



Instruction Manual
capaNCDT
IDC801

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1. General remarks

Knowledge of the operating instructions is a prerequisite for equipment operation.

1.1 Symbols used

The following symbols are used in this instruction manual:



Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.



Indicates a situation which, if not avoided, may lead to property damage.



Indicates a user action.



Indicates a user tip.

1.2 Warnings

The sensor is heated by the application. Wear protective gloves and suitable clothing.

> Risk of burning

Disconnect power before touching the sensor surface.

> Risk of injury from static discharge

Connect the power supply and the display for the safety of electrical equipment.

> Injury

> Damage to or destruction of the sensor and/or controller

Avoid banging and knocking the sensor and the controller.

> Damage to or destruction of the controller and/or sensor

Protect the cable from damage.

> Failure of the instrument

1.3 Intended Use

The idiamCONTROL IDC801 is designed for industrial application.

The idiamCONTROL IDC801 measures the wear in the housing bore holes ("8"-shaped overlapping bore holes) in extruder machines.

The idiamCONTROL IDC801 may only be operated within the limits stated in the technical data (see chapter 2.2).

Over the complete measurement stroke the device determines the actual bore hole diameter at 5 mm intervals (left and right bore hole).

By means of the additional measurement of the sensor position with a cable-length measuring system, it is possible to detect local existing too large diameters quickly and safely. This allows exact planning of maintenance and replacement intervals of the housing.

1.4 Notes on CE identification

The following applies to the idiamCONTROL IDC801_ME:

- EMC regulation 2004/108/EC
- EMC regulation 2006/95/EC

Products bearing the CE mark satisfy the requirements of EU Directive 2004/108/EC „Electromagnetic compatibility“ that discusses the European standards (EN). The EC Declaration of Conformity is held under the EU Directive, Annex II, to the competent authority is available at

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The system is designed for use in industry and satisfies the requirements of the standards

- EN 61326-1: 2006-10 EMC requirements - Part 1:
 General require
- EN 61326-2-3: 2007-05 EMC requirements - Part 2-3:
 Particular requirements
- EN 61000-3-2: 2006-10 Limits
 EN 61000-3-3: 2002-05

1.5 Dangers arising from non-observance of safety instructions

Non-observance of the safety rules may lead to injury of the operator or of other persons, or to the destruction of the measuring system.

1.6 Safety instructions for the user of the plant

On the basis of the available operating manual the operator must establish appropriate operating instructions. Local and factory conditions must be taken into consideration.

1.7 Safety instructions for operation and maintenance work

Operation and maintenance of the measuring system may only be performed by trained staff.

- The information in this operating manual, and
- the national legislation, regulations, and guidelines

must be observed for the installation and operation of the measuring system

1.8 Consequences of arbitrary modification

If unauthorised modifications are performed, the warranty and any liability claims will become void.

1.9 Inadmissible operation

Any use that is not intended and is thus contrary to the prescribed use may damage or destroy the measuring system.

2. Design, Function and Technical Data

2.1 Function

The idiamCONTROL IDC801 measures the wear in the “8“-shaped overlapping bore holes of extruder-machines. An integral double capacitive sensor of series capaNCDT measures the actual bore hole diameter. With the cable-length measuring system a diameter is assigned to the sensor position in the longitudinal bore hole axis. As a result the longitudinal diameter profiles are available in six tracks and with an axial resolution of 5 mm.

2.2 Technical data

Measuring range:	10 mm
Accuracy:	0.1 mm
Resolution:	10 Bit
Local resolution:	5 mm
Max. speed:	5 m/s
Interface:	RS 232
Operation temperature:	+5 to +60 °C
Humidity:	5 - 95 % (no condensing)
Protection class for sensor and electronics	IP 40
Protection class for power supply unit:	IP 20
EMV, according to:	EN 50081-2 Spurious emission EN 50082-2 Resistance to disturbance
Influence of a coating thickness (ϵ_r) on the output signal	see chapter 3.7

2.3 Structure

The screw barrel measuring system idiamCONTROL 801 consists of

- Submodule IDS-801-SU-xxx
 - Sensor with front and back guide roller carrier
 - Calibration dish
 - Cleaner
- Submodule IDC-801-CU
 - Electronic evaluation unit with positioning system
 - Sensor cable
 - Earthing cable
 - Power supply unit
 - Connection piece for linkage

