# 'Probe function pulse encoder input'

Translation of the "Original Dokumentation"


**Name:** FKT_Messfunktionen_Impulsgebereingang_en

**Version:**

| Version: 2017/04 | |
|---|---|
| **Change** | **Letter symbol** |
| • Symbols changed to DIN EN ISO 7010 | STL |

**Previous version:** 2016/19

**Product version:**

| Product (AMK part no.) | Firmware Version (AMK part no.) |
|---|---|
| KW-R06 (O835)<br>KW-R07 (O807) | AE-R05/R06 V1.05 2010/32 (203194) |

**Publisher:**
AMK Arnold Müller GmbH & Co. KG
Gaußstraße 37 – 39,
D-73230 Kirchheim/Teck
Germany
Phone: +49 7021/50 05-0,
Fax: +49 7021/50 05-176
E-Mail: info@amk-group.com
Homepage: www.amk-group.com
Personally liable shareholder: AMK Verwaltungsgesellschaft mbH, Kirchheim/Teck
Registration court: Stuttgart HRB 231283; HRA 230681

# Content

# 1 Probe function pulse encoder input

For applications such as a mark control, high-precision actual-position value measurements are required.

Probe functions store the actual position value in real-time, also in between a SERCOS clock pulse. The output of the probe value and the current actual position value takes place with the next SERCOS clock pulse.

The stored values can subsequently be read out and further processed by a controller. The controller can create a real-time reference to an external touch probe signal.

Pulse encoders are used, for example, in applications where the converter is not able to create a direct reference to the actual position value. For example, a conveyor belt that is driven by a frequency inverter.

A pulse encoder on the conveyor belt can create the required positional reference.

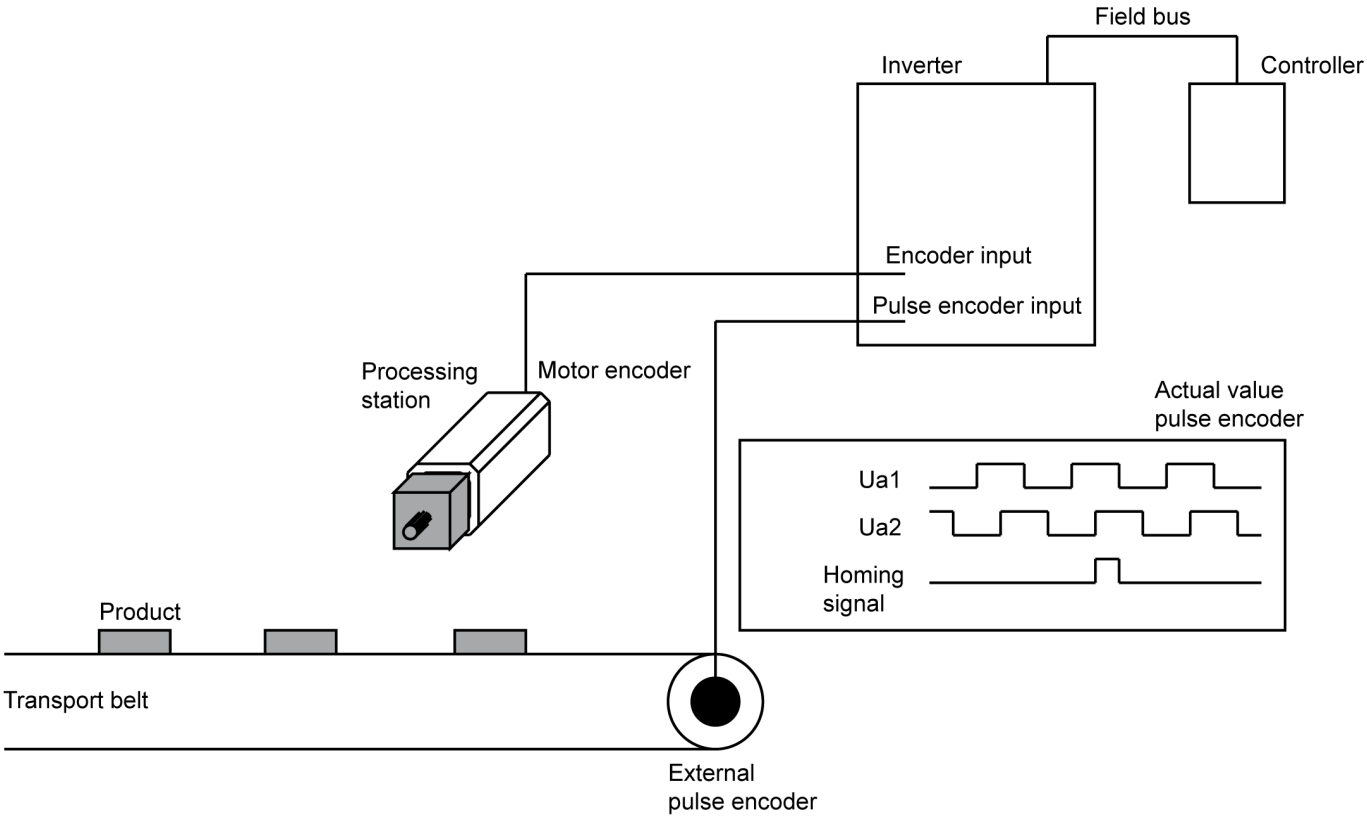
## 2 'Probe function pulse encoder with homing mark'

