Robust and reliable
Weighing systems for the heavy industries
Online weighing systems
Prompt and accurate weighing information

Heavy demands are made on weighing systems for use in metal-processing and heavy industries because they are an important component in the process chain. It must be guaranteed that all the components work safely, accurately and reliably in a harsh operating environment.

**High accuracy and reliability**
ABB’s many years of experience has enabled it to develop weighing systems which eminently meet these requirements. Our weighing systems, which are especially designed for these environmental conditions, can withstand impact loads and high overloads without a loss of accuracy.

**Customized solutions**
We offer a wide range of load cells and solutions for cranes and platforms in all environments.

- Crane weighing systems
- Overload protection for cranes – load pins
- Scrap weighing systems
- Torpedo-type ladle scales
- Continuous casting plants
  - Ladle-, tundish and slab scales
- Blast furnace weighing systems
- Container scales
- Charging scales
- Hopper scales
- Rolling mills
- Roller conveyors
- Coil scales

**Load information available at all times**
The load information is immediately and continuously available with our weighing system without the need for any additional operations. This means that you have a better overview of stock and recipes with an immediate effect on material consumption and the time taken to prepare batches.

**System integration**
Weighing data can also be integrated across the plant in process data handling, warehouse and logging systems to provide general monitoring and quality control.

**Rugged design**
Our weighing systems are particularly suitable for scales in harsh environmental conditions found in heavy industry. They are highly resistant to the influences of the ambient temperature. Special design solutions are available.
Tried-and-tested reliable technology
For harsh operating environments

Tried-and-tested reliable technology
- Strain gauge measurement principle
- High accuracy
- High overload capacity
- Wide range of measuring sensors
- Great variety of interfaces and control units
- System integration – freely programmable

Experience and Know-how
ABB has decades of experience and know-how in the field of weighing systems and accurate and reliable measurement of flatness, position, tensile force, thickness or torque in continuous operation. The Force Measurement section of ABB is the world’s leading supplier of advanced measuring technology for the steel, paper and conveyor belt industries.

ABB is the right partner
Our customers can rely on ABB as a dependable partner with industrial expertise and excellent designs. ABB stands for:

Expertise and experience.
Custom-designed solutions.
Tried-and-tested reliable technology.
International references.

Feel free to contact us!

Weighing systems for the heavy industries | 3
Load cell
For cranes

The 9QGPK crane scale load cell is designed for use in cranes and for the measurement of the tensile force between the hook and the ropes. Rugged and reliable with capacities up to 160 t.

Mounting and installation versions
The disk-shaped load cell is either mounted on the hook block or the lifting beam. The load on the ropes is transmitted to a weighing terminal via the load cell. The load cells are insensitive to lateral forces and are fitted with strong dustproof cover plates. After installation, the load cells are an integrated part of the crane structure.

The crane scale load cell is available with various nominal capacities depending on the required load. High temperature compensation and high temperature cables are available as options.

Replacement of existing load cells
The existing Pressductor® load cell type QGPK105 can be replaced without any problems. All the mechanical dimensions and measuring ranges are fully compatible.

The advantages
- Suitable for harsh environmental conditions
- Mechanically rugged design
- High resistance to the influences of temperature
- High accuracy
Load cell
For use in container and platform scales

The 9QGPL load cell has a especially rugged design and is suited for weighing in harsh environments. It is usually used in conjunction with rubber/steel pressure plates or sliding pressure plates.

Mounting and installation
The load cells are usually installed under a platform or a weighbridge in a weighing frame. The applied load is transferred via the rubber pressure plates or sliding pressure plates to the load cells. The load cells are usually connected to the weighing controller via a junction box.

The load cell is available with various nominal capacities depending on the required load. Versions for high ambient temperatures (max. +180 °C) are available as an option.

Replacement of existing load cells
The existing Pressductor® load cell type QGPL105 can be replaced without any problems. All the mechanical dimensions and measuring ranges are fully compatible.

