



# Weighing Solutions for Hazardous Areas

# PUE HX5.EX

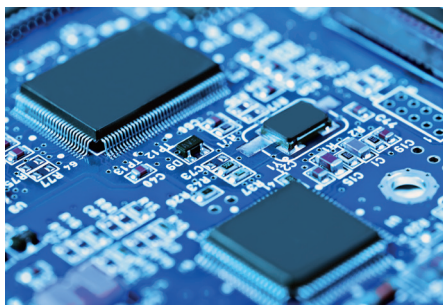
## explosion-proof hazardous area indicator



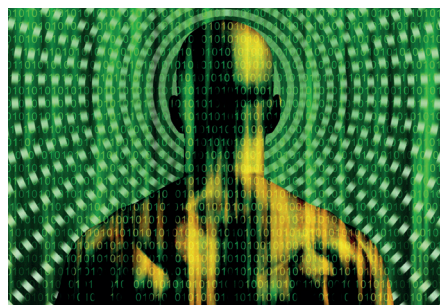
**ATEX APPROVAL**  
PUE HX5.EX is a cutting-edge weighing indicator, designed to make industrial load-cell scales that can be operated in production areas endangered with explosion, classified as zones 1, 2, 21, 22.



**VERSATILITY OF USE**  
The indicator is intended to be used under challenging environmental conditions, and in places of high hygiene standards, e.g. in chemical, pharmaceutical or food industries.



**ELECTRONICS**  
PUE HX5.EX is equipped with high-tech electronics due to which utmost precision and perfect measurement repeatability are ensured. The indicator can cooperate with system comprised of 4 load cells, where the impedance value is 350  $\Omega$ , or of 8 load cells, with 1000  $\Omega$  impedance.



**COMMUNICATION PROTOCOL**  
Complex communication protocol enables establishing communication with IT systems, and superior adjustment and control systems.



#### DISPLAY

5" colour graphic display of high resolution guarantees clear and fast presentation of displayed information on current state of carried out process. Graphic user interface features option of customization via widgets, this adds to comfort of operation.

#### KEYPAD

Large and functional 35-key keypad is equipped with programmable function keys which enable its customization.

#### SOFTWARE

Advanced software enables carrying out many operations connected with mass measurement, e.g. parts counting, checkweighing, statistics. Alibi memory guarantees stored data safety.



#### HOUSING

Robust, made of AISI304 stainless steel, guarantees IP66 / IP68 ingress protection (up to 1.5-meter deep immersion). Solid bracket enables mounting of the device either on a flat surface or wall.



#### COMMUNICATION INTERFACES

PUE HX5.EX is equipped with two intrinsically safe RS232 connectors and one intrinsically safe RS485 connector.

Possibility to install additional digital inputs/outputs (4 IN/4 OUT) extends the range of instruments compatible with the indicator by automation components that are compliant with ATEX directive.



# Power Supply certified intrinsically safe technology

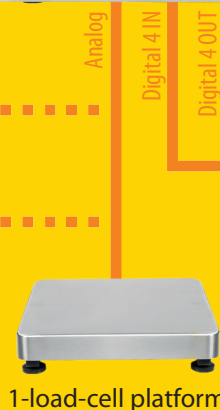
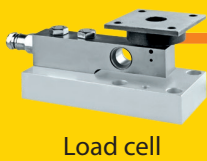
PUE HX5.EX indicator must be powered using exclusively a certified intrinsically safe Radwag PM01.EX power supply. Depending on the needs, the PM01.EX can be connected to the voltage source placed either in hazardous or safe area.

PM01.EX power supply comes in two designs:

- **PM01.EX-1:** power supply intended for operation in hazardous area:
  - Zone 1 and 2, where there is a risk of explosion due to mixture of air with vapour, mist or gas, classified as explosion group IIC, IIB and IIA and as temperature class T1, T2, T3, T4.
  - Zone 21 and 22, where there is a risk of explosion due to mixture of air with dust, flammable fibres and volatile fuels, classified as explosion group IIIC, IIIB and IIIA.
- **PM01.EX-2:** power supply intended for operation outside hazardous area, equipped with intrinsically safe circuits which may be placed in zones 1, 2, 21, 22.



