Measurement & Analytics | Measurement made easy

Robust and reliable
Weighing systems for the heavy industries

Power and productivity
for a better world™

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 car 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!

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.

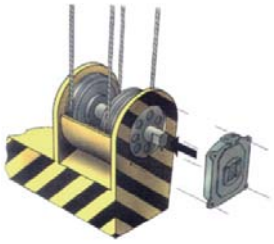
The crane scale load cell is available with various nominal capacities depending on the required load. High temperature compensation and high temperature cables are available as options.

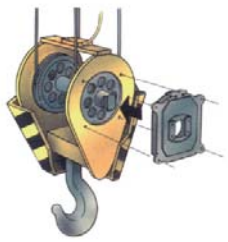
Replacement of existing load cells

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.

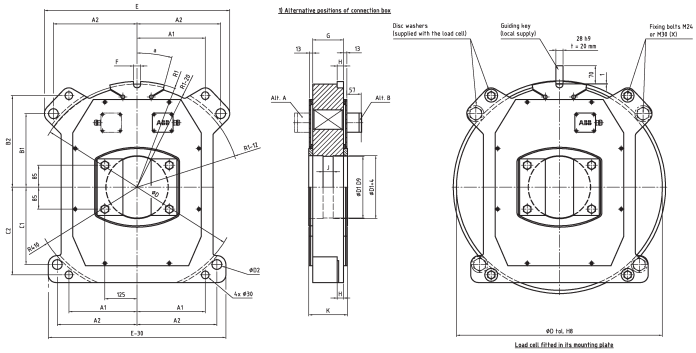
The advantages

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

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_{nom}
Max. overload	400% of F_{nom}
Excitation range	5…15 V
Nominal excitation	5 V DC
Combined error	± 0.1% of F_{nom}
Repeatability error	± 0.02% of F_{nom}
Insulation resistance	> 5000 MΩ
Capacities	For loads from 6.3 t to 160 t

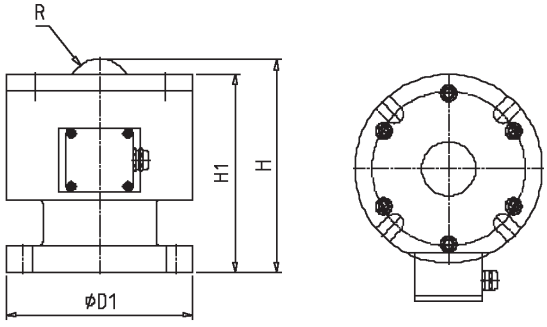


Load [t]	A1	A2	B1	B2	C1	C2	D	D1	D2	E	F	G	H	J	K	R1	R3	α°
6.3	145	140	180	180	170	175	400	80	16/20	320	16	50	15	20	80	210	15	12
10	155	165/180	175	205	190	195	450	100	20/24	410	20	70	20	25	100	235	20	10
16	185	195/210	180	215	195	205	500	120	20/24	470	20	70	20	25	100	260	20	12
25	200	220/240	225	270	245	260	600	160	24/30	540	20	70	20	25	100	310	25	13
40/63	250	280/295	240	300	255	290	700	200	24/30	650	28	90	20	30	120	360	25	13
100	265	310/320	285	355	300	340	800	240	30/38	720	28	120	25	40	150	410	30	15
160	295	340/360	325	395	348	380	900	280	30/38	790	32	120	25	40	150	460	30	17

Dimensions in mm

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_{nom} (160 t:200%)
Max. overload	400% of F_{nom} (160 t:350%)
Excitation range	5 … 15 V
Nominal excitation	5 V DC
Combined error	0.1% of F_{nom}
Repeatability error	± 0.03% of F_{nom}
Insulation resistance	> 5000 MΩ
Capacities	For loads from 5 t to 160 t



Load [t]	D1	H	H1	R
5	132	160	148	19.00
10	143	175	161	25.40
16	154	185	169	31.75
25	184	195	179	31.75
40	204	230	214	31.75
63	224	255	237	38.10
100	245	270	252	38.10
160	295	310	292	38.10