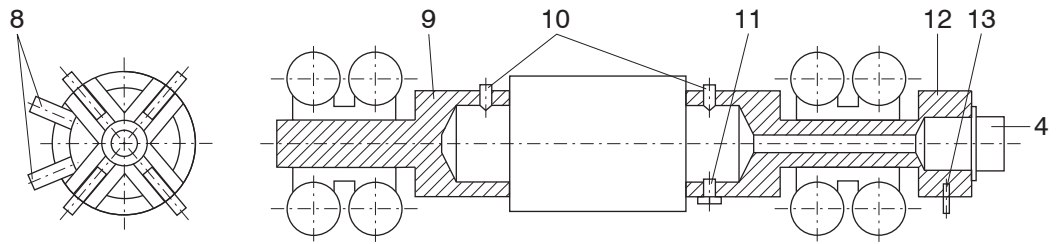


Fig. 1: IDS-801-SU-xxx

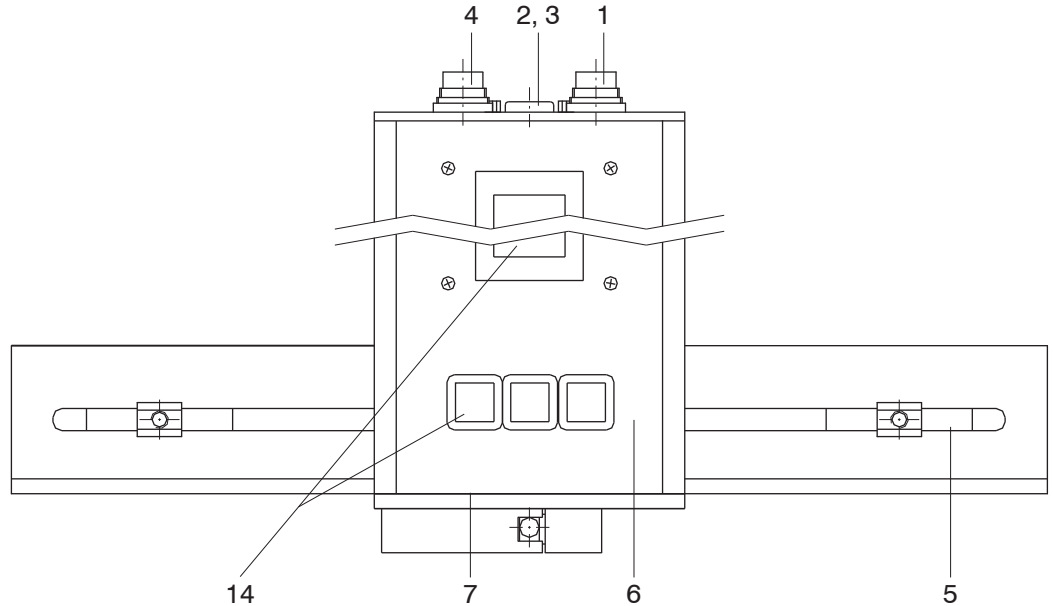


Fig. 2: IDC-801-CU

- | | |
|-------------------------------------------|------------------------------------|
| 1 Connector for power supply unit | 8 Guide pins |
| 2 RS 232 | 9 Front guide roller carrier |
| 3 Connector for earthing cable | 10 Locking of measuring variants |
| 4 Connector for sensor cable | 11 Anti-rotation lock |
| 5 Positioning system with magnetic holder | 12 Back guide roller carrier |
| 6 Electronic evaluation unit | 13 Locking of the connection piece |
| 7 Cable length measuring system | 14 Display and keypad (see Fig. 3) |

2.4 Operation

2.4.1 LCD-display and keypad

An LCD-dot-matrix with 20x4 character format is used as a display.

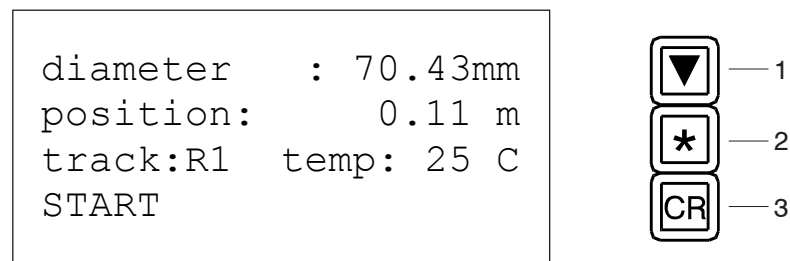


Fig. 3: Display and keypad of the electronic evaluation unit

2.4.2 Main menu

The following functions are assigned to the keypad of figure 3:

- (1) Start measuring record (keep pressed for 5 sec.) and stop measuring record
- (2) Menu change between main menu and sub-menu
- (3) Selection of the axial measurement track (R1, L1, R2, L2, R3, L3)

The display is structured as follows:

- 1st line: Diameter in millimetres (accuracy ± 0.1 mm)
- 2nd line: Measuring operation ¹⁾: Position of the sensor in meters (resolution 0.01 m), otherwise: Length of the recorded track. Unit: Metres
- 3rd line: Selected axial measurement track and temperature in °C
- 4th line: Status messages

2.4.3 Sub menu







The following functions are assigned to the keypad of figure. 3:

- (1) and (3) Calibration, press both keys for approx. 5 sec
- (2) Menu change between main menu and sub-menu

The display is structured as follows:

- 1st line: Sensor type and selected axial measurement track
- 2nd line: Date and time of this recorded axial measurement track
- 3rd line: Values of the A/D-converter of both sensors in digits (0...255)
- 4th line: Current date and current time

2.4.4 Service

- Clock adjustment:
 - 1. Keep  pressed while applying the supply voltage, until the time/date menu appears.
 - 2. Move the cursor with 
 - 3. Adjust the desired value with 
 - 4. Exit the menu item with 
- Sensor test: Display of the current sensor type, sensor temperature, and both sensor values sensor A/B in digits.
 - 1. Keep  pressed while applying the supply voltage until the test menu appears
 - 2. Exit the menu item with 
- Status messages: Status messages are displayed in the fourth line of the main menu. The presently available functions are:
- START: Measuring record active, position-dependent measurement.
- STOP: No measuring record, permanent measurement
- opening: Sensor A or B sees bore hole opening
- speed ERROR: Maximum speed of 5 m/sec. exceeded
- no sensor: No sensor connected
- data transfer: Data are transferred to the PC
- transfer ERROR: Error in the data transfer
- calibrate new sensor: Sensor exchanged, calibration required
- WARNING!! max. temp.: Sensor temperature exceeded, remove the sensor from the system, cool the system

1) Measuring operation means position-dependent measurement, as opposed to permanent measurement.