**Hazardous area**



Analog

PT0327

PT0322

Analog

Digital 4 IN

Digital 4 OUT

PM01.EX-1 power supply

4-load-cell platform

1-load-cell platform

Intrinsically safe control button

Solenoid valve with an intrinsically safe circuit

# Communication Module cooperation with external devices

With use of IM01.EX communication module it is possible to expand communication interfaces range of the HX5.EX indicator. The module is installed outside the hazardous area, and connected to the indicator using intrinsically safe interface.

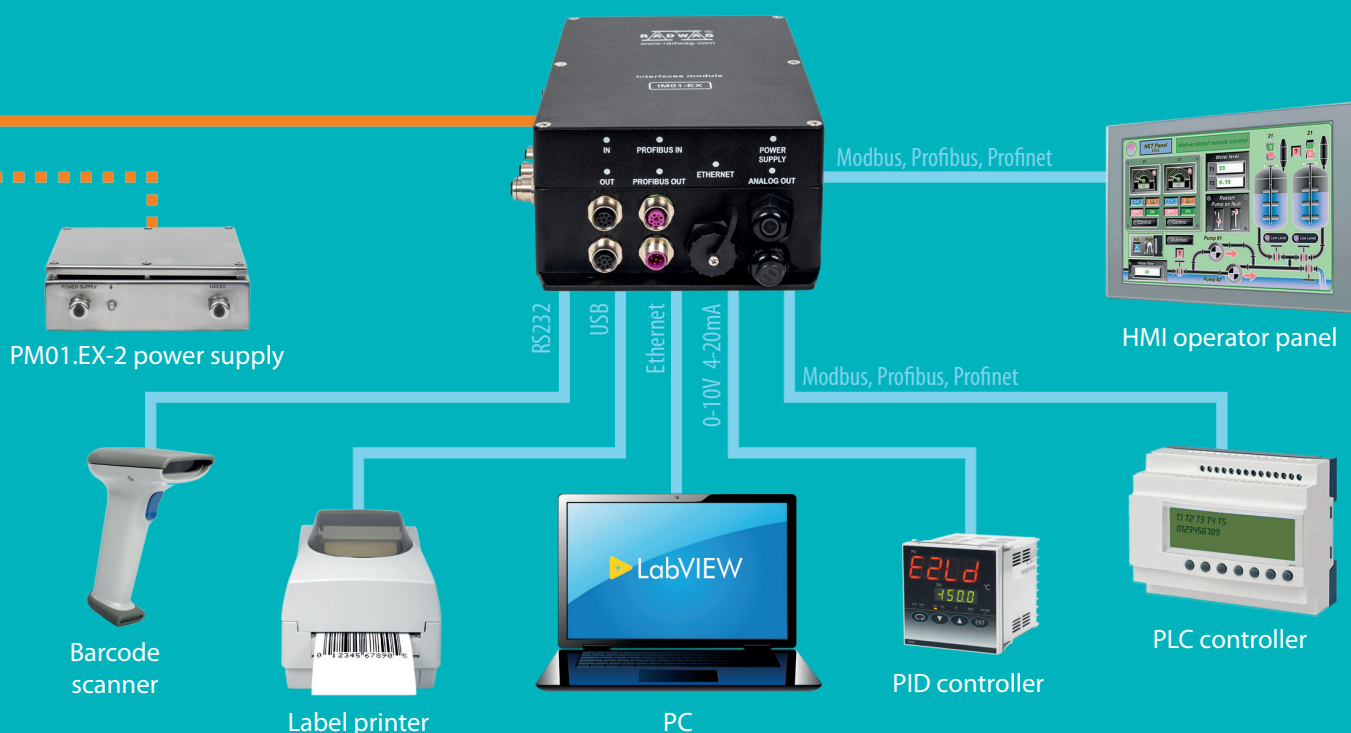
The module facilitates cooperation with various accessories, e.g. barcode scanners, printers, displays, control buttons, light signalling towers, buzzers and other controlling/signalling devices. It enables establishing communication with systems of automatic adjustment and control of industrial processes, and with superior IT systems.