Dimensions in mm

Weigh controllers
Monitoring and operation

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

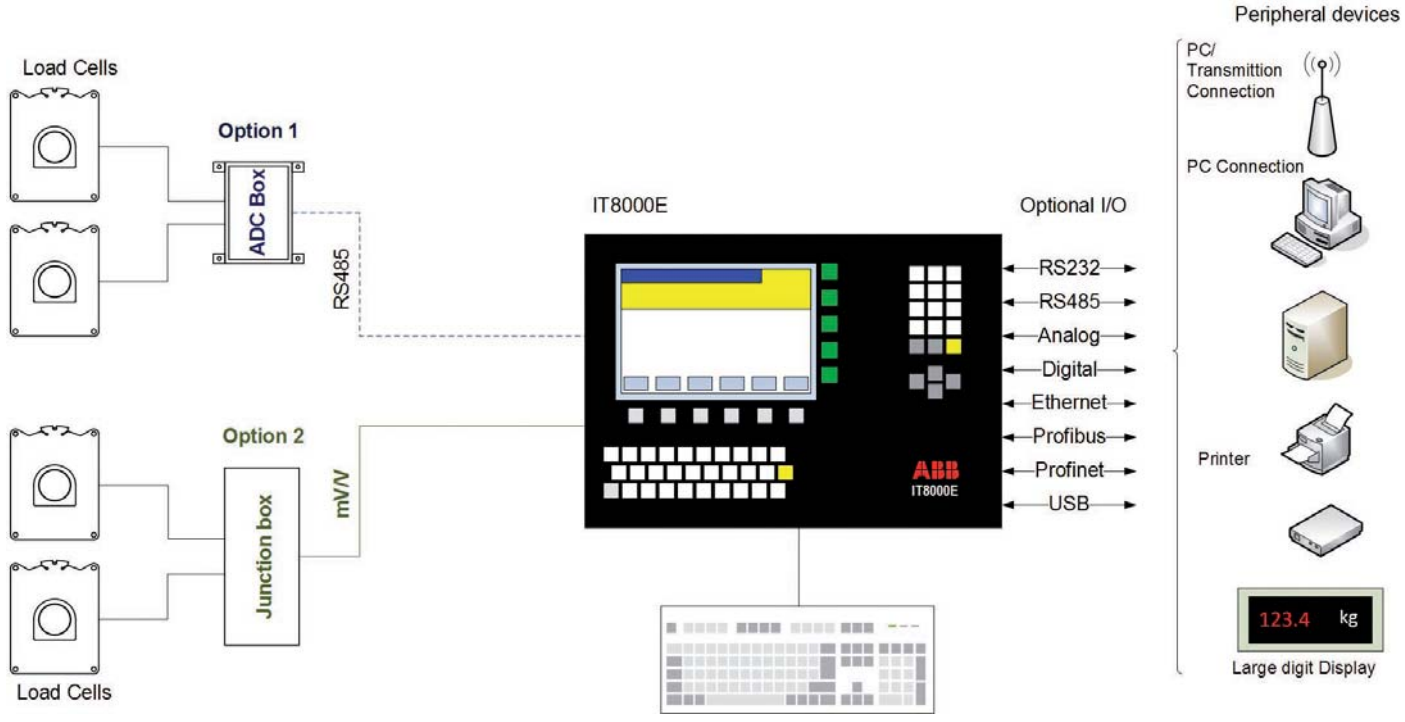
Universal weighing terminal IT8000 E
Its modular concept, proven standard programs and free programmability make the IT8000 E the ideal terminal for weighing installations needing customized operating sequences.
For the connection of 1 or 2 scale platforms with a max. of 16 analog load cells, the IT8000 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	Degree of protection IP65
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 (PC keyboard can be connected as an option)