CAUTION

Risk of burning

The sensor is heated by the application. Wear protective gloves and suitable clothing.

2.5 Control and Supervision

The status messages (see chapter 2.2.4) provide information about the current operating condition of the measuring system.

If the maximum sensor temperature (see chapter 2.2.4; WARNING!! max. temp.) is exceeded, the sensor must be immediately removed from the system. When doing this take care to transport the sensor in a suitable way. Risk of burning!

3. Transportation, Storage and Preservation

3.1 Packing and marking

The idiamCONTROL IDC801 is supplied packed in two plastic cases. The marking of the cases is placed above the handle.

	Dimensions [mm]	Weight [kg]	Lettering
IDC-801-CU	600x450x250	8	CONTROLUNIT
IDC-801-SU	500x400x150	5.5	SENSORUNIT

3.2 Degree of assembly

The idiamCONTROL IDC801 is divided into components according to chapter. 3.1.

3.3 Checking of the scope of supply

The delivery includes:

- | | |
|------------------------------------------------------|--------------------------------|
| 1 Electronic evaluation unit with positioning system | 1 Calibration dish |
| 1 Sensor cable | 1 Cleaner |
| 1 Earthing cable | 1 Connection piece for linkage |
| 1 Power supply unit | 1 Instruction manual |
| 1 Sensor with front and back guide roller carrier | 2 Plastic cases |

Check the measuring system for completeness and for any transport damage immediately after unpacking. Please contact the manufacturer or supplier immediately, if you find any damage or find that the delivery is not complete.

3.4 Transportation

The idiamCONTROL IDC801 must be transported in the packing.

3.5 Requirements on storage spaces

Temperature: -25 bis +85 °C
 Humidity: 5 - 95 % (no condensation)

3.6 Preservation

If the measuring system must be stored for extended periods of time, MICRO-EPSILON recommends the system is kept in the original packing. Storage in the original packing will prevent dirt and/or dust from entering the guide rollers and plug connectors of sensor/electronic unit.

3.7 Influence of a coating thickness (d, ϵ_r) between sensor and target on the output signal

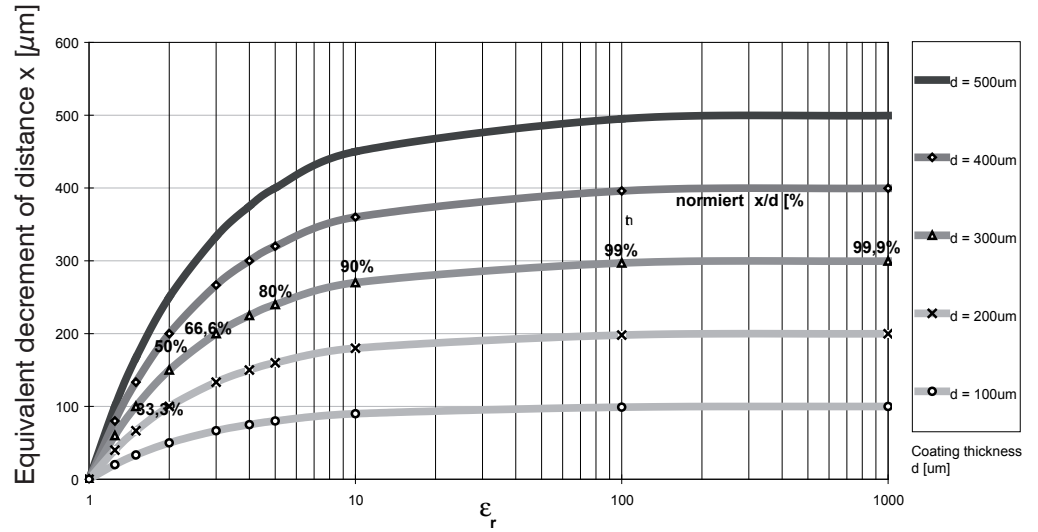


Fig. 4: Influence of ϵ_r

3.8 Non-magnetic housing materials

Process components without magnetized materials		
WP material prefix	Material number	Label
02	1.4541	V2A (stainless steel)
07	1.4571	V4A (stainless steel)
53	1.4580	VA-cast
73	1.4550	Rustproof and acid-resistant steel
72	2.4856	Rustproof and acid-resistant steel
76	2.4610	Corrosion-resistant Ni-material
77	1.4462	Rustproof and acid-resistant steel
78	1.4492	Rustproof and acid-resistant steel
82	1.4539	Rustproof and acid-resistant steel (austenitic)

4. Installation

4.1 General remarks

Carefully remove the individual components of the idiamCONTROL IDC801 from the packing and transport them in such a way that they can not be damaged.

Make sure that no sharp-edged or heavy items affect the cable sheaths.

Kinking of the cables must be avoided at all costs.

Make sure that the plug connectors fit tightly.

4.2 Montage

Install the electronic evaluation unit on the positioning system (see (5) Fig. 2) by the process component. Attach it using the magnetic holder. The cable length measuring system must be positioned centrally in the relevant "8"-shaped overlapping bore hole.

Mount the electronic evaluation unit on the positioning system with suitable devices (for example screw clamps), if the process components are not made of without magnetic materials (see chapter 3.8).