## Available designs:

- IM01.EX-1 (standard): 2 × RS232, USB, 4 IN/4 OUT, Ethernet
- IM01.EX-2: Analog output 4-20mA/0-10V
- IM01.EX-3: Digital 12IN/12OUT
- IM01.EX-4: Profibus DP
- IM01.EX-5: Profinet
- IM01.EX-8: RS485
- IM01.EX-9: EtherNet/IP



Safe area



# 1-Load-Cell EX Scales

## remarkably fast and precise measurements

EX scales equipped with 1-load-cell platforms are designed to enable fast and precise measurement of loads, weight of which is not greater than 300 kg.

Characteristic feature of 1-load-cell platforms is use of one load cell sensor for mass measurements. The platforms are equipped with stainless steel weighing pan, their frame, depending on the model, can be made of stainless, acid-proof or powder coated steel.

### F1, C2 and C3 series

Platforms of F1, C2 and C3 series, designed with durability and reliability in mind, are relatively inexpensive devices when speaking in terms of quality they offer. These are solutions of up to 30 000 d resolution (non-verified scales). IP65 ingress protection allows to use these platforms in dry environment.

The series is intended for operation in zone 1 and 2.

### H1-H6 series

Platforms of H1-H6 series are intended to be operated either under high humidity conditions or at direct contact with water. Solid and reliable mechanical design makes them a perfect solution in food and cosmetic industries, and wherever meeting high hygiene standards is required.

The series is intended for operation in zone 1 and 2.

### HR2-HR6 Series

Platforms of HR2-HR6 series are intended to be operated under the most challenging environmental conditions, and at direct contact with both water and chemical substances. They are made of acid-proof steel providing resistance to corrosive substances used in chemical and pharmaceutical industries on a regular basis.

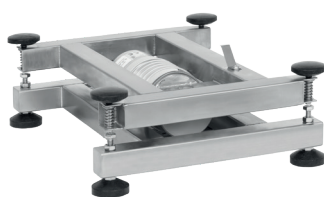
The series is intended for operation in zone 1, 2, 21 and 22.

### The main features

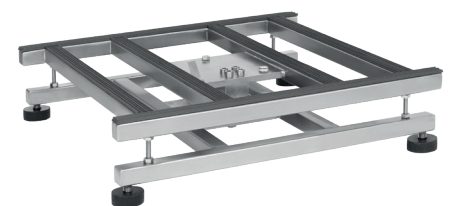
resolution	3000 d	verified scales
	up to 30000 d	non-verified scales
ingress protection	F1, C2-C3	IP65
	H1-H6	IP68
	HR2-HR5	IP68/69
material	F1, C2-C3	mechanical design St3S, platform AISI304
	H1-H6	AISI304
	HR2-HR5	AISI316
load cell	F1, C2-C3	aluminium IP65
	H1-H6	aluminium IP65, protected by silicone bellow
	HR2-HR5	stainless steel IP68/69



Platform F1



Platform H2



Platform HR3

# 4-Load-Cell EX Scales

## precise measurements of large loads

EX scales equipped with platforms featuring multiple load cells are intended to carry out fast and precise mass measurements of large loads.

When it comes to design of multiple-load-cell platforms, its characteristic feature is use of numerous load cells, usually four. They are made of either stainless steel or powder coated carbon steel, their design is often customized so that particular user needs are met (pallet scales, ramp scales, etc.).