The 'Probe function pulse encoder with homing mark' continuously reads in the current count of the pulse encoder interface. The actual value is stored in the 'Current counter' with every SERCOS clock pulse.

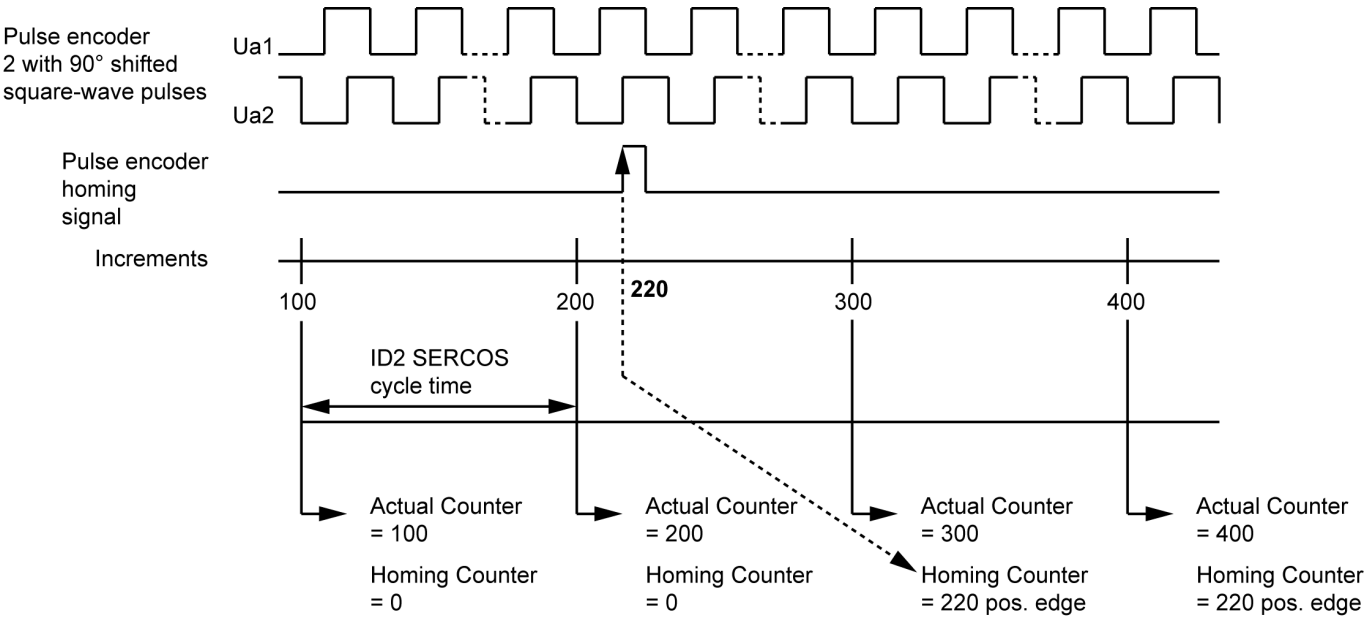
The reference mark signal (zero pulse) stores the actual value for the 'reference counter'.