The advantages
- Suitable for harsh environmental conditions
- Mechanically rugged design
- High resistance to the influences of temperature
- High accuracy
- Easy commissioning

Weighing systems for the heavy industries
Load cells
Technical data

Load cell for cranes type 9QGPK
Measurement principle: Strain gauge
Calibrated output: 0.5 mV/V
Bridge resistance: 700 Ω
Material: Nickel-plated steel
Calibrated temperature: -10...+45 °C
Operating temperature: -40...+100 °C (optional +180 °C)
Safe overload: 250% of \( F_{\text{nom}} \)
Max. overload: 400% of \( F_{\text{nom}} \)
Excitation range: 5...15 V
Nominal excitation: 5 V DC
Combined error: ± 0.1% of \( F_{\text{nom}} \)
Repeatability error: ± 0.02% of \( F_{\text{nom}} \)
Insulation resistance: > 5000 MΩ
Capacities: For loads from 6.3 t to 160 t

Load cell for container and platform scales type 9QGPL
Measurement principle: Strain gauge
Calibrated output: 0.5 mV/V
Bridge resistance: 700 Ω
Material: Nickel-plated steel
Calibrated temperature: -10...+45 °C
Operating temperature: -40...+100 °C (optional +180 °C)
Safe overload: 250% of \( F_{\text{nom}} \)
Max. overload: 400% of \( F_{\text{nom}} \)
Excitation range: 5...15 V
Nominal excitation: 5 V DC
Combined error: ± 0.1% of \( F_{\text{nom}} \)
Repeatability error: ± 0.03% of \( F_{\text{nom}} \)
Insulation resistance: > 5000 MΩ
Capacities: For loads from 5 t to 160 t

<table>
<thead>
<tr>
<th>Load [t]</th>
<th>A1</th>
<th>A2</th>
<th>B1</th>
<th>B2</th>
<th>C1</th>
<th>C2</th>
<th>D</th>
<th>D1</th>
<th>D2</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>R1</th>
<th>R3</th>
<th>α°</th>
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<tr>
<td>6.3</td>
<td>145</td>
<td>140</td>
<td>180</td>
<td>180</td>
<td>170</td>
<td>175</td>
<td>400</td>
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<td>16/20</td>
<td>320</td>
<td>16</td>
<td>50</td>
<td>15</td>
<td>20</td>
<td>80</td>
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<td>155</td>
<td>165</td>
<td>180</td>
<td>175</td>
<td>205</td>
<td>190</td>
<td>195</td>
<td>450</td>
<td>100</td>
<td>20/24</td>
<td>410</td>
<td>20</td>
<td>70</td>
<td>20</td>
<td>25</td>
<td>100</td>
<td>235</td>
<td>20</td>
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<tr>
<td>16</td>
<td>185</td>
<td>195</td>
<td>210</td>
<td>180</td>
<td>215</td>
<td>195</td>
<td>205</td>
<td>500</td>
<td>120</td>
<td>20/24</td>
<td>470</td>
<td>20</td>
<td>70</td>
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<td>25</td>
<td>100</td>
<td>260</td>
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<td>200</td>
<td>220</td>
<td>240</td>
<td>225</td>
<td>270</td>
<td>245</td>
<td>260</td>
<td>600</td>
<td>160</td>
<td>24/30</td>
<td>540</td>
<td>20</td>
<td>70</td>
<td>20</td>
<td>25</td>
<td>100</td>
<td>310</td>
<td>25</td>
</tr>
<tr>
<td>40/63</td>
<td>250</td>
<td>280</td>
<td>295</td>
<td>240</td>
<td>300</td>
<td>255</td>
<td>290</td>
<td>700</td>
<td>200</td>
<td>24/30</td>
<td>650</td>
<td>28</td>
<td>90</td>
<td>20</td>
<td>30</td>
<td>120</td>
<td>360</td>
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<td>285</td>
<td>355</td>
<td>300</td>
<td>340</td>
<td>800</td>
<td>240</td>
<td>30/38</td>
<td>720</td>
<td>28</td>
<td>120</td>
<td>25</td>
<td>40</td>
<td>150</td>
<td>410</td>
<td>30</td>
</tr>
<tr>
<td>160</td>
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<td>340</td>
<td>360</td>
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<td>395</td>
<td>348</td>
<td>380</td>
<td>900</td>
<td>280</td>
<td>30/38</td>
<td>790</td>
<td>32</td>
<td>120</td>
<td>25</td>
<td>40</td>
<td>150</td>
<td>460</td>
<td>30</td>
</tr>
</tbody>
</table>

