)	6650 (188)	6650 (188)	6650 (188)	6650 (188)
Flow Rate, 1.0" w.c. (2.49 mbar), Gas	acfh (m³)	**	9350 (265)	9350 (265)	9350 (265)	9350 (265)	9350 (265)
Flow Rate, 2.0" w.c. (4.98 mbar), Gas	acfh (m³)	**	**	13150 (372)	13150 (372)	13150 (372)	13150 (372)
Pressure Drop at Rated Capacity	in. w.c. (mbar)	0.55 (1.37)	1.39 (3.46)	2.98 (7.4)	6.18 (15.4)	17.37 (43)	37.73 (94)
Flange Connection size	inches	4"	4"	4"	4"	4"	4"
Flange to Flange Dimensions	inches	9 1/2	9 1/2	9 1/2	9 1/2	9 1/2	9 1/2
Weight	lbs. (kg)	114 (51.7)	114 (51.7)	114 (51.7)	114 (51.7)	114 (51.7)	114 (51.7)
Shipping Weight	lbs. (kg)	128 (58.1)	128 (58.1)	128 (58.1)	128 (58.1)	128 (58.1)	128 (58.1)

* The Dattus Meter may be run at up to 25% over its rated capacity and still maintain accurate measurement, except for the 56M with has a maximum of 57,000 acfh (1614 m3/h)
** Flow rate at stated pressure drop is higher than the rated capacity of meter

Meter Sizing – fM3

Meter Size	fM3 7M	fM3 11M	fM3 16M	fM3 23M	fM3 38M	fM3 56M
Rated Capacity acfh (m3/h)	7000 (198.2)	11000 (311.5)	16000 (453.1)	23000 (651.3)	38000 (1076.1)	56000 (1585.8)
Meter Pressure psig (Bar)	Metering Capacity in MSCFH (m³/h)					
1 (0.07)	7.5 (211.7)	11.7 (332.6)	17.1 (483.8)	24.6 (695.5)	40.6 (1149.1)	
2 (0.14)	8.0 (225.1)	12.5 (353.8)	18.2 (514.6)	26.1 (739.7)	43.2 (1222.2)	63.6 (1801.1)
3 (0.21)	8.4 (238.6)	13.2 (374.9)	19.3 (545.4)	27.7 (783.9)	45.7 (1295.2)	67.4 (1908.7)
5 (0.34)	9.4 (265.5)	14.7 (417.2)	21.4 (606.9)	30.8 (872.4)	50.9 (1441.3)	75.0 (2124.1)
10 (0.69)	11.8 (332.8)	18.5 (523.0)	26.9 (760.7)	38.6 (1093.5)	63.8 (1806.6)	94.0 (2662.3)
15 (1.03)	14.1 (400.1)	22.2 (628.7)	32.3 (914.5)	46.4 (1314.5)	76.7 (2171.8)	113.0 (3200.6)
20 (1.38)	16.5 (467.4)	25.9 (734.4)	37.7 (1068.3)	54.2 (1535.6)	89.6 (2537.1)	132.0 (3738.9)
25 (1.72)	18.9 (534.6)	29.7 (840.2)	43.2 (1222.0)	62.0 (1756.7)	102.5 (2902.4)	151.0 (4277.2)
45 (3.10)	28.4 (803.8)	44.6 (1263.1)	64.9 (1837.2)	93.3 (2641.0)	154.1 (4363.4)	227.1 (6430.3)
60 (4.13)	35.5 (1005.6)	55.8 (1580.3)	81.2 (2298.6)	116.7 (3304.3)	192.8 (5459.2)	284.1 (8045.1)
90 (6.20)	49.8 (1409.4)	78.2 (2214.7)	113.8 (3221.4)	163.5 (4630.7)	270.2 (7650.8)	398.2 (11274.8)
100 (6.89)	54.5 (1543.9)	85.7 (2426.2)	124.6 (3529.0)	179.1 (5072.9)	296.0 (8381.3)	436.2 (12351.4)
150 (10.3)	78.3 (2216.8)	123.0 (3483.5)	178.9 (5066.9)	257.2 (7283.7)	425.0 (12033.9)	626.3 (17734.2)
175 (12.1)	90.2 (2553.2)	141.7 (4012.2)	206.1 (5835.9)	296.3 (8389.1)	489.5 (13860.2)	721.3 (20425.6)

▮ Pressure loss across meter exceeds supply pressure
▮ Pressure loss across meter in excess of 50% of supply pressure

Communications Software

The Dattus Meter can come factory configured as required by the customer with whatever display, pulse output, and fixed factor pressure configurations needed. It is not necessary to purchase software or communication cable in order to use the Dattus meter.

