Operating Instructions

for

Low Volume Rotating Vane

Flow Meter

Model: DPL-1P...

DPL-1V...

DPL-1E...

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2. Note

Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.
The instruction manuals on our website www.kobold.com are always for currently manufactured version of our products. Due to technical changes, the instruction manuals available online may not always correspond to the product version you have purchased. If you need an instruction manual that corresponds to the purchased product version, you can request it from us free of charge by email (info.de@kobold.com) in PDF format, specifying the relevant invoice number and serial number. If you wish, the operating instructions can also be sent to you by post in paper form against an applicable postage fee.

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and prevention of accidents.

When used in machines, the measuring unit should be used only when the machines fulfil the EC-machine guidelines.

PED 2014/68/EU
In acc. with Article 4 Paragraph (3), "Sound Engineering Practice", of the PED 2014/68/EU no CE mark.
Diagram 8, Pipe, Group 1 dangerous fluids

3. Instrument Inspection

Instruments are inspected before shipping and sent out in perfect condition.
Should damage to a device be visible, we recommend a thorough inspection of the delivery packaging. In case of damage, please inform your parcel service / forwarding agent immediately, since they are responsible for damages during transit.

Scope of delivery:
The standard delivery includes:
- Low Volume Rotating Vane Flow Meter model: DPL

4. Regulation Use

Any use of the DPL which exceeds the manufacturer's specification may invalidate its warranty. Therefore, any resulting damage is not the responsibility of the manufacturer. The user assumes all risk for such usage.

5. Operating Principle

The KOBOLD flow meters models DPL are used to measure and monitor liquids. Its compact design allows it to be used in equipment where only small space is available. The large number of evaluating electronics offered means that the system is suited for a wide range of applications.

The medium flows through a specially shaped flow housing and causes a vane to rotate. This rotary motion is sensed by optoelectronics in a non-contacting manner, and converted to an asymmetric frequency signal or an analogue signal. A frequency divider with symmetrical output is available as an option. The frequency is proportional to the flow velocity. The vane has a sapphire-bearing and ensures a high degree of linearity and long service life.

6. Mechanical Connection

6.1. Check of operating conditions

- flow rate
- maximum operating pressure
- maximum operating temperature

Note! Exceeding the measuring range can cause damage to the axle bearings, resulting in significant errors in measurement.

6.2. Mounting

- Flow in direction of the arrow (universal positioning).
- Avoid high pressure or tensile/torsion loads on the connection joints.
  Fasten inlet and outlet pipe mechanically at a distance of approx. 50 mm from the connection joint.
- Check the connections for leaks.
- We recommend a minimum inlet straight run of 5xDN and a minimum outlet straight run of 2xDN.

7. Electrical Connection

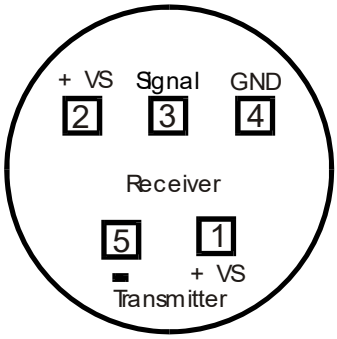
7.1. General

Attention! Make sure that the voltage values of your system correspond with the voltage values of the measuring unit.

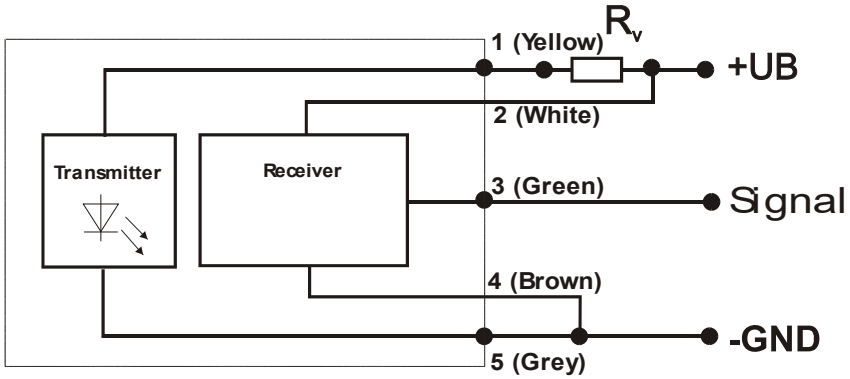
- Make sure that the supply wires are de-energised before making any connections.

Attention! Incorrect wiring will lead to damage of the unit's electronics.

7.2. DPL...0000 (frequency output, OEM without cable)



Feed voltage receiver	4,5 ... 16 V_{DC}
Feed current receiver	typ. 7 mA
Signal amplitude High	approx. operating voltage
Signal amplitude Low	0,2 V
Reverse voltage Sender	3,0 V max.
Feed current Sender	8 mA - 12 mA
Output dissipation (power)	2,5 mW max.