### 4.C6–4.C11 series

Platforms of IP65 ingress protection, made of St3S carbon steel, and protected against corrosion via powder coating. Their tear plate surface prevents potential slip. The platforms are offered in wide range of different dimensions and maximum capacities. They can be equipped with numerous dedicated accessories (ramps, ramps for pit-version scales, etc.). These scales are intended to be operated in dry environment.

The series can be used in zone 1 and 2 (ATEX).

### 4.H6–4.H10 and 4.H6/Z–4.H10/Z series

Extremely solid and reliable platforms made of AISI304 stainless steel. Due to IP68 ingress protection they can be operated under severe industrial conditions and at a frequent contact with water. Z series features frame that is to be embedded in the ground, and opened weighing pan, which allows to maintain the device clean.

H6–H10 series is intended for operation in zone 1/21 and 2/22, and H6/Z–H10/Z in zone 1 and 2.

### 4N.H1–4N.H4 series

Low-profile platforms made of AISI304 stainless steel, and equipped with two ramps. They are perfect solution for weighing loads transported using trolleys. The IP68 ingress protection allows to use these platforms in corrosive conditions (frequent cleaning and contact with water).

The series is intended for operation in zone 1/21 and 2/22.

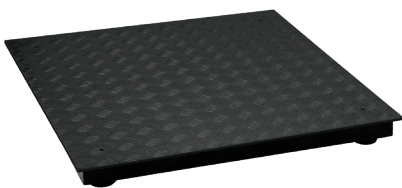
### 4P and 4P2 series

Pallet and beam scales made of carbon steel, St3S, or stainless steel, AISI304. They are designed to enable weighing of loads placed on pallets, and objects of atypical and unfixed size. These scales can be operated in challenging industrial environment.

The series is intended for operation in zones 1, 2 (St3S), and in zones 1/21, 2/22 (AISI304).

### The main features

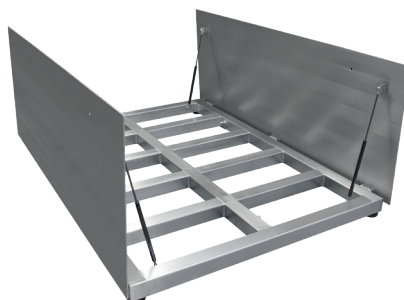
resolution	3000 d	verified scales
	up to 30000 d	non-verified scales
ingress protection	4.C6–4.C11	IP65
	4P.C, 4P2.C– 4P2.C2	
	4.H6–4.H10, 4.H6/Z–4.H10/Z 4N.H1–4N.H4 4P.H, 4P2.H–4P2.H2	IP68
material	4.C6–4.C11 4P.C, 4P2.C– 4P2.C2	St3S
	4.H6–4.H10, 4.H6/Z–4.H10/Z 4N/H1–4N/H4 4P/H, 4P2/H–4P2/H2	AISI304
load cell	4.C6–4.C11, 4P.C	powder coated steel IP67
	4P2.C– 4P2.C2	stainless steel IP67
	4.H6–4.H10, 4.H6/Z–4.H10/Z 4N.H1–4N.H4 4P.H, 4P2.H–4P2.H2	stainless steel IP68



Platform C6



Platform 4N.H



Platform 4.H/Z



Platform 4P.H

# EX Zones

## classification, description, characteristics

Zone endangered with explosion risk is a hazardous area where gases, vapours and mists or dusts are mixed with air causing potentially explosive atmosphere. In accordance with 1999/92/EC directive, these zones are classified with regard to frequency of explosive atmosphere occurrence and its duration:

Explosive atmosphere caused by mixture of air and:	Hazardous area	Characteristics
gas, liquid and vapours (zone G)	Zone 0	constant explosion risk lasting for a long period of time
	Zone 1	occasional explosion risk
	Zone 2	no explosion risk during regular work, shall any occur it lasts for a short period of time
flammable dust (zone D)	Zone 20	constant explosion risk lasting for a long period of time
	Zone 21	occasional explosion risk
	Zone 22	no explosion risk during regular work, shall any occur it lasts for a short period of time

Wherever there is a risk of fire or explosion, it is necessary to use safe, respective for a particular zone, devices. The devices must allow operation in potentially hazardous environment. They must eliminate risk of fire or explosion due to electric arch, spark or high temperature.