Dimensions in mm

Load cell for cranes type 9QGPK

Dimensions in mm

Load cell for container and platform scales type 9QGPL

Dimensions in mm

Weighing systems for the heavy industries
System structure weighing system
A complete weighing system usually consists of two to four load cells, a weighing multiplexer (ADC Box) or a connection box, one weigh controller IT series and optional peripherals, such as PC, printer, keyboard or large scale display.

Weigh controllers IT series
The ABB weighing terminals were specially designed for industrial use. From simple through to complex applications and freely programmable versions are available.

Communication
The modular design of the electronics permits a variety of configurations with a large number of interfaces or external control options including:

- Various fieldbus connections
- Ethernet LAN with TCP/IP protocol (not for IT1000), which supports easy integration into an existing network
- Analog inputs/outputs 15 bit and 12 bit resolution
- Wireless communication, radio transmission, WLAN

Universal weighing terminal IT8000 E
Its modular concept, proven standard programs and free programmability make the IT8000 E the ideal terminal for weighing installations needing customized operating sequences.

For the connection of 1 or 2 scale platforms with a max. of 16 analog load cells, the IT8000 E offers a resolution of 6000d at a max. 80% preload.

The scales can be calibrated as single or multiple-range scales (e.g. 3 x 3000d) and as single or multi-interval scales. An internal storage of up to 450,000 weighing transacts is implemented. The free programmability is done straightforwardly on a PC by means of the RTC program development environment and turns the IT8000 E into a powerful all-round tool for weighing applications.

Technical data IT8000
Stainless steel housing
TFT color display
320 x 240 dots
Up to 8 x 44 alphanumeric characters
Ambient temperature
-10 °C…+40 °C
Relative humidity
95%, no formation of condensate
Membrane keyboard
With tactile response
(Please keyboard can be connected as an option)
### Control units and operator panels

**For load cells**

<table>
<thead>
<tr>
<th>Typ</th>
<th>IT1000</th>
<th>IT2000M</th>
<th>IT4000E</th>
<th>IT8000E</th>
<th>IT9000E</th>
<th>Profibox</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Application</strong></td>
<td>Load display and/or data transfer to PLC</td>
<td>Data transfer to PLC via PROFIBUS-DP, Profinet or Ethernet</td>
<td>Load display and/or data transfer to PLC</td>
<td>Freely programmable terminal for crane scales or large container scales</td>
<td>Freely programmable terminal for crane scales or large container scales</td>
<td>On-site device for data transfer to PLC</td>
</tr>
<tr>
<td><strong>Installation</strong></td>
<td>On-site or control room</td>
<td>On-site or control room</td>
<td>On-site or control room</td>
<td>Operator place or control room</td>
<td>Operator place or control room</td>
<td>On-site</td>
</tr>
<tr>
<td><strong>Design</strong></td>
<td>Wall/desktop or panel-mounting</td>
<td>For DIN rail mounting</td>
<td>Wall/desktop or panel-mounting</td>
<td>Wall/desktop or panel-mounting</td>
<td>Wall/desktop or panel-mounting</td>
<td>Load cell junction box</td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>13-character text display</td>
<td>16-character LCD display</td>
<td>5.7&quot; color TFT display, Resolution 320 x 240</td>
<td>5.7&quot; color TFT display, Resolution 320 x 240</td>
<td>8 x 44-character TFT display</td>
<td>-</td>
</tr>
<tr>
<td><strong>Keyboard</strong></td>
<td>5 keys</td>
<td>5 keys</td>
<td>20 keys, alphanumeric</td>
<td>32 keys, alphanumeric</td>
<td>62 keys, alphanumeric, cursor keys</td>
<td>-</td>
</tr>
<tr>
<td><strong>Dimensions B x H x T [mm]</strong></td>
<td>168 x 167 x 115</td>
<td>86 x 120 x 106</td>
<td>225 x 190 x 145</td>
<td>330 x 229 x 134</td>
<td>370 x 265 x 140</td>
<td>325 x 107 x 64</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>10-30 V DC or 110-240 V AC</td>
<td>12-30 V DC</td>
<td>10-30 V DC or 110-240 V AC</td>
<td>10-30 V DC or 110-240 V AC</td>
<td>10-30 V DC or 110-240 V AC</td>
<td>10-30 V DC or 110-240 V AC</td>
</tr>
<tr>
<td><strong>Interfaces</strong></td>
<td>1 scale</td>
<td>1 scale</td>
<td>1 or 2 scales</td>
<td>1 or 2 scales</td>
<td>1 or 2 scales</td>
<td>1 x serial RS232/RS485</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td>BASIC, COUNT, FILL, CHECK, ONLINE</td>
<td>ONLINE, OP, BAG</td>
<td>DOS, BASIC, COUNT, CONTROL, ONLINE, TRUCK</td>
<td>BAG, BIGBAG, BASIC, BATCH, BELT, BULK, CHECK, COUNT, FILL, LOSS IN WEIGHT, FLOW CONTROL, ONLINE, SQC, TRUCK, ABB IT SCALE E</td>
<td>BAG, BIGBAG, BASIC, BATCH, BULK, CHECK, COUNT, FILL, LOSS IN WEIGHT, FLOW CONTROL, ONLINE, SQC, TRUCK, ABB IT SCALE E</td>
<td>PROFIBUS-DP 1 x serial RS232 1 x parallel</td>
</tr>
</tbody>
</table>
Examples
Customer-specific applications