System structure weighing system

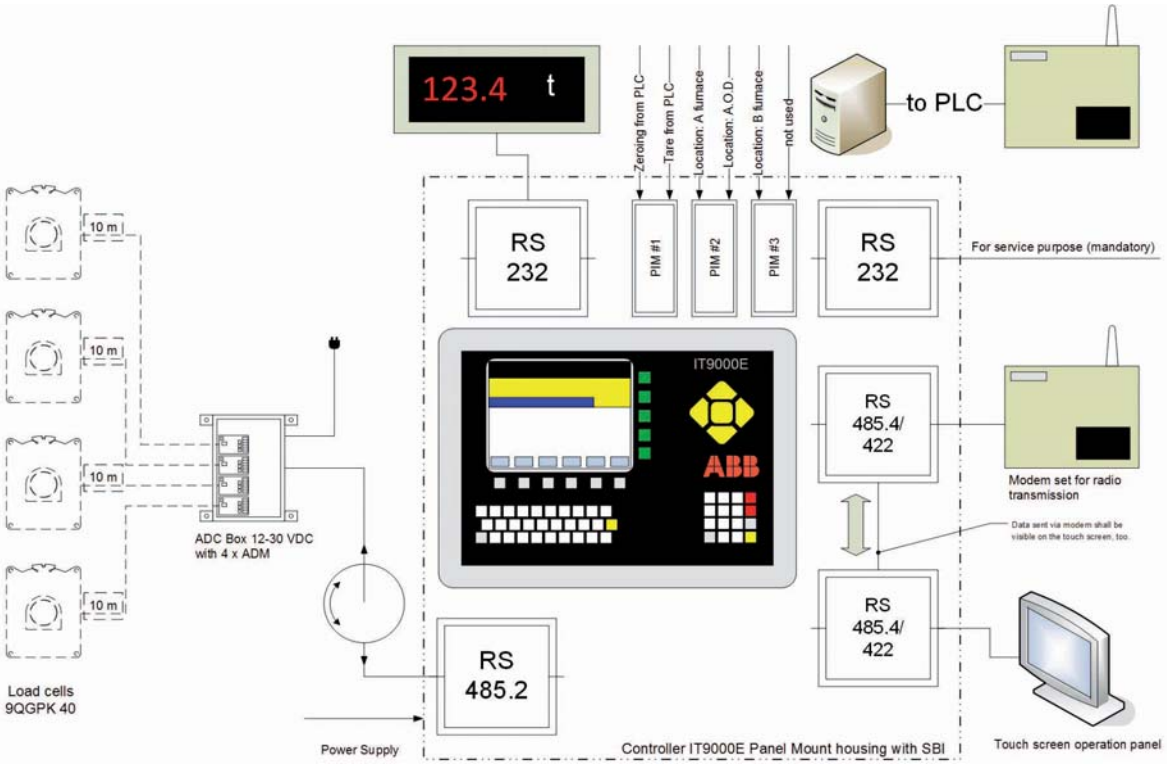


Control units and operator panels
For load cells

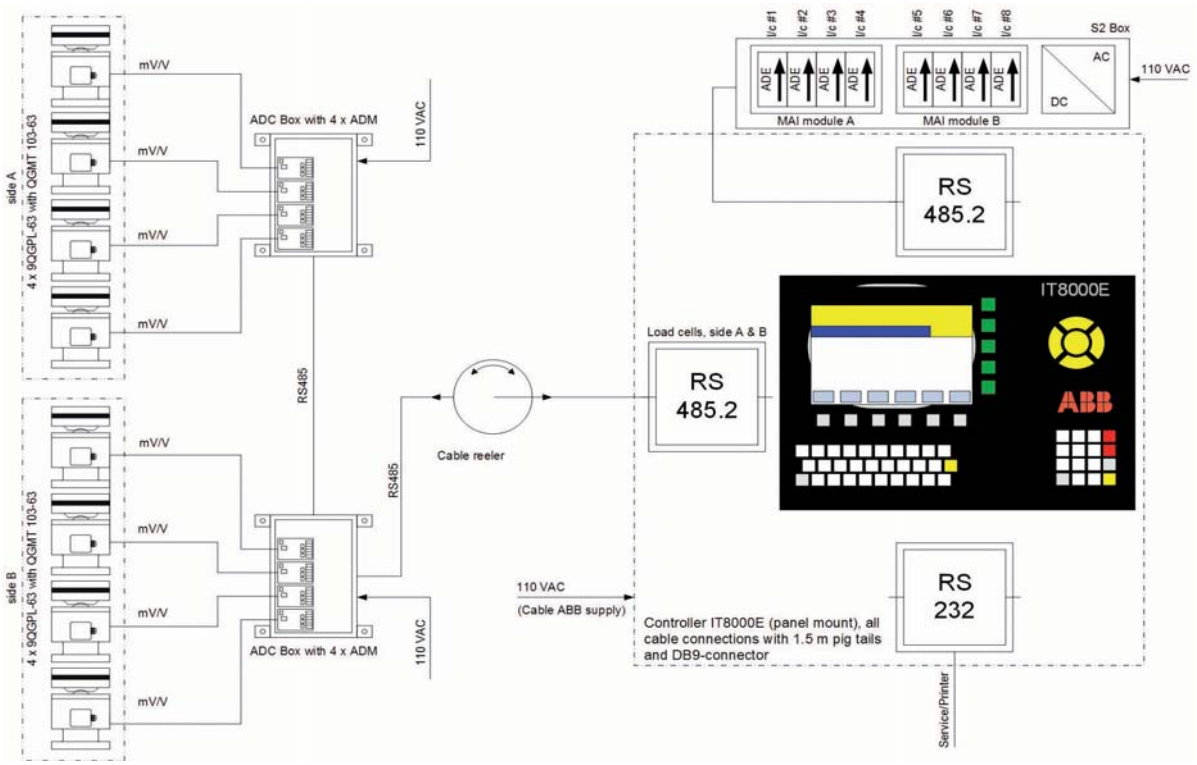
Typ	IT1000	IT2000M	IT4000E	IT8000E	IT9000E	Profibox
						
