TruFlow® Flow Detection System

Preliminary Manual P/N 7179720_02
- English -

Edition 05/14
Note
This document applies to products with the following P/Ns:

<table>
<thead>
<tr>
<th>P/N 7173009</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Order number
P/N = Order number for Nordson articles

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Declaration of Conformity
Safety Instructions

ATTENTION: Observe and follow all safety instructions, the general safety instructions included as a separate document, as well as the specific safety instructions in all other related documentation.

Introduction

Intended Use

The TruFlow® Flow Detection System - also referred to as Flow Detection System - may be used only to evaluate and process optical signals triggered by the turning motion of the gears in a Flow Splitter. Suitable optical fiber cables must be connected for this purpose (Refer to Installation).

Until now, only a frequency signal for evaluation was possible. Now, with P/N 7173009 Rev. 02, an analog signal (0-10 V or 4-20 mA) can be selected.

Area of Use (EMC)

This unit is intended for use in industrial applications.

Operating Restrictions

When operated in residential or commercial areas, the unit may cause interference in other electrical units, e.g. radios.

Unintended Use - Examples

The Flow Detection System may not be used under the following conditions:

• In defective condition
• When the unit lid is open
• When changes or modifications have been made by the customer
• When the values stated under Technical Data are not complied with.

Residual Risks

Nordson knows of no residual risks.
Function

The turning motion in the *TruFlow* can be measured two different ways:

- With a mechanical encoder directly connected to the *TruFlow* shaft
- With optical fiber cables that optically compile the motion of the gear teeth.

![Fig. 1 TruFlow with encoder shaft (left) and optical fiber cables (right)](image)

There are two optical fiber cables on each *TruFlow*. The motion of the gear teeth is compiled and transmitted to the *Flow Detection System* as an optical signal.

The *Flow Detection System* converts the optical signals to digital signals (also into analog signals, beginning with Rev. 02. The signals are sent via the encoder line to a *TruFlow* electrical cabinet (generation 2) or a *VersaBlue Plus* melter to be further processed.

The encoder/pulse line is also used to relay fault signals via frequency or analog encoding. These fault signals are evaluated by the connected devices and emitted as fault indications.
System Environment

Encoder Line

NOTE: Meaning of inputs and outputs:

- Voltage supply to Flow Detection System through the TruFlow electrical cabinet or the VersaBlue Plus melter
- Signals from the Flow Detection System to the TruFlow electrical cabinet or the VersaBlue Plus melter.

ID Plate

The ID plate inside the box indicates the following information:

- P/N: Nordson part number
- S/N: Serial number
- FT: Manufacturing date (month / year)
Installation

ATTENTION: Allow only qualified personnel to perform the following tasks. Follow the safety instructions here and in the entire documentation.

Transport

Transport the unit such as to prevent damage. Do not throw the unit. Use suitable packing material, e.g. Styrofoam and sturdy cardboard. Refer to Technical Data for weight.

Protect the unit from extreme temperature deviations (condensate), humidity, dust, jolts and vibrations.

Unpacking

Unpack the unit carefully to prevent damage. Then check for any damage caused during shipping. Check that all accessories are complete.

Keep packaging material for any later use, or dispose of properly according to local regulations.

Mounting

Protect the unit from extreme temperature deviations (condensate), humidity, dust, jolts and vibrations.

Mount the unit in the appropriate place in the application system. Take into consideration the length of the optical fiber cables and the electrical lines.

Refer to Technical Data for IP degree of protection and dimensions.

Removal

Stop voltage supply, then disconnect all optical and electrical connections.

Storage

Pack the unit in suitable packing material, e.g. Styrofoam and sturdy cardboard. Protect the unit from extreme temperature deviations (condensate), humidity, dust, jolts and vibrations.

Disposal

Dispose of properly according to local regulations.
Connecting Encoder Line

The encoder line is the electrical connection between the Flow Detection System and a TruFlow electrical cabinet, generation 2 or a VersaBlue Plus melter or similar devices.

![Diagram of encoder line connections](image)

Fig. 4

1. Connect the encoder line to the center receptacle below the Power LED.
2. Connect the encoder lines by channel to one of the receptacles (XS8, XS12, ...) on the TruFlow electrical cabinet, generation 2

   OR:

   Connect the encoder lines by channel to one of the encoder receptacles (XSE1 ... XSE8) on the VersaBlue Plus melter tower or similar devices.

3. Observe the system plan.

Connecting Optical Fiber Cables

**ATTENTION:** Hot! Risk of burns. Wear heat-protective gloves.

The optical fiber cables provide the connection between the TruFlow and the Flow Detection System.

1. Remove the plug (when there is one) from the TruFlow.
2. Wipe the end of the optical fiber cables with a clean, lint-free cloth.

**NOTE:** Ensure that only optical fiber cables are used that are suitable for the type of the TruFlow. Observe the ID plate!