Make sure to clean any adhering product residue from the attachment places of the electronic evaluation unit at the last housing face.

Connect the sensor to the electronic evaluation unit. To do this, join the plug connector between the cable and the back guide roller carrier (bayonet coupling, see (4) Fig. 1 and Fig. 2).

Connect the electronic evaluation unit to the power supply unit (see (1) Fig. 2).

It is essential to establish an electrical connection between the electronic evaluation unit (see (3) Fig. 2) and the housing of the process component. Sand off a suitable place of the housing to fix the contact magnet with connected jack for the earthing cable. Earthing can be done with the supplied crocodil clip alternativeley. Check the correct earthing with the continuity tester. The contact resistance must be below 900 Ohm (Buzzer / both LED's on).

Insert the sensor cable into the cable length measuring system (see (7) Fig. 1). Make sure that the sensor cable is not dirty, because this leads to a false measurement of length (see also Chapter 6)

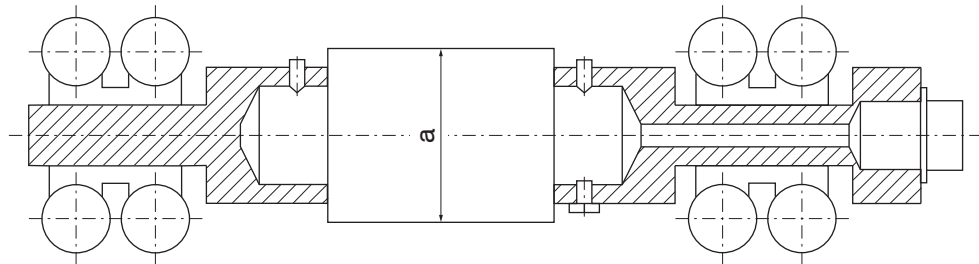


Fig. 5: Measuring unit with capacitive double sensor of series capaNCDT

Sensortype	Dimension a (mm)	Sensortype	Dimension a (mm)	Sensortype	Dimension a (mm)
SU 40	38.5	SU 70	68.9	SU 115	107.6
SU 42	40.0	SU 75	72.6	SU 119	116.6
SU 43	41.0	SU 80	77.4	SU 120	116.1
SU 50	48.0	SU 83	81	SU 125	122.6
SU 52/10	49.6	SU 87	85.5	SU 130	127.6
SU 53	50.8	SU 88	85.6	SU 135	133.5
SU 57/58	54.8	SU 90	87.3	SU 140	137.6
SU 60	58.5	SU 92	90.4	SU 160	155.6
SU 62	59.2	SU 96.01	93.6	SU 169	166.6
SU 64	61.6	SU 100	98.5		
SU 69	66.6	SU 105	102.6	ZSE 75	74.9

NOTICE

Damage to the controller by falling down.

Uneven surface, product residues and rust layers reduce the adhesion.

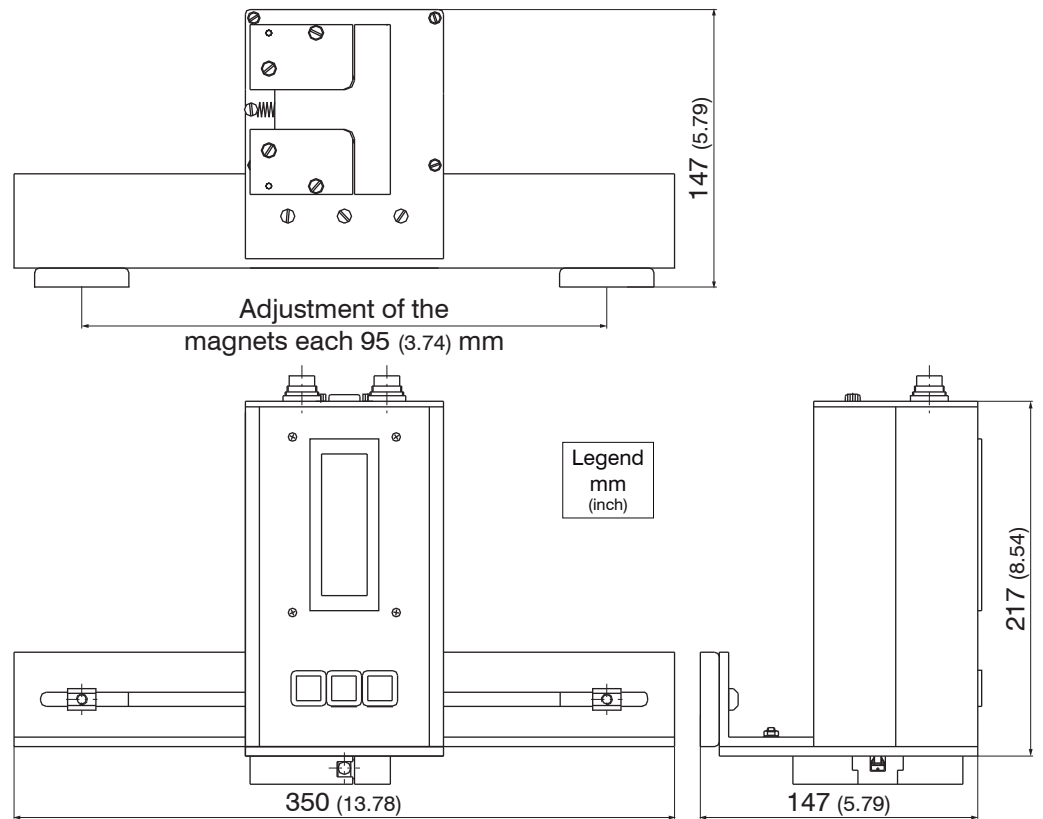


Fig. 6: Dimensioned drawing of electronic evaluation unit with positioning system

5. Start-up and Operation

5.1 Manpower requirements

Start-up and operation can be performed by one person. ¹

PC-basics are required to evaluate the measuring data through calculation software (for example EXCEL).