The stored values can subsequently be read out and further processed by a controller.

The AMK converter generates 4 increments (4x evaluation) from one encoder pulse (encoder line number)
Increments per revolution = 4 x encoder line number




Example:



## 2.1 Relevant parameters

| Parameter | Meaning |
|---|---|
| ID32948 'Message 4x32' | **Code for Message 1:**<br>0x0003 : Reference mark stores current counter state as reference counter 1<br>**Code for Message 2:**<br>Code 0x0300 : Reference mark stores current counter state as reference counter 2 |
| ID34074 'Homing Counter 1' | Message 1:<br>The 'Homing Counter 1' stores the position information from ID34075 'Actual Counter 1' at the point where the homing signal occurs. |
| ID34075 'Actual Counter 1' | Message 1:<br>The 'Actual Counter 1' cyclically saves (each 250 µs) the position information. |
| ID34076 'Homing Counter 2' | Message 2:<br>The 'Homing Counter 2' stores the position information from ID34077 'Actual Counter 2' at the point where the homing signal occurs. |
| ID34077 'Actual Counter 2' | Message 2:<br>The 'Actual Counter 2' cyclically saves (each 250 µs) the position information. |

## 3 'Probe function pulse encoder with touch probe signal'

With the function 'Probe function pulse encoder with touch probe signal', a master controller can generate a real-time reference between the actual value of the pulse encoder and a touch probe signal. The real-time reference can, for example, be used for a mark control.