<table>
<thead>
<tr>
<th>TruFlow type A</th>
<th>⇒ optical fiber cable type A</th>
<th>P/N 7173008</th>
</tr>
</thead>
<tbody>
<tr>
<td>TruFlow type B</td>
<td>⇒ optical fiber cable type B</td>
<td>P/N 7173000</td>
</tr>
</tbody>
</table>

3. Insert the optical fiber cables in the TruFlow.
4. Position the optical fiber cables such that they cannot be damaged.
5. Connect the other end of the optical fiber cables to the respective receptacle (Sensor 1 / Sensor 2) on the Flow Detection System and secure with the sleeve nuts.
Rev. 01: Setting DIP Switches

**ATTENTION:** Voltage of 24 VDC is supplied to the box. Follow all regulations regarding working on live (energized) circuits. Do not touch conductors or soldered joints!

Open the box and check the positions of the jumpers and the DIP switches; adjust if necessary (Refer to illustration):

Fig. 5 Jumpers and DIP switches

JP 1: The red jumper should connect the left and the center pin.

SW 1: Set DIP switch 1 and 2 to ON
**Rev. 02: Setting DIP Switch SW1**

**ATTENTION:** Voltage of 24 VDC is supplied to the box. Follow all regulations regarding working on live (energized) circuits. Do not touch conductors or soldered joints!

Open the box and check the positions of the jumpers and the DIP switches; adjust if necessary (Refer to illustration):

![JP 1: The red jumper should connect the left and the center pin (R).](image)

<table>
<thead>
<tr>
<th>DIP switch no.</th>
<th>Jumper</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Channel 1</td>
<td>Channel 1</td>
</tr>
<tr>
<td>2</td>
<td>Channel 2</td>
<td>Channel 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Analog out</td>
<td>Analog output signal</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4*</td>
<td>Average off/on</td>
<td>Average</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5*</td>
<td>Average 0.5/1s</td>
<td></td>
</tr>
<tr>
<td>6*</td>
<td>RPM 40/350</td>
<td>Max. speed 40/350 rpm</td>
</tr>
<tr>
<td>7*</td>
<td>Gear 28/56</td>
<td>Number of teeth (max. 56)</td>
</tr>
<tr>
<td>8</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

* These DIP switches work only when Analog output signal (DIP 3= ON) is selected
Rev. 02: Setting Additional DIP Switch SW2

When SW1 DIP switch 3 is set to ON:
The switch setting of SW2 is evaluated. I (OFF): current 4 - 20 mA or U (ON):
voltage 0 - 10 V

Fig. 7 DIP switch SW2
Calibrating Light Output

NOTE: Every time an optical fiber cable is detached and then put back into place, the light output has to be recalibrated.

1. Switch on the melter. Feed adhesive at a high pump speed to the TruFlow applicator or Flow Divider.

This causes the TruFlow applicator or Flow Divider to turn at a speed higher than 5 rpm, which is essential before the light output can be calibrated.

2. Open the box to access the button S1.

ATTENTION: Voltage of 24 VDC is supplied to the box. Follow all regulations regarding working on live (energized) circuits. Do not touch conductors or soldered joints!

3. Press S1 until the yellow and red LEDs (CAL.S1 and CAL.S2) light up.

   CAL.S1 = Calibrate sensor 1
   CAL.S2 = Calibrate sensor 2

NOTE: Calibration begins.

4. Calibration is completed when the yellow and red LEDs are off and only the green LED is illuminated.

Operation

ATTENTION: Allow only qualified personnel to perform the following tasks. Follow the safety instructions here and in the entire documentation.

1. Verify that the system environment (melter or TruFlow electrical cabinet, applicator and the Flow Detection System) is ready.

2. Start material application.
Maintenance

The Flow Detection System requires no maintenance.

Troubleshooting

NOTE: When in doubt, observe the troubleshooting instructions contained in the manuals for the other components of the hot melt application system.

Troubleshooting Tables

The troubleshooting tables serve as an orientation for qualified personnel. They cannot, however, replace targeted fault location with the help of wiring diagrams and measuring instruments.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible cause</th>
<th>Corrective action</th>
<th>Refer to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excessive transmitted light (higher than 99%)</td>
<td>Polluted optical fiber cable</td>
<td>Clean the ends of the optical fiber cables with a lint-free cloth and re-calibrate the light output!</td>
<td>Page 9</td>
</tr>
<tr>
<td>No (clear) signals</td>
<td>DIP switch SW 1 on the board not set correctly</td>
<td>Rev. 01: Set both DIP switches to ON.</td>
<td>Page 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rev. 02: Switch setting dependent on number of sensors</td>
<td>Page 7</td>
</tr>
<tr>
<td>Incorrect application quantity</td>
<td>Optical fiber cable type not suitable for TruFlow type</td>
<td>Connect proper optical fiber cable (type A to A, type B to B)</td>
<td>ID Plate</td>
</tr>
<tr>
<td>Application quantity twice as high as expected</td>
<td>One optical fiber cable channel is switched off</td>
<td>Rev. 01: Both optical fiber cable channels have to be switched on / dependent on number of sensors Observe sensor LEDs</td>
<td>Page 8</td>
</tr>
</tbody>
</table>

NOTE: A dirty optical fiber cable may cause excessive transmitted light (greater than 99 %). Correct measured values are guaranteed as long as the transmitted light is less than 99 %.
**Status Signals**

Conversion of output pulses to analog values (0 - 80 %)

The *Flow Detection System* emits fault signals that are processed by the connected devices (electrical cabinet *TruFlow*, generation 2; *VersaBlue Plus* or similar) and can be displayed as plain text.