HX5.EX series scales intended for operation in hazardous areas meet the highest safety standards. Their mechanical design prevents initiation of explosive mixtures ignition.

**General classification of devices designed to be used within hazardous area where the devices have been classified with regard to the intended use and required safety level:**

Group I	protective systems and devices intended to be used in mines, where there is methane hazard or risk of coal dust explosion
Group II	protective systems and devices intended to be used in other than mines places where there is risk of explosive atmospheres occurrence

**Devices of each group are divided into categories. When speaking of group II, the categories are:**

Category 1	devices guaranteeing very high safety level, even in case of sporadic device breakdowns, with the following safety measures taken: <ol style="list-style-type: none"> <li>if one of the safety measures fails, the required safety level is ensured by a second independent safety solution</li> <li>required safety level is ensured in case two independent breakdowns occur</li> </ol>
Category 2	devices guaranteeing high safety level with such safety measures taken that protection is ensured even in case of frequent breakdowns
Category 3	devices ensuring standard safety level with such safety measures taken that guarantee protection in the course of typical operation





# EX Zones classification and marking

The device intended to be operated within an area where there is risk of explosion, features CE mark and symbols classifying the device for a particular area, group and category. For explanation of EX marking symbols see the table below.

Hazardous areas classification and marking				
Flammable material	Explosion probability	Hazardous areas classification	Products classification	
			Group	Category
Gases, vapours, mists	Continuously or frequently	Zone 0	II	1G
	Occasionally	Zone 1	II	2G
	Rarely or for a short period only	Zone 2	II	3G
Dusts	Continuously or frequently	Zone 20	II	1D
	Occasionally	Zone 21	II	2D
	Rarely or for a short period only	Zone 22	II	3D

Area classification with regard to gases, vapours and mists							
Explosion group	Examples (depending on explosion group and temperature class)						
IIA	IIB	IIC	Hydrogen	Acetylene			Carbon disulfide
			Acrylate	Ethylene oxide	Ethylene glycol Hydrogen sulfide	Diethyl ether	
			Nitrile Town gas				
			Ammonia	Butane Ethanol	Petrol Diesel oil Hexane	Acetaldehyde	
			Propane				
			Ethane				

Temperature class	
T1 < 450 °C	
T2 < 300 °C	
T3 < 200 °C	
T4 < 135 °C	
T5 < 100 °C	
T6 < 85 °C	

Protection level (gases)		
Ga	Zone 0, 1, 2	
Gb	Zone 1, 2	
Gc	Zone 2	



**II 2G Ex ib IIC T4 Gb**  
**II 2D Ex ib IIIC T60°C Db**

Flame-proof enclosures preventing the explosion from spreading outside the enclosure	1, 2	EN 60079-1	Ex db
Increased safety preventing high temperature and ignition sparks	1, 2	EN 60079-7	Ex eb
Intrinsic safety low voltage /current	0, 1, 2, 20, 21, 22	EN 60079-11	Ex ia
Intrinsic safety low voltage /current	1, 2, 21, 22	EN 60079-11	Ex ib
Encapsulation sealing	1, 2, 21, 22	EN 60079-18	Ex mb
Hermetic housing preventing dust explosion	21, 22	EN 60079-31	Ex tb
Exemplary protection types	Zone	Standard	Code

	Da	Zone 20, 21, 22	Protection level (dusts)
	Db	Zone 21, 22	
	Dc	Zone 22	
	Maximum surface temperature in area endangered with dust explosion		Surface temperature
Explosion group	IIIA	Volatile fuels	
	IIIB	Non-conductive dust	
	IIIC	Conductive dust	
Explosion group		Examples (depending on explosion group)	

Classification and marking of protection type

Hazardous areas classification due to dusts







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