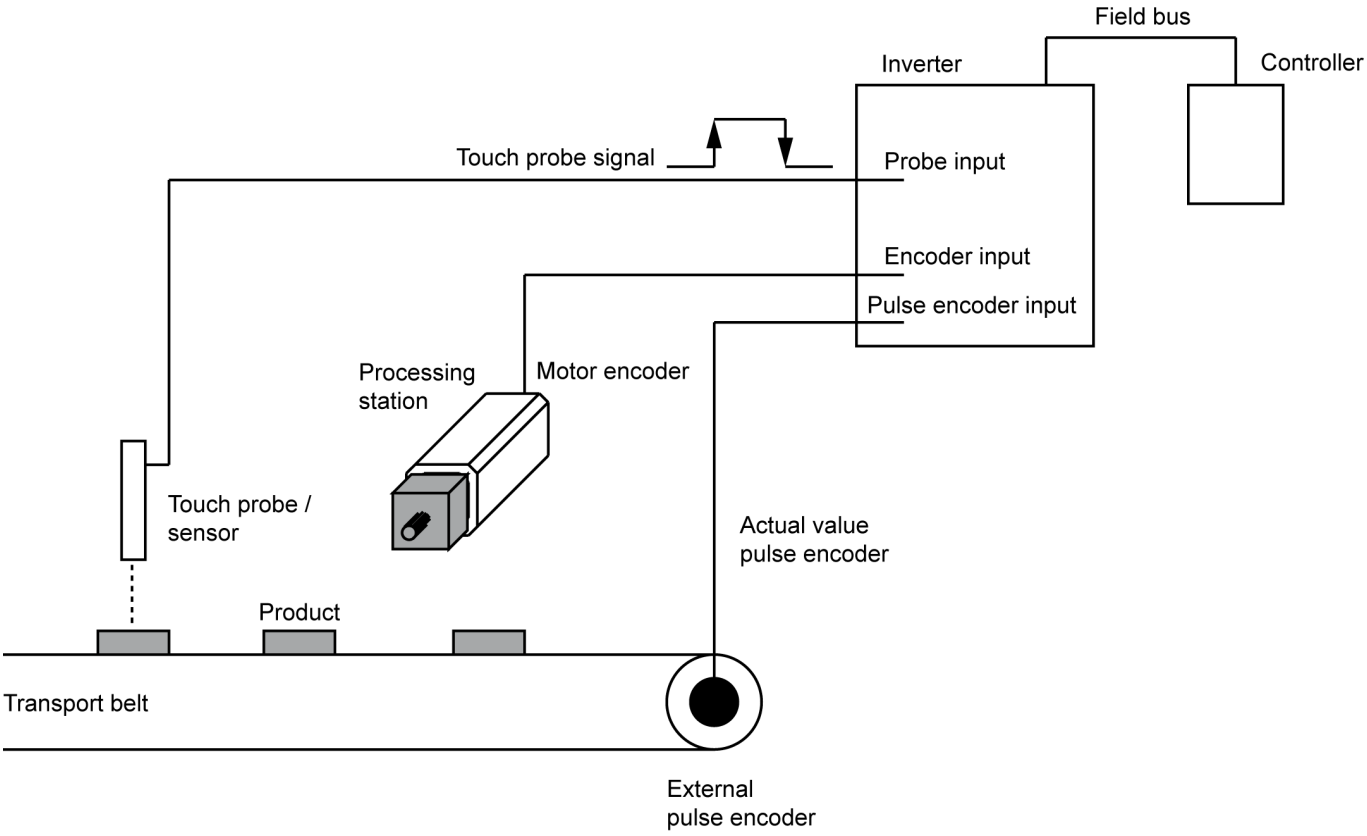
Two touch probes (MT1/MT2) can be connected to the probe inputs (BE3/ME1 - BE2/ME2) on the converter. The probe function can evaluate the positive or the negative edge of an input signal.

The probe function continuously reads in the counter state of the pulse encoder interface. The actual value is stored in the 'Current counter' with every SERCOS clock pulse.