However, by using PC Link © software the end user could have access to a number of features offered by the Dattus meter, as well as the ability to modify the configuration if necessary. Capabilities available via PC Link ©;

▶ **Data Logging**
• Configurable hourly, daily, and monthly logs
• Configurable frequency logging, as often as every 30 seconds
• Data exportable to Microsoft® Excel
▶ **Event Logging**
• Date & time stamp for all alarms and configuration changes
▶ **Configuration Snapshots**
• Create a Microsoft® WORD document with all configuration information and instantaneous values
• Great tool for recording site visits
▶ **Pulse Output Configuration**
• Enable a pulse output
• Change the pulse output type/weight
▶ **Fixed Factor Pressure Correction**
• Enable display of fixed pressure corrected volume
• Programmable base, atmospheric, and fixed pressures
▶ **Alarm Diagnostics**
▶ **Performing Meter Calibration**
▶ **View/Reset Maximum Flow Rate**
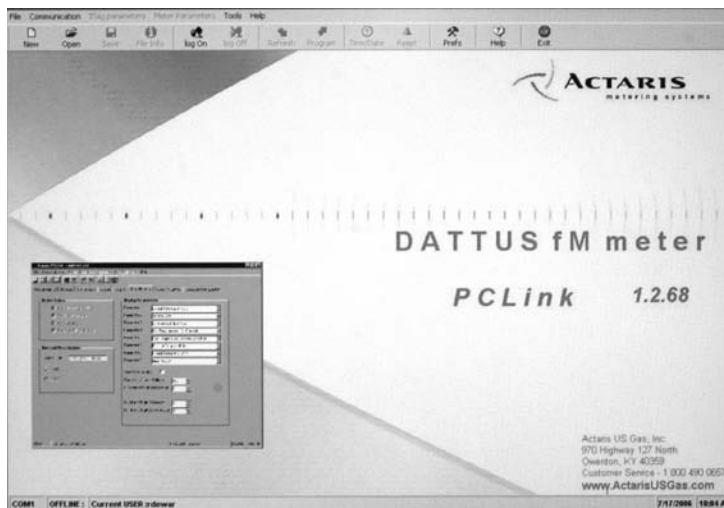▶ **Performing Meter Upgrades**

Note: The Dattus meter is password protected. No configuration changes can be made without it. Two levels of access are available, read only access and supervisor level, which allows for configuration changes.

System requirements for PC Link include;
• Windows Operating Systems 2000, NT, or XP
• Minimum 300 MHz processor
• Minimum 128 MB RAM
• Serial Port connection (DB9) on computer (or USB to serial converter, or PCMCIA serial port)

Factory available accessories;
• PC Link Software CD (part no. 442001-002)
• RS232 Communication Cable, 6' (part no. 600204-001)
• Pulse output cable 10' (part no. 442461-005)
• Pulse output cable 20' (part no. 442461-006)

Screen shot – Main

Screen shot – Data Logging

Screen shot – Event Logging

Limited Warranty

Actaris U.S. Gas, Inc., 970 Highway 127 North, Owenton, Kentucky 40359-9802, warrants this gas product against defects in materials and workmanship for the earlier of one (1) year from the date the product is shipped by Actaris or a period of one year from the date the product is installed by Actaris at the original purchaser's site. During such one-year period, provided that the original purchaser continues to own the product, Actaris will, at its sole option, repair any defects, replace the product or repay the purchase price.

• This warranty will be void if the purchaser fails to observe the procedures for installation, operation or service of the product as set forth in the Operating Manual and Specifications for the product or if the defect is caused by tampering, physical abuse or misuse of the product.

• **ACTARIS SPECIFICALLY DISCLAIMS ALL IMPLIED WARRANTIES INCLUDING THOSE OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE. UNDER NO CIRCUMSTANCES WILL ACTARIS BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND WHATSOEVER.**

• Actaris' liability for any claim of any kind, including negligence and breach of warranty for the sale and use of any product covered by or furnished, shall in no case exceed the price allocable to the product or part thereof which gives rise to the claim.

• In the event of a malfunction of the product, consult your Actaris Service Representative or Actaris U.S. Gas, Inc., 970 Highway 127 North, Owenton, Kentucky 40359-9802.

SEE ACTARIS TERMS AND CONDITIONS OF SALE FOR THE FULL AND COMPLETE TERMS OF THE LIMITED WARRANTY.

▶ **Ordering Information**

Specify:

1. Dattus Model (fM2 or fM3)
2. Dattus Capacity Size (i.e. 1M, 2M,...56M)
3. Flange connection size (2" or 3" for fM2 or 4" for fM3)
4. Installation orientation (Horizontal or Vertical)
5. Volume units (Imperial or Metric)
6. Register multiplier (CFx100 is default)
7. Pulse output configuration if needed
8. Data logging enabled
9. Pete's plugs included
10. Fixed Pressure (if used, please specify Fixed, Atmospheric, and Base pressures)

▶ **Reference Information**

- Dattus Installation Guide
- Dattus™ Technical Reference Guide
  Part No. 442002-002