Block diagram typical crane weighing system

Block diagram for ladle turret
Overload detection for cranes
Load pins

Increasing demands on the safety of cranes makes it necessary to monitor the loads applied. In case of an overload or an imbalanced load situation the operator should be informed about that event.

High demands on the safety of cranes
For that purpose ABB has developed pin load cells and evaluation electronics, dedicated to indicate exceptional load situations of the crane.

An overload system consists of a load pin, containing strain gauge sensors. It replaces the rope’s fixed point shaft or it can be used instead of a shaft in any loaded sheave arrangement, either in the hook block or on the crane’s trolley. The load pin, working as a double shear beam, sends an output signal to the load cell evaluation electronic, which in turn generates an alarm signal to inform the crane operator about an overload situation.

Tailor-made customized application
The load pin is a non-standard part, made from stainless steel, which is tailor-made according the crane’s design. It’s designed to fit into the available mechanics and provides a safety factor of at least 300%. Load pins can be rated for loads from 300 kg to 1,000 t.
Evaluation electronics
The evaluation electronics are simple designed units, to be mounted either on a DIN rail in the control room or into a locally installed housing. The units provide one or three alarm outputs for overload detection (typically 110 %), slack rope detection or detection of asymmetrical loads. All units provide analog load output signals, 0…10 V or 4…20 mA.

The advantages
- Reliable and accurate also for harsh environmental conditions
- Easy installation and operation
- Cost-effective and efficient in operation

Technical data load pins
Design: Double shear beam
Material: Stainless steel
Protection class: IP65, optional IP68
Typical error for hoisting application: ± 1% of nominal load
Output sensitivity: ± 1 mV/V ± 20%
Safety factor: min > 300%

Load pin electronics
BRIDGE BOY 1-R and 3-R
- Load monitor with 1 to 3 relays
- To be used for overload detection, not for weighing purpose
- Slack rope detection and detection of asymmetric loads
- Analogue output signal (0…10 V or 4…20 mA)
- Test function
- Input: mV/V
- 4-wire connection
- Multimeter setup

COACH DATA II
- Data recording and management system for cranes and hoisting devices, can be used as a “Black Box”
- Data logging of all hoisting movements (up, down, transversal and directional motion) and loads for several years
- Maintenance planning tool through SWP (Safe Working Period) calculation
- Optional GSM module for SMS alerts, such as overloads, SWP overdue, cut wire etc.
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