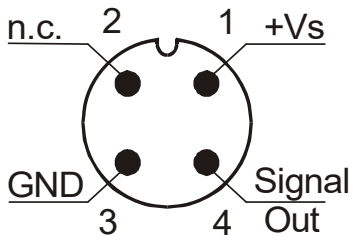


V_S	R_V*
5 V	470 Ω / 0,25 W
8 V	820 Ω / 0,25 W
12 V	1300 Ω / 0,25 W

*Not included in delivery

7.3. Evaluating electronic: Frequency output

Plug connection M12x1 (...F3..)

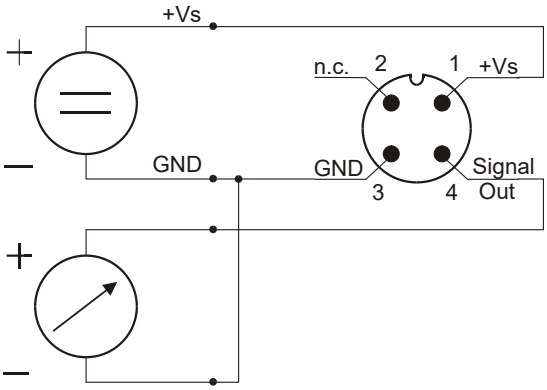


Cable connection (...F5..)

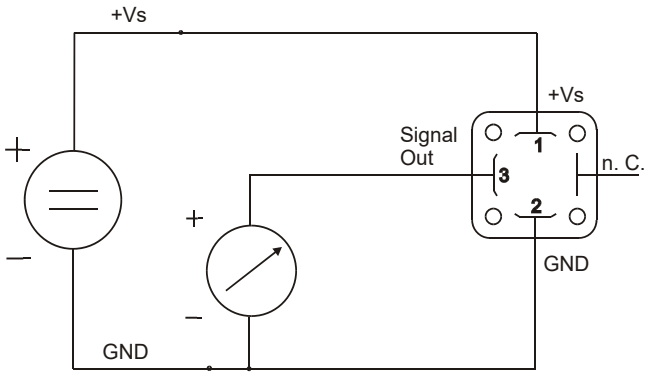
brown:	$+V_S$
blue:	GND
black	Signal

7.4. Evaluating electronic: Analogue output (..L..)

3-wire, connector M12x1 (DPL-..L303,..L343)

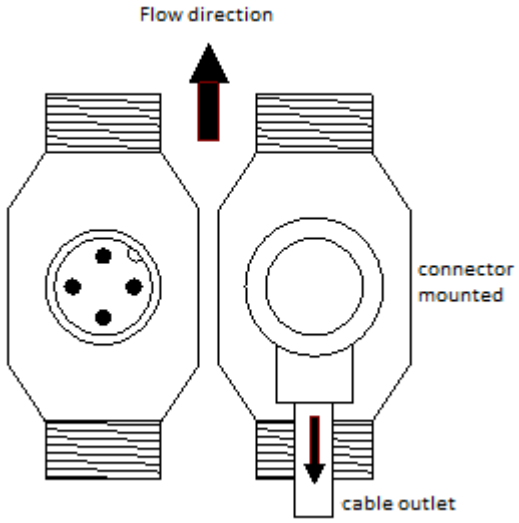


3-wire, DIN-plug 43650 (DPL-...L403;...L443)



7.5. Cable outlet with M12x1 angle plug electronic options F3x and L3x

When using a pre-assembled M12x1 connection cable with angled plug, the cable outlet is always aligned opposite to the flow direction.



7.6. Compact electronics: (..C30R, ..C30M, ..C34P, ..C34N)

See Operating Instructions Completion for compact electronics with frequency output
Model: ..C30R,..C30M,...C34P,...C34N

8. Commissioning – Evaluating Electronic

8.1. Frequency output

The measuring instruments are preset and after connection ready for operation.

8.2. Analogue output

The measuring instruments are preset and after connection ready for operation.

8.3. Compact electronics

The measuring instruments are preset and after connection ready for operation. (In order to change settings see the operating instructions for the compact electronics model ..C30R, ..C30M, ..C34P, ..C34N)

9. Maintenance

As long as the measured medium is clean, the instrument is maintenance-free. In order to avoid problems, we recommend the installation of a filter, e.g. the magnetic filter, model MFR.
If cleaning of the sensor is necessary, the sensor can be opened, so that the inner parts are accessible. Take care that the sensor and especially the vane are not damaged; make sure that the mounting position and the mounting direction of the vane is correct. All work on the sensor electronics should be done only by the manufacturer; otherwise, the guarantee will become invalid.

