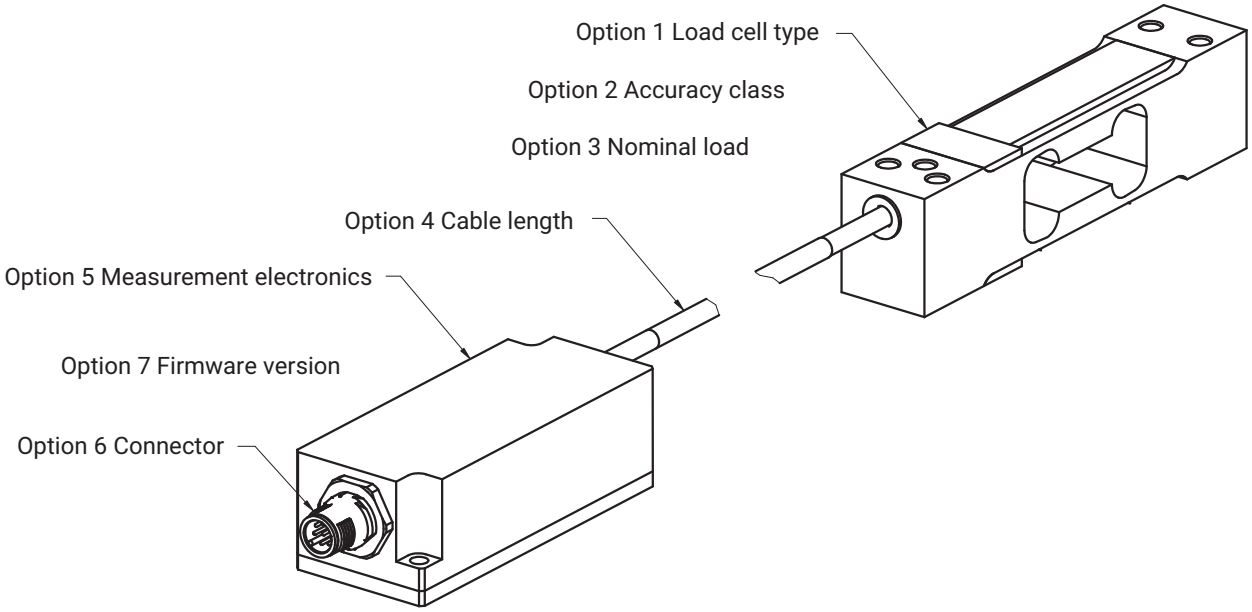
DATA SHEET

LCMC
Load Cell Measuring Chain

SPECIAL FEATURES

- The load cell measurement chain (LCMC) is the combination of your chosen HBK load cell and an electronic unit.
- The LCMC involves selecting one of 14 available HBK load cells that suits your requirements, combined with a common electronic unit. While the electronic unit is nearly the same across all 14 load cells, it provides seven distinct output options, including IO-Link compatibility.
- With a potential for 11,000 unique configurations, this standardized solution not only offers superior performance and cost-effectiveness but also ensures a precise match for your needs.
- The IO-Link interface brings several advantages, such as smart functions (pre-preprocessing of data, self-monitoring, and warnings), bidirectional sensor communication, and easy installation.

THE LCMC OPTIONS



LOAD CELLS

Type	Description	URL
PW2C	Weighs with Extremely High Precision	https://www.hbm.com/en/3023/pw2c-highly-precise-single-point-load-cell-for-static-applications
PW2D	Weighs a Maximum Load of 72 kg with High Speed	https://www.hbm.com/en/3025/pw2d-single-point-load-cell-ideal-for-fast-weighing-tasks
PW4M-OP	Single Point Load Cells for Precise Weighing of Masses from 300 g to 5 kg with over-load protection	https://www.hbm.com/en/3026/pw4m-high-precision-miniature-load-cell
PW6C	Weighing of Static Loads of up to 40 kg	https://www.hbm.com/en/3027/pw6c-single-point-load-cell-for-static-applications
PW6D	Load Cell for Extremely Fast Weighing Processes	https://www.hbm.com/en/3028/pw6d-single-point-load-cell/
PW10A	Weighing Heavy Loads with Class C3MR Precision	https://www.hbm.com/en/3016/pw10a-the-compact-single-point-load-cell-for-heavy-loads
PW12C	Weighing Precisely with Large Platforms	https://www.hbm.com/en/3017/pw12c-precise-single-point-load-cell-for-large-platforms/
PW15AH	Enormously robust, hermetically encapsulated, has the highest possible degree of protection IP68 / IP69K	https://www.hbm.com/en/3010/pw15b-robust-stainless-steel-single-point-load-cell
PW15B	Made of stainless steel and can therefore be used in a wide range of ambient conditions	https://www.hbm.com/en/3010/pw15b-robust-stainless-steel-single-point-load-cell
PW16A	The Single-Point Load Cell for Applications With High Cycle Rates	https://www.hbm.com/en/3018/pw16a-single-point-load-cell-wide-range-of-applications
PW22	Extremely Fast Weighing with Accuracy Class C3	https://www.hbm.com/en/3020/pw22-high-speed-single-point-load-cell-for-dynamic-weighing
SP4M	Made of aluminum and a very large nominal load range weighs particularly precisely and with enormous Y value	https://www.hbm.com/en/3010/pw15b-robust-stainless-steel-single-point-load-cell
SP8	A Compact and Cost-Effective Solution for Multi-Head Combination Weighers	https://www.hbm.com/en/7802/sp8-load-cell-for-multi-head-combination-weighers
Z6	The Market Standard for Precision and Robustness in the Weighing Range from 5 kg to 1 t	https://www.hbm.com/en/2701/z6-beam-load-cell/

AMPLIFIER

The technical data of the measuring chain is in accordance to the technical data of the connected load cell, if not specified in the table bellow.

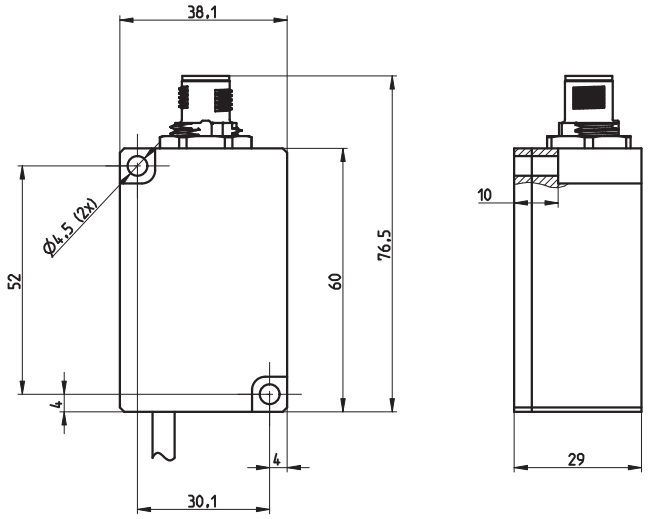
Option	Interface (electronics)	Characteristics
RMIO	IO-Link	Digital sensor electronics with one digital input/output, 2000 measured values/s
105R/C	RS485/CAN	Digital sensor electronics with one digital input and one digital output, 200 measured values/s
112R/C	RS485/CAN	Digital sensor electronics with two digital input/outputs, 1,200 measured values/s
RM42	4 … 20 mA	Analog electronics with current output
RM43	0 … 10 V	Analog electronics with voltage output

Amplifier box is IP67 protected.