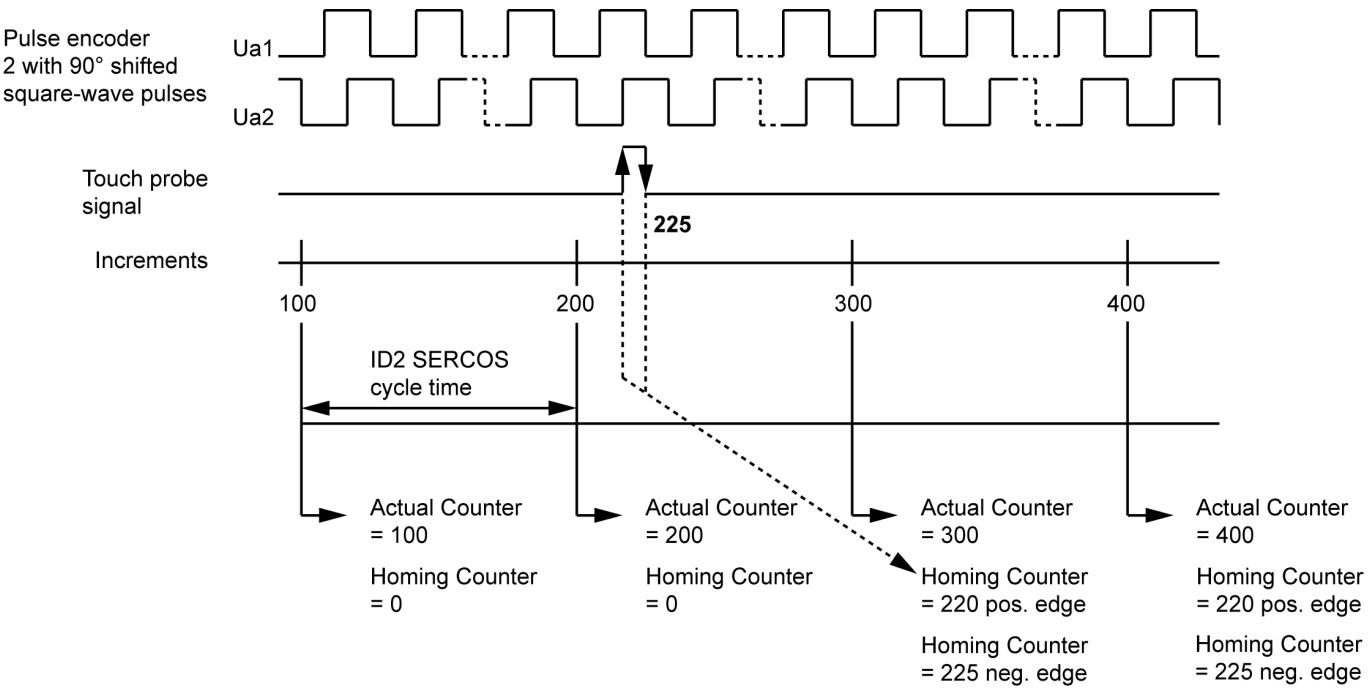
The touch probe signal stores the actual value for the 'reference counter'.

The stored values can subsequently be read out and further processed by a controller.

The AMK converter generates 4 increments (4x evaluation) from one encoder pulse (encoder line number)
Increments per revolution = 4 x encoder line number



Example:




**Overview of the touch probe inputs and the associated parameters**

| Probe input 1 - BE3 | Probe input 2 - BE2 | Meaning |
|---|---|---|
| Code 401 | Code 402 | Basic setting:<br>A binary input with connected touch probe must be assigned with the 'touch probe' function code. |
| ID169 'Probe control parameter' Bit 0-1 | ID169 'Probe control parameter' Bit 2-3 | Basic setting:<br>Selection positive or negative edge evaluation |
| ID130 'Probe value 1 positive edge' | ID132 'Probe value 2 positive edge' | Probe value:<br>Stored actual position value for positive edge selection |
| ID131 'Probe value 1 negative edge' | ID133 'Probe value 2 negative edge' | Probe value:<br>Stored actual position value for negative edge selection |
| ID32948 'Message 4x32'<br>1. Message | ID32948 'Message 4x32'<br>2. Message | Basic setting:<br>'Probe function pulse encoder with touch probe signal' activate / deactivate |
| ID34047 'Dead time compensation measuring 1' | ID34210 'Dead time compensation measure 2' | Basic setting:<br>Dead time compensation of the input circuitry on the probe input |
| ID34074<br>'Homing Counter 1' | ID34076<br>'Homing Counter 2' | Probe value:<br>Actual position value at the point in time of the touch probe signal |
| ID34075<br>'Actual Counter 1' | ID34077<br>'Actual Counter 2' | Probe value:<br>Actual position value at the point in time of the SERCOS clock pulse |

**Commissioning instructions:**

inhibit time probe input ME1/ME2 (BE3/BE2):
The probe input is blocked for 250 µs after every active measurement edge.