10. Technical Information

10.1. Sensor data

Accuracy:	± 2.5 % f. s.
	± 5 % f. s. (OEM version)
Linearity:	± 1 % f.s.
Medium temperature:	- 40...+ 70 °C
Ambient temperature:	- 30...+ 60 °C
Max. operating pressure:	10 bar
Protection type.:	IP 65

Materials

Housing:	polypropylene
Rotating Vane:	polypropylene
Axle/bearing:	sapphire
Vane mount:	polysulfone
Gasket:	NBR, FPM or EPDM

10.2. Evaluating electronic

Frequency output (OEM-model), no CE-mark

Power supply:	4.5 – 12 V_{DC}
Supply current:	approx. 7 mA
Signal amplitude high:	approx. power supply
Signal amplitude low:	≤ 0.2 V
Transmitter cut-off voltage:	3 V max.
Transmitter supply current:	15 mA .. 25 mA
Output loss:	max. 2.5 mW
Electrical connection:	solder pins
Pulse output:	NPN, open collector, max. 10 mA

Frequency output (option frequency divider)

Supply voltage:	24 V_{DC} ± 20%
Supply current:	40 - 50 mA
Signal amplitude high:	approx. power supply
Signal amplitude low:	≤ 0.2 V
Output loss:	max. 2.5 mW
Electrical connection:	plug connector M12x1 (option: 2 m PVC cable)
Division ratio (option):	1…1/128, factory-set
Pulse output:	PNP, open collector, max. 20 mA

Analogue output (option plug-on display)

Power supply:	24 V_{DC} ± 20 %
Output:	0 - 20 mA or 4 - 20 mA, 3-wire technology
Max. load:	500 Ohm
Electrical connection:	plug connector M12x1 or DIN 43 650
Option:	plug-on display (with plug connector DIN 43 650 and output 4-20mA)

Compact electronics

Display:	3-digit LED
Analogue output:	(0)4...20 mA adjustable, max. 500 Ω
Switching outputs:	1 (2) semiconductor PNP or NPN, set at the factory
Contact operation:	N/C / N/O contact programmable
Setting:	via 2 buttons
Power supply:	24 V_{DC} ± 20 %, 3-wire technology, approx. 100 mA
Electrical connection:	plug connector M12x1

11. Order Codes

Order Details (Example: **DPL-1P05 G4 0000**)

Meas. range [L/min] water	approx. frequency [Hz] at max. value	approx. pressure loss [bar] at max. value	Gasket model NBR	Gasket model FPM	Gasket model EPDM	Connection	Electronic analyser
						G4..= G 1/2 male **S4..**= Hose connector for inner diameter of Hose 12 mm + 14 mm	**Frequency output** **..0000** = Frequency output, NPN, without cable (OEM), no CE **..F300** = Frequency output, plug connector M12x1, PNP **..F320** = Frequency divider 1:2, plug connector M12x1, PNP **..F340** = Frequency divider 1:4, plug connector M12x1, PNP **..F390** = divider 1...1/128, plug connector M12x1, PNP **..F500** = Frequency output, PNP, 2 m PVC cable **..F520** = Frequency divider, 1:2, 2 m PVC cable, PNP **..F540** = Frequency divider, 1:4, 2 m PVC cable, PNP **..F590** = divider 1...1/128, 2 m PVC cable, PNP **Analogue output** **..L303** = 0 - 20 mA output, M12x1 plug connector **..L343** = 4 - 20 mA output, M12x1 plug connector **..L403** = 0 - 20 mA output, plug connector DIN 43 650 **..L443** = 4 - 20 mA output, plug connector DIN 43 650 **Compact electronics*** **C30R** = LED display, 2x open collector, PNP, plug connector M12x1 **C30M** = LED display, 2x open collector, NPN, plug connector M12x1 **C34P** = LED display, 4 - 20 mA, 1x open coll., PNP, plug con. M12x1 **C34N** = LED display, 4 - 20 mA, 1x open coll., NPN, plug con. M12x1
0.025 - 0.5	272	0.77	**DPL-1P05**	**DPL-1V05**	**DPL-1E05**		
0.05 - 1.8	471	0.77	**DPL-1P10**	**DPL-1V10**	**DPL-1E10**		
0.2 - 6	505	0.70	**DPL-1P15**	**DPL-1V15**	**DPL-1E15**		
0.4 - 12	265	1.0	**DPL-1P20**	**DPL-1V20**	**DPL-1E20**		
1 - 25	399	1.3	**DPL-1P25**	**DPL-1V25**	**DPL-1E25**		