<table>
<thead>
<tr>
<th>No.</th>
<th>Frequency kHz</th>
<th>Analog V</th>
<th>Analog mA</th>
<th>Description</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10,0</td>
<td>10</td>
<td>20</td>
<td>Sensor 1 is still in the start and calibration phase after re-start</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>9,5</td>
<td>9,7</td>
<td>19,52</td>
<td>Sensor 2 is still in the start and calibration phase after re-start</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>9,0</td>
<td>9,4</td>
<td>19,04</td>
<td>Sensor 1 and 2 are still in the start and calibration phase after re-start</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>8,5</td>
<td>9,1</td>
<td>18,56</td>
<td>Sensor 1 is in operating mode and the transmitted light is 99 - 100 %</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>8,0</td>
<td>8,8</td>
<td>18,08</td>
<td>Sensor 2 is in operating mode and the transmitted light is 99 - 100 %</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>7,5</td>
<td>8,5</td>
<td>17,6</td>
<td>Sensor 1 and 2 are in operating mode and the transmitted light is 99 - 100 %</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>Not yet specified</td>
<td>- -</td>
</tr>
<tr>
<td>8</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>Not yet specified</td>
<td>- -</td>
</tr>
<tr>
<td>9</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>Not yet specified</td>
<td>- -</td>
</tr>
<tr>
<td>10</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>Not yet specified</td>
<td>- -</td>
</tr>
</tbody>
</table>
Technical Data

Board

![Diagram of the board showing signal and power connections.]

Fig. 9  Rev. 02 has SW1 with eight switches and also SW2

**Encoder Receptacle**

<table>
<thead>
<tr>
<th>PIN (encoder)</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not assigned</td>
</tr>
<tr>
<td>2</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>Signal</td>
</tr>
<tr>
<td>4</td>
<td>DC in</td>
</tr>
<tr>
<td>5 - 7</td>
<td>Not assigned</td>
</tr>
</tbody>
</table>

**Receptacle for Sensor 1 and 2 (Optical Fiber Cable 1 and 2)**

Optical fiber cables connection
# General Data

<table>
<thead>
<tr>
<th>Flow Detection System</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Casing dimensions</strong></td>
</tr>
<tr>
<td><strong>Weight</strong></td>
</tr>
<tr>
<td><strong>Voltage supply</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Electrical output</strong></td>
</tr>
<tr>
<td><strong>Optical fiber cable inputs</strong></td>
</tr>
<tr>
<td><strong>Serial interface RS 232</strong></td>
</tr>
<tr>
<td><strong>Degree of protection</strong></td>
</tr>
<tr>
<td><strong>Permitted ambient temperature</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Permitted storage temperature</strong></td>
</tr>
<tr>
<td><strong>Maximum height above zero</strong></td>
</tr>
<tr>
<td><strong>Humidity</strong></td>
</tr>
</tbody>
</table>

# Accessories

<table>
<thead>
<tr>
<th>P/N</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7173008</td>
<td>Light conductor TruFlow type: A (for TruFlow type A): Type A means gear-module m0.5</td>
</tr>
<tr>
<td>7173000</td>
<td>Light conductor TruFlow type: B (for TruFlow type B): Type B means gear-module m1</td>
</tr>
<tr>
<td>7173025</td>
<td>Plug blank light conductor complete</td>
</tr>
<tr>
<td>7117293</td>
<td>Cord set Encoder (5 m / 16 ft.)</td>
</tr>
<tr>
<td>285080</td>
<td>Cord set Encoder (10 m / 33 ft.)</td>
</tr>
<tr>
<td>7163251</td>
<td>Cord set Encoder (15 m / 50 ft.)</td>
</tr>
<tr>
<td>7163252</td>
<td>Cord set Encoder (20 m / 66 ft.)</td>
</tr>
<tr>
<td>285341</td>
<td>Cord set Encoder (25 m / 82 ft.)</td>
</tr>
<tr>
<td>409926</td>
<td>Cord set Encoder (30 m / 100 ft.)</td>
</tr>
</tbody>
</table>

![Fig. 10 Optical fiber cable (Light conductor)]
CE
Declaration of Conformity

The manufacturer
Nordson Engineering GmbH
Lilienthalstrasse 6
D-21337 Lüneburg
Deutschland

herewith declares that the following product

Brand:       Electrical Cabinet
Type:        Flow Detection System

conforms to the requirements of the following stated directives:
2006/95/EC - Low Voltage
2004/108/EC - Electromagnetic Compatibility

Complies with international provisions:

| EN 60204 | Part | 1 | Issued | 06.07 |
| EN 61000 | Part | 6-2 | Issued | 03.06 |
| EN 61000 | Part | 6-4 | Issued | 09.07 |

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Axel Wenz
Managing Director

Lüneburg 31.01.2014