## 3.1 Relevant parameters and function codes

**Basic setting probe function**

<table>
<tr><th>Parameter</th><th>Meaning</th></tr>
<tr><td>ID169 'Probe control parameter'</td><td>With ID169 'Probe control parameter' determines whether the positive or the negative edge at the measurement input 1 or 2 is evaluated.<br><br>Configuration ID169 'Probe control parameter'
<table>
<tr><th>Bit no.</th><th>Condition</th><th>Meaning</th></tr>
<tr><td rowspan="4">0-1</td><td>--</td><td>Edge evaluation touch probe input 1</td></tr>
<tr><td>00</td><td>No evaluation</td></tr>
<tr><td>01</td><td>Positive edge at the touch probe input 1 is evaluated</td></tr>
<tr><td>10</td><td>Negative edge at the touch probe input 1 is evaluated</td></tr>
<tr><td rowspan="4">2-3</td><td>--</td><td>Edge evaluation touch probe input 1</td></tr>
<tr><td>00</td><td>No evaluation</td></tr>
<tr><td>01</td><td>Positive edge at the touch probe input 2 is evaluated</td></tr>
<tr><td>10</td><td>Negative edge at the touch probe input 2 is evaluated</td></tr>
<tr><td rowspan="2">4-15</td><td>0</td><td>Reserved</td></tr>
<tr><td>1</td><td>Reserved</td></tr>
</table>

Only 1 edge evaluation must be activated per measuring input. Selecting positive AND negative edge is not allowed.<br><br> 
Only 1 edge evaluation per touch probe input may be activated in each case. The selection positive AND negative edge is not permitted.</td></tr>
<tr><td>ID34047 'Dead time compensation measuring 1'</td><td>Dead times can be compensated for with this parameter due to, for example, sensors and input circuits in connection with the touch probe function at the binary input BE3. The measured value is corrected by the configured dead time.</td></tr>
<tr><td>ID34210 'Dead time compensation measure 2'</td><td>Dead times can be compensated for with this parameter due to, for example, sensors and input circuits in connection with the touch probe function at the binary input BE2. The measured value is corrected by the configured dead time.</td></tr>
</table>

A binary input with connected touch probe must be assigned with the 'touch probe' function code.

| Parameter | Meaning |
|---|---|
| Code 401 | Function code touch probe for BE3<br>Measurement signal 1 for touch probe function only at BE3 (ID32980 'Port 3 Bit 2') |
| Code 402 | Function code touch probe for BE2<br>Measurement signal 2 for touch probe function only at BE2 (ID32979 'Port 3 Bit 1') |

**Relevant parameters during the measurement**

| Parameter | Meaning |
|---|---|
| ID130 'Probe value 1 positive edge' | A positive edge at the probe input 1 stores the actual position value. The stored actual position value can be read at a later time by a PLC. |
| ID131 'Probe value 1 negative edge' | A negative edge at the probe input 1 stores the actual position value. The stored actual position value can be read at a later time by a PLC. |
| ID132 'Probe value 2 positive edge' | A positive edge at the probe input 2 stores the actual position value. The stored actual position value can be read at a later time by a PLC. |
| ID133 'Probe value 2 negative edge' | A negative edge at the probe input 2 stores the actual position value. The stored actual position value can be read at a later time by a PLC. |

| Parameter | Meaning |
|---|---|
| ID32948 'Message 4x32' | **Code for message 1 (probe input 1 - BE3)**<br>0x0023 : Reference mark stores current counter state as reference counter 1<br>**Code for message 2 (probe input 2 - BE2)**<br>Code 0x2300 : Reference mark stores current counter state as reference counter 2 |
| ID34074 'Homing Counter 1' | Message 1:<br>The 'Homing Counter 1' stores the position information from ID34075 'Actual Counter 1' at the point where the homing signal occurs. |
| ID34075 'Actual Counter 1' | Message 1:<br>The 'Actual Counter 1' cyclically saves (each 250 µs) the position information. |
| ID34076 'Homing Counter 2' | Message 2:<br>The 'Homing Counter 2' stores the position information from ID34077 'Actual Counter 2' at the point where the homing signal occurs. |
| ID34077 'Actual Counter 2' | Message 2:<br>The 'Actual Counter 2' cyclically saves (each 250 µs) the position information. |