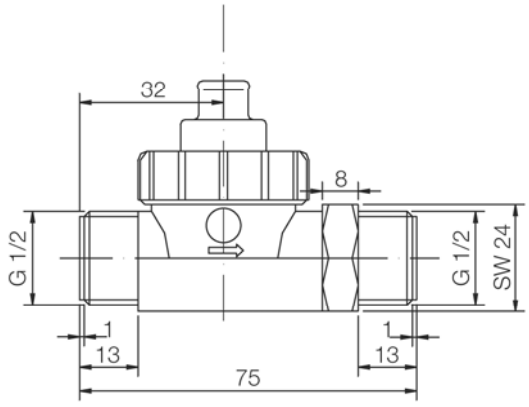
*please specify flow direction in writing

Plug-on display
for model DPL...L443 (with 4 – 20 mA output and plug connector DIN 43650)

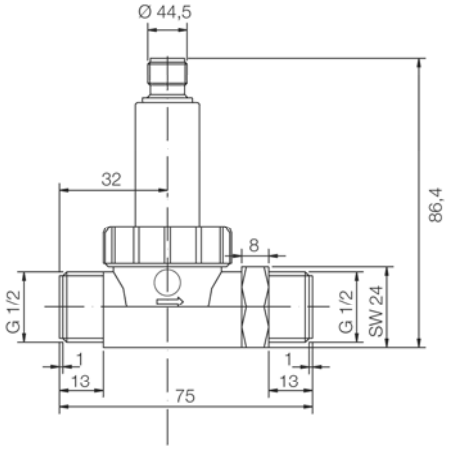
Description	Order number
3-digit LED, plug connector DIN 43 650, 3-wire, power supply through analogue output	AUF-3000

12. Dimensions

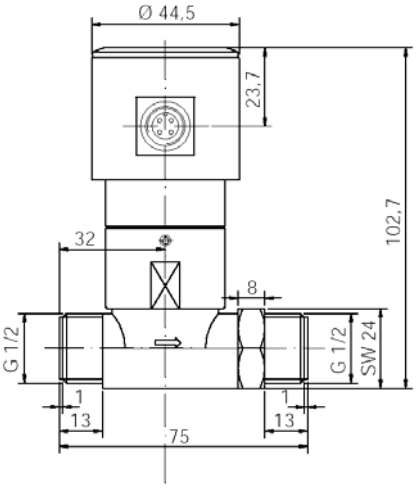
DPL-...0000



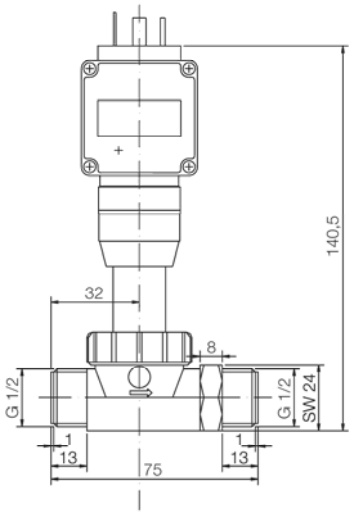
DPL-...F3...; DPL-...L3...



DPL-...C3 with compact electronic



DPL-..L4 with analogue output and plug-on display



13. EU Declaration of Conformance

We, Kobold Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

Low Volume Rotating Vane Flow Meter
model: DPL-1P..., DPL-1V..., DPL-1E...

to which this declaration relates is in conformity with the standards noted below:

EN 61000-6-4:2011
Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

EN 61000-6-2:2006
Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments

EN 61010-1:2011
Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements

EN 60529:2014
Degrees of protection provided by enclosures (IP Code)

EN IEC 63000:2018
Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Also, the following EC guidelines are fulfilled:

2014/30/EU	**EMC Directive**
2014/35/EU	**Low Voltage Directive**
2011/65/EU	**RoHS** (category 9)
2015/863/EU	Delegated Directive (RoHS III)

Hofheim, 06 Aug. 2019

H. Peters
General Manager

M. Wenzel
Proxy Holder

14. UK Declaration of Conformity

We, KOBOLD Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

Low Volume Rotating Vane Flow Meter
model: DPL-1P..., DPL-1V..., DPL-1E...

to which this declaration relates is in conformity with the standards noted below:

BS EN 61000-6-4:2007+A1:2011
Electromagnetic compatibility (EMC). Generic standards. Emission standard for industrial environments

BS EN 61000-6-2:2005
Electromagnetic compatibility (EMC). Generic standards. Immunity for industrial environments

BS EN 61010-1:2010
Safety requirements for electrical equipment for measurement, control, and laboratory use. General requirements

BS EN 60529:1992+A2:2013
Degrees of protection provided by enclosures (IP Code)

BS EN IEC 63000:2018
Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

Also, the following UK guidelines are fulfilled:

S.I. 2016/1091	Electromagnetic Compatibility Regulations 2016
S.I. 2016/1101	Electrical Equipment (Safety) Regulations 2016
S.I. 2012/3032	The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

Hofheim, 19 Jan. 2021

H. Peters
General Manager

M. Wenzel
Proxy Holder