Use of DANGER, WARNING, CAUTION, and NOTE

This publication includes, DANGER, WARNING, CAUTION, and NOTE information where appropriate to point out safety related or other important information.

DANGER  Hazards which could result in severe personal injury or death
WARNING  Hazards which could result in personal injury
CAUTION  Hazards which could result in equipment or property damage
NOTE  Alerts user to pertinent facts and conditions

Although DANGER and WARNING hazards are related to personal injury, and CAUTION hazards are associated with equipment or property damage, it should be understood that operation of damaged equipment could, under certain operational conditions, result in degraded process performance leading to personal injury or death. Therefore, comply fully with all DANGER, WARNING, and CAUTION notices.

TRADEMARKS

Pressductor® is registered trademark of ABB Automation Technologies AB.

NOTICE

The information in this document is subject to change without notice and should not be construed as a commitment by ABB Automation Technologies AB. ABB Automation Technologies AB assumes no responsibility for any errors that may appear in this document.

In no event shall ABB Automation Technologies AB be liable for direct, indirect, special, incidental or consequential damages of any nature or kind arising from the use of this document, nor shall ABB Automation Technologies AB be liable for incidental or consequential damages arising from use of any software or hardware described in this document.

This document and parts thereof must not be reproduced or copied without ABB Automation Technologies AB’s written permission, and the contents thereof must not be imparted to a third party nor be used for any unauthorized purpose.

The software described in this document is furnished under a license and may be used, copied, or disclosed only in accordance with the terms of such license.

Copyright © ABB Automation Technologies AB, 2005
# TABLE OF CONTENTS

Chapter 1 - Scaling Profibus Measuring Values

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>About this Supplement</td>
<td>1-1</td>
</tr>
<tr>
<td>1.2</td>
<td>Miscellaneous Menu</td>
<td>1-1</td>
</tr>
<tr>
<td>1.2.1</td>
<td>Profibus</td>
<td>1-2</td>
</tr>
<tr>
<td>1.2.2</td>
<td>Scaling of Profibus Measuring Values</td>
<td>1-2</td>
</tr>
<tr>
<td>1.2.2.1</td>
<td>Default Scaling</td>
<td>1-3</td>
</tr>
<tr>
<td>1.2.2.2</td>
<td>User Defined Scaling</td>
<td>1-4</td>
</tr>
</tbody>
</table>
Chapter 1 Scaling Profibus Measuring Values

1.1 About this Supplement

To improve the Profibus resolution, the profbus scaling function has been changed.

This supplement explains the new Profibus function for improved resolution and necessary changes in the Profibus master to adapt to changes in Tension Electronics PFEA113.

The new scaling function is valid for SW-version 1.8 and higher.

This supplement can be used together with all language versions of User Manual, Web Tension Systems with Tension Electronics PFEA113 3BSE029382R00xx.

1.2 Miscellaneous Menu

Use this menu for scaling Profibus measuring values.
Refer to User Manual PFEA113, 3BSE029382R0001 Rev B, Section 3.12.11.

![Figure 1-1. Profibus Scaling, One Roll or Two Rolls](image-url)
2. Profibus Scaling: Segmented roll selected in SystemDefinition

1.2.1 Profibus

- Profibus On/Off
  The Profibus can be enabled or disabled.
- Profibus Address?
  If the Profibus is enabled, the Profibus address must be set in the range 000 - 125.
- Profibus Measuring Range?
  If the Profibus is enabled, the Profibus Measuring Range and load division can be set for Roll1 and Roll2 separately.

Read more about the Profibus in User manual for PFEA113, Section 3.13.

1.2.2 Scaling of Profibus Measuring Values

The Profibus values can be scaled in two ways:

- **Default Scaling** – the scaling is only depending on load cell nominal load.
- **User defined Scaling** – the scaling of the Profibus values can be set by the user.
1.2.2.1 Default Scaling

This is a similar function as in previous software versions, SW 1.0-1.7.

**Load Cell Combination, LoadCellComb: One roll or Two rolls**

For Load cell Combination One or Two rolls, default scaling is a similar function as in previous software versions, SW 1.0-1.7. The main change is for Difference signals. In SW 1.0-1.7, the difference signal has a separate scaling. In SW1.8, all signals for each measurement object have the same scaling. For difference signals, the load scaling must be adjusted in the Profibus master when replacing an old unit with an SW1.8-unit.