5.2 Description of start-up

If the system is started up for the first time, a calibration (see chapter 5.2.2) must be performed. Take care for correct data setting.

5.2.1 Cleaning of the process component bore hole

Depending on the length of the process component (or number of housings) a sufficient number of push-rods (see chapter 3.7) must be assembled.

Then screw the cleaner supplied (see Fig. 11) (see Fig. 1) on to the Pg16 thread of the first push-rod. This cleaner has the same outside diameter as the sensor. Use the cleaner to check both housing bore holes for resistance-free movement. If necessary cold product remains can be removed with the cleaner. If this is not successful, see chapter 7: Trouble shooting.

CAUTION

Risk of burning

The cleaner is heated by the application. Wear protective gloves and suitable clothing.

It is recommended that this movement test is performed with the cleaner before or during the cooling phase of the process component.

The bore hole measuring unit must never be pushed through the process component bore holes by force, because this might damage the sensor. If resistance-free movement is achieved, replace the cleaner with the connection piece (see Fig. 10).

¹ If necessary, another person must assist, depending on the measurement stroke. See also chapter 5.2.4 .

5.2.2 Calibration

The sensor and electronic evaluation unit are matched to each other. With calibrate new sensor (see chapter 2.4.4) the electronic evaluation unit automatically signals if the sensor has been exchanged and calibration is therefore required. The calibration is performed as follows:

1. Remove the front guide roller carrier (see (9) Fig. 1).
2. Push on the calibration ring (see fig. 12) until it reaches the stop and lock it (countersunk head screw M5). Connect the calibration ring with the electronic evaluation unit by the earthing cable and crocodile clip. It is recommendable to check the earthing connection.
3. Connect the sensor with the electronic evaluation unit. For this purpose join the plug connector between cable and back guide roller carrier (see (12) Fig. 1) (bayonet coupling)
4. Start calibration in the sub-menu (see chapter 2.4.3). The electronic unit signal the end of calibration.
5. Calibration can be checked in the main menu with installed calibration ring. The value on the calibration ring corresponds with the display value.
6. Remove the calibration ring and install the guide roller carrier (see (9) Fig. 1) again.

A calibration of the measuring unit approx. every six months increases the accuracy of the system.

Do not damage the calibration dish, otherwise no dimensional stability guaranteed.

5.2.3 Selection of the measurement variant (1-3)

See Chapter 5.2.6; Fig. 7, 8 and 9 for detailed drawings.

- Measuring variant 1: Minimum measuring scope measurement series R1 and L1 in verticalplanes. In this basic setting rotation of the sensor with respect to the two guide roller carriers (see (9), (12) Fig. 1) is not necessary.
- Measuring variant 2 and 3: Rotation of the sensor with respect to the front (see (9) Fig. 1) and back (see (12) Fig. 2) guide roller carriers. The angle of rotation is 40 ° to the left or 40 ° to the right.
- Procedure:
1. Open the locking screws (see (10) Fig. 1).
 2. The sensor can now be rotated to the stop (see (11) Fig. 1) with respect to the guide roller carrier (see (12) Fig. 1). The guide roller carrier (see (9) Fig. 1) has no stop, but it has a marking (counter bore) at the front face of the sensor. This marking must be directly opposite of the locking screw (see (10) Fig. 1).
 3. Tighten the locking screws (see (10) Fig. 1).

Take care that both guide roller carriers are rotated in the same direction with respect to the sensor, so that the guide pins (8) (see Fig. 1) have the same angle on the same side when the measuring unit is inserted into the bore hole.

Attention: The anti-rotation lock (see (11) Fig. 1) at the back guide roller carrier (see (12) Fig. 1) must not be loosened, because otherwise there is the risk that the sensor can be rotated by more than 40° with respect to the guide roller carrier. If this happens, the cable connection inside the sensor or inside the back guide roller carrier can be mechanically destroyed.

5.2.4 Insertion of the unit into the bore holes

A conductive connection between the controller (see (3) Figure 2) and the step-housing. This is an essential part of the measuring principle. Use the earthing cable.

Push the measuring unit with the front guide roller carrier first into the extruder bore hole until all the wheels on the guide roller carriers engage in the bore hole. When doing so take care that all the 4 guide pins (8) (see Fig. 1) are in the drawn position at the bottom and top housing saddle (see chapter 7, 8 and 9). Since all the wheels are suspended on springs the measuring unit centers it self automatically in the bore hole.

Push the connection piece with the push rods over the connector and over the bolt at the guide roller carrier (see (12) Fig. 1) until the pin (see (13) Fig. 1) engages at the short 90° slot. A small turn to the right side (seen against the flow direction) will prevent unintentional loosening of the connection. Be careful not to damage the connecting cable when pushing the connection piece over the connector. The connecting cable must be led out through the long slot of the connection piece.