Application	Load display and/or data transfer to PLC	Data transfer to PLC via PROFIBUS-DP, ProfiNet or Ethernet	Load display and/or data transfer to PLC	Freely programmable terminal for crane scales or large container scales	Freely program-mable terminal for cran scales or large container scales	On-site device for data transfer to PLC
Installation	On-site or control room	On-site or control room	On-site or control room	Operator place or control room	Operator place or control room	On-site
Design	Wall/desktop or panel-mounting	For DIN rail mounting	Wall/desktop or panel-mounting	Wall/desktop or panel-mounting	Wall/desktop or panel-mounting	Load cell junction box
Display	13-character text display	16-character LCD display	5,7“ color TFTdisplay, Resolution 320 x 240	5,7“ color TFT display, Resolution 320 x 240, 8 x 44-character Resolution 320 x 240	8 x 44-character TFT display	- -
Keyboard	5 keys	5 keys	20 keys, alphanumeric	32 keys, alphanumeric	62 keys, alphanumeric, cursor keys	
Dimensions B x H x T [mm]	168 x 167 x 115	86 x 120 x 106	225 x 190 x 145	330 x 229 x 134	370 x 265 x 140	325 x 107 x 64
Power supply	10-30 V DC or 110-240 V AC	12-30 V DC	10-30 V DC or 110-240 V AC	10-30 V DC or 110-240 V AC	10-30 V DC or 110-240 V AC	10-30 V DC or 110-240 V AC
Interfaces	1 scale 1 x serial RS232/RS485 or 1 x parallel or 1 x analog output 15 Bit	1 scale 1 x Profinet 1 x Ethernet 2 x parallel 1 x analog input/ output 15 Bit 1 x serial RS232 or RS485 1 USB	1 or 2 scales 2 x parallel or analog input/ output 15 Bit Standard: Ethernet USB 2.0	1 or 2 scales 3 (4) x serial RS232/ RS485 2 x parallel or 2 x analog input/ output 15 Bit, Options: PROFIBUS-DP Profinet Standard: Ethernet (E) USB2.0	1 or 2 scales 3 (5/6) x serial RS232/RS485 2/8 x parallel or 2/8 x analog input/ output 15 Bit Options: PROFIBUS-DP Standard: Ethernet (E) USB2.0	PROFIBUS-DP 1 x serial RS232 1 x parallel
Software	BASIC, COUNT, FILL, CHECK, ONLINE	ONLINE, OP, BAG	DOS, BASIC, COUNT, CONTROL, ONLINE, TRUCK	BAG, BIGBAG, BASIC, BATCH, BELT, BULK, CHECK, COUNT, FILL, LOSS IN WEIGHT, FLOW CONTROL, ONLINE, SQC, TRUCK, ABB IT SCALE E	BAG, BIGBAG, BASIC, BATCH, BULK, CHECK, COUNT, FILL, LOSS IN WEIGHT, FLOW CONTROL, ONLINE, SQC, TRUCK, ABB IT SCALE E	

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.

Tailor-made and customer-specific

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.

Bridge Boy

Coach Data

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