**Load Cell Combination, LoadCellComb: Segmented roll**

For SW1.8 Default scaling has a similar function as the 9 to 12 load cells function (connected to an analog output) in SW 1.0-1.7, with the exception for difference signals. For 3-8 load cells, the load scaling must be adjusted in the Profibus master when replacing an old unit with an SW1.8-unit.

### Table: Number of load cells connected to the analog output channel

<table>
<thead>
<tr>
<th>Number of load cells connected to the analog output channel</th>
<th>Value of least significant bit, Load Division (Resolution) ( \left( F_{\text{nom}} = \text{Load cell nominal load} \right) )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>One or Two rolls</strong></td>
<td></td>
</tr>
<tr>
<td>• 1 or 2 load cells</td>
<td>( 0.001 \times 2 \times F_{\text{nom}} ) ( \quad 0.001 \times 2 \times F_{\text{nom}} )</td>
</tr>
<tr>
<td>• Difference signal</td>
<td>( 0.001 \times F_{\text{nom}} ) ( \quad 0.001 \times 2 \times F_{\text{nom}} )</td>
</tr>
<tr>
<td><strong>Segmented roll</strong></td>
<td></td>
</tr>
<tr>
<td>• 3 load cells</td>
<td>( 0.001 \times 3 \times F_{\text{nom}} ) ( \quad 0.001 \times 12 \times F_{\text{nom}} )</td>
</tr>
<tr>
<td>• 4 load cells</td>
<td>( 0.001 \times 4 \times F_{\text{nom}} ) ( \quad 0.001 \times 12 \times F_{\text{nom}} )</td>
</tr>
<tr>
<td>• 5 to 8 load cells (1 to 4 load cells + AI1)</td>
<td>( 0.001 \times 8 \times F_{\text{nom}} ) ( \quad 0.001 \times 12 \times F_{\text{nom}} )</td>
</tr>
<tr>
<td>• 9 to 12 load cells (1 to 4 load cells + AI1 + AI2)</td>
<td>( 0.001 \times 12 \times F_{\text{nom}} ) ( \quad 0.001 \times 12 \times F_{\text{nom}} )</td>
</tr>
<tr>
<td>• Difference signal</td>
<td>( 0.001 \times F_{\text{nom}} ) ( \quad 0.001 \times 12 \times F_{\text{nom}} )</td>
</tr>
</tbody>
</table>

Example for 1 kN load cells (SW1.8):

With 1 kN load cells, and with AI1+A+B (AI1 + 2 load cells) connected to the AO 1, the value of the least significant bit is:

\[ 0.001 \times 12 \times 1000 = 12 \text{ N} \]

Measuring range: 60 000 N
1.2.2.2 User Defined Scaling

The Profibus Measuring Range and Load Division can be adjusted to user needs.

**Profibus Measuring Range**

Profibus Measuring Range *(estimated web tension during normal operation)* is a parameter entered by the user. After the user has changed the Measuring Range value, changing Load cell nominal load does not affect the Profibus scaling. The value of the least significant bit is defined as Load Division.

**Load Division**

Load Division is the resolution that will be used on Profibus. The Load Division value is calculated by PFEA113 and depends on the set measuring range.

The measuring range is divided into a limited number of divisions in the range 2001 - 5000.

The Load Division value = one division, contains only one significant digit (1, 2 or 5).

The Profibus can handle max. –32768 to +32767 \((2^{16})\) divisions.

Example 1:

a. Profibus Measuring Range (set by user) = 15 500 N *(estimated web tension during normal operation)*

b. Load Division calculated by PFEA113 = 5 N *(value of least significant bit on Profibus)*

c. Profibus Measuring Range/Load Division = 15500/5 = 3100 *(the measuring range is divided into 3100 divisions)*

Example 2:

If the Load Division, 5 N, in Example 1 is not sufficient, the Load Division can be adjusted. This can be done by setting (decreasing) MeasuringRange in the Miscellaneous Menu to a value that gives a sufficient Load Division (resolution).

a. Measuring Range = 9000 N *(New, lower setting on measuring range)*

b. New Load Division calculated by PFEA113 = 2 N *(New value of least significant bit on Profibus)*

With the setting 9000 N in PFEA113, the Profibus measuring range 0 – 15500 N (divided into 7750 divisions) can still be used, now with the Load Division (resolution) 2 N.

Normally, there is no need to set the measuring range lower than 1/3 of the estimated web tension during normal operation.

The max. value that can be transmitted via Profibus, for a given Load Division, is:

- Max. value = Load Division x 32767

**NOTE**

After the user has changed the Measuring Range value, the only way to return to Default scaling, is to use the function Set Factory default in the Miscellaneous Menu.