In case of larger measurement strokes that require more than 2-3 push-rods supports should be provided outside the machine appropriate for the machine height, or a second person should assist in the work. The measuring unit must not get wedged in the bore hole.

The measuring unit can now be carefully pushed through to the stop at the first housing after the gearbox.

Then pull out the push-rods again. For this purpose loosen the locking (see (13) Fig. 1) again by turning the push-rods slightly to the left (seen against the flow direction).

To make sure that later distance measurements are not corrupted the internal bore hole diameter measuring unit must always be at the stop of the last housing (first housing after gear) before actual measurement is started!

Several exception requires to disassemble the first funnel, if two housings direct in series positioned. There by you ensure that the sensor can not twist and caught itself.

All measurements must always be performed in the flow direction by pulling the connecting cable.

It is not permissible to perform the measurement with the push-rods because possible wedging of the measuring unit in the bore hole may lead to incorrect or inaccurate measurement results.

After you have moved the measuring unit to the end position and pulled out the push-rods attach the evaluation unit with integrated (friction wheel) distance measurement at the front face of the last housing (seen in downstream direction) according to chapter 4.2.

5.2.5 Measurement and evaluation possibilities

The idiamCONTROL IDC801 distinguishes between two measurements.

Position-dependent measurement:

NOTICE

Observe the max. pull-out speed of 5m/sec.

- The selection of the axial measurement track (R1, L1, R2, L2, R3, L3) for storing the measurement results is only possible, if the electronic evaluation unit is in STOP-mode ².
- The measurement series can only be started, if the sensor is connected and if there is no data transfer through the serial interface.
- Start of measurement in the main menu (see chapter 2.4.2).
- Value taken every 5 mm.
- Indication of measured value on the display.
- Stop of measurement in the main menu.
- Read-out of the stored measured values through the serial interface is only possible, if the electronic evaluation unit is in STOP-mode.

Permanent measurement:

- Continuous output of the measurement results on the display after connecting the supply voltage to the electronic evaluation unit and with connected sensor.
- Storage of measurement results or read-out through the serial interface is not possible.

² Display of the status message STOP in the main chapter 2.4.4

5.2.6 Measurement variants idiamCONTROL 801

(seen against flow direction)

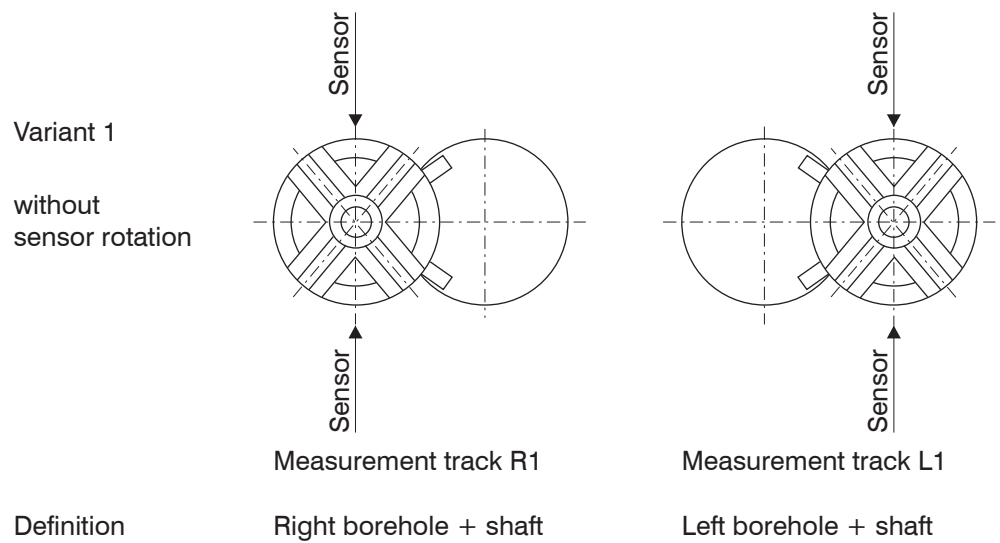


Fig. 7: Measurement variant 1 (without sensor rotation)

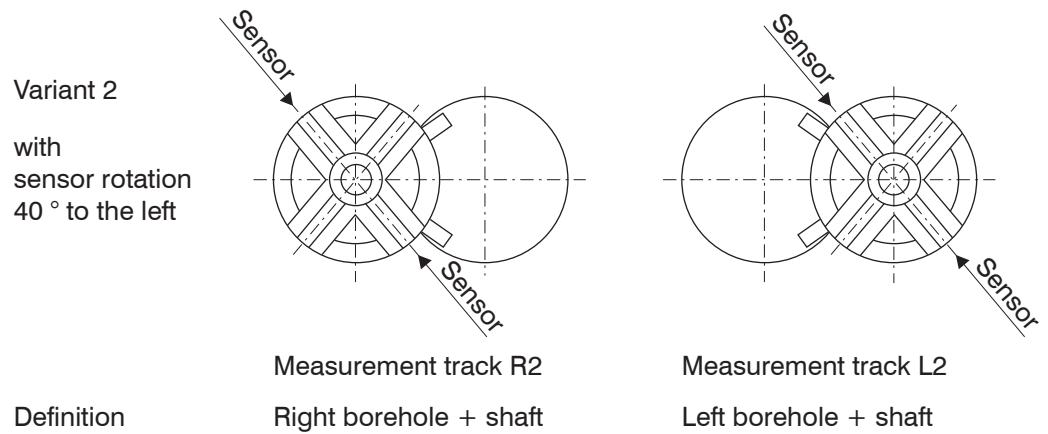


Fig. 8: Measurement variant 2 (with sensor rotation 40° to the left)

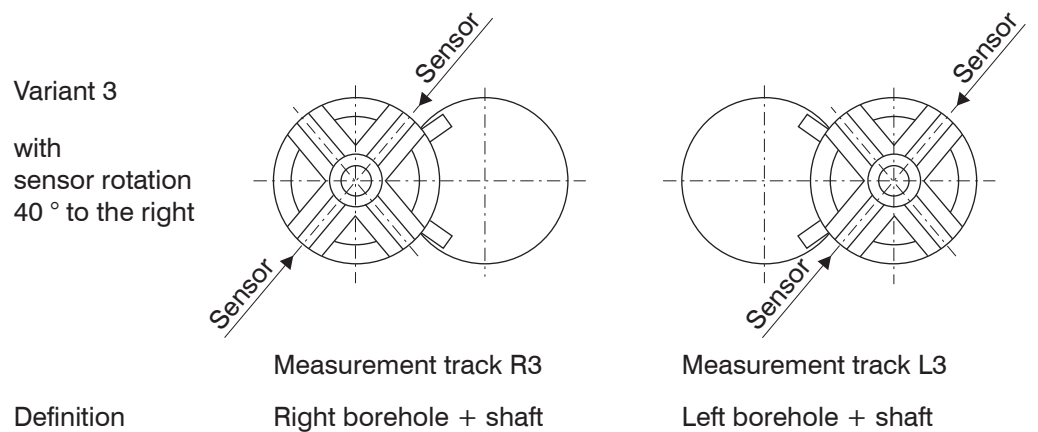


Fig. 9: Measurement variant 3 (with sensor rotation 40° to the right)

6. Maintenance and Repair

Regular care and maintenance will improve trouble-free operation. Maintenance work may only be performed by trained personnel.

Unit	Interval	Maintenance work
Sensor front faces	After each measurement	The sensor front faces must be kept clean and the plastic sheet tested against damage in order to achieve exact measurement results. Remove teared plastic sheets, clean surface and stick on a new plastic sheet. To avoid measuring errors stick on more layers of plastic sheets.
Guide rail	After each measurement	A sufficient height of the guide rails is necessary to avoid perturbation in the signal. A guide rail must be removed if the fastening screw is aligned to the guide rail.
Sensor cable	After each measurement	Dirt accumulations or product remains on the sensor cable lead to incorrect cable-length measuring system results. Remove any dirt with a lint-free cloth.
Sensor rollers	At the end of the measurement or if required	The spring-mounted wheels center the sensor in the bore hole. Blocked springs will corrupt the measurement result. Clean springs and wheels with a brush and with spirit.
Cable-length measuring system	If required	Dirt accumulations or product remains on the rollers lead to a risk of slippage. This impairs the length measurement. If necessary, clean the rollers with cotton-wool tips, then blow them out carefully with oil-free compressed air.
Power supply unit	If required	Check the air-cooled power supply unit for dust accumulation at regular intervals and clean the ventilation slots, if necessary.
Lithium battery	Approx. every six years	The electronic evaluation unit is equipped with a backup battery for the clock and for the data memory. The lithium battery may ONLY be replaced by MICRO-EPSILON!

7. Trouble-shooting

Error	Remedy
The test cylinder can not be pushed through completely to the stop, or it gets wedged.	<p>If accessible:</p> <p>Check the</p> <ul style="list-style-type: none"> • Inlet housing • Degassing openings • Housing for lateral feed <p>If multiple back-and-forth movement of the desired result due to cooled product remains, the machine must be heated up again at least to the melting temperature of the remaining product. During this heating and the following cooling period move the test cylinder back and forth several times, until it can be pushed to the stop in the first housing without force.</p>
Clock keeps bad time	<p>Replace the battery.</p> <p>May ONLY be performed by MICRO-EPSILON!</p>

8. Spare Parts, Dimensional Drawing, Attachments

The following spare parts can be ordered from MICRO-EPSILON.

- IDC-801-CU: • Power supply unit
 • Sensor cable
 • Earthing cable

 IDS-801-SU: • Roller with spring and axis

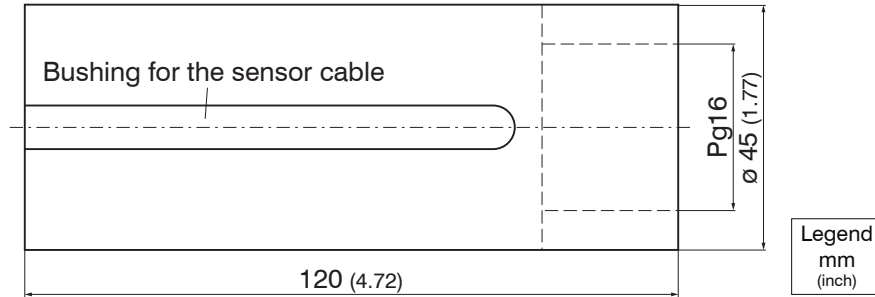


Fig. 10: Dimensional drawing connection piece (not to scale)

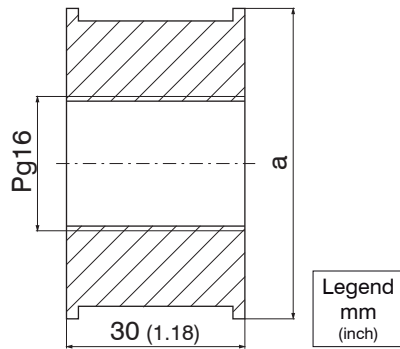


Fig. 11: Dimensional drawing cleaner (not to scale)

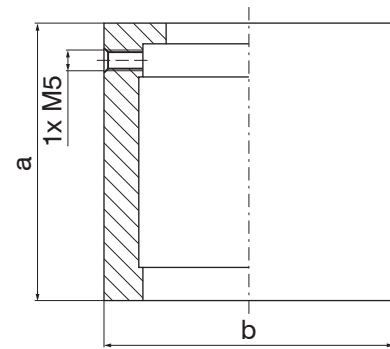


Fig. 12: Dimensional drawing calibration dish (not to scale)

Dimensions for cleaner

Sensor type	Dimension a (mm)
SU 40	ø39.5
SU 42	ø41.1
SU 43	ø42.1
SU 50	ø49.4
SU 52/10	ø51.1
SU 53	ø52.2
SU 57/58	ø56.2
SU 60	ø59.9
SU 62	ø60.6
SU 64	ø63
SU 69	ø68

Sensor type	Dimension a (mm)
SU 70	ø70.3
SU 75	ø74
SU 80	ø79
SU 83	ø82.4
SU 87	ø86.9
SU 88	ø87
SU 90	ø88.7
SU 92	ø91.8
SU 96.01	ø95
SU 100	ø99.9
SU 105	ø104

Sensor type	Dimension a (mm)
SU 115	ø109
SU 119	ø118
SU 120	ø117.5
SU 125	ø124
SU 130	ø129
SU 135	ø134.9
SU 140	ø139
SU 160	ø157
SU 169	ø168
ZSE 75	ø74.9

Dimensions for calibration dish

Sensor-type	Dim. a (mm)	Dim. b (mm)	Lettering	Sensor-type	Dim. a (mm)	Dim. b (mm)	Lettering
SU 40	63	ø55	SU 40 ø40,9 ± 0,05	SU 88	70	ø110	SU 88 ø88 ± 0,05
SU 42	63	ø55	SU 42 ø42,4 ± 0,05	SU 90	70	ø110	SU 90 ø89,7 ± 0,05
SU 43	63	ø55	SU 43 ø43,5 ± 0,05	SU 92	70	ø115	SU 92 ø92,8 ± 0,05
SU 50	63	ø70	SU 50 ø50,4 ± 0,05	SU 96.01	70	ø120	SU 96 ø96,9 ± 0,05
SU 52/10	63	ø70	SU 52/10 ø52,9 ± 0,05	SU 100	70	ø120	SU 100 ø100,9 ± 0,05
SU 53	63	ø70	SU 53 ø53,2 ± 0,05	SU 105	70	ø125	SU 105 ø105 ± 0,05
SU 57/58	63	ø80	SU 57/58 ø57,2 ± 0,05	SU 115	70	ø130	SU 115 ø110 ± 0,05
SU 60	63	ø80	SU 60 ø60,9 ± 0,05	SU 119	70	ø135	SU 119 ø119,9 ± 0,05
SU 62	63	ø80	SU 62 ø62,5 ± 0,05	SU 120	70	ø130	SU 120 ø118,5 ± 0,05
SU 64	63	ø80	SU 64 ø64,9 ± 0,05	SU 125	70	ø145	SU 125 ø125 ± 0,05
SU 69	63	ø90	SU 69 ø69,9 ± 0,05	SU 130	70	ø145	SU 130 ø130 ± 0,05
SU 70	63	ø90	SU 70 ø71,3 ± 0,05	SU 135	70	ø150	SU 135 ø135,9 ± 0,05
SU 75	63	ø90	SU 75 ø75,9 ± 0,05	SU 140	70	ø150	SU 140 ø140,9 ± 0,05
SU 80	70	ø95	SU 80 ø80,9 ± 0,05	SU 160	70	ø170	SU 160 ø160 ± 0,05
SU 83	70	ø100	SU 83 ø83,4 ± 0,05	SU 169	70	ø180	SU 169 ø169,9 ± 0,05
SU 87	70	ø100	SU 87 ø87,9 ± 0,05	ZSE 75	63	ø75.9	ZSE 75 ø75,9 ± 0,05

9. Warranty

All components of the device have been checked and tested for perfect function in the factory.

In the unlikely event that errors should occur despite our thorough quality control, this should be reported immediately to MICRO-EPSILON.

The warranty period lasts 12 months following the day of shipment. Defective parts, except wear parts, will be repaired or replaced free of charge within this period if you return the device free of cost to MICRO-EPSILON.

This warranty does not apply towards damage resulting from abuse of the equipment and devices, from forceful handling or installation of the devices or from repair or modifications performed by third parties.

Repairs must be done exclusively by MICRO-EPSILON. No other claims, except as warranted, are accepted. The terms of the purchasing contract apply in full.

MICRO-EPSILON will specifically not be responsible for eventual consequential damages.

MICRO-EPSILON always strives to supply customers with the finest and most advanced equipment. Development and refinement is therefore performed continuously and the right for design changes without prior notice is accordingly reserved.

For translation in other languages, the data and statements in the German-language operation manual are to be taken as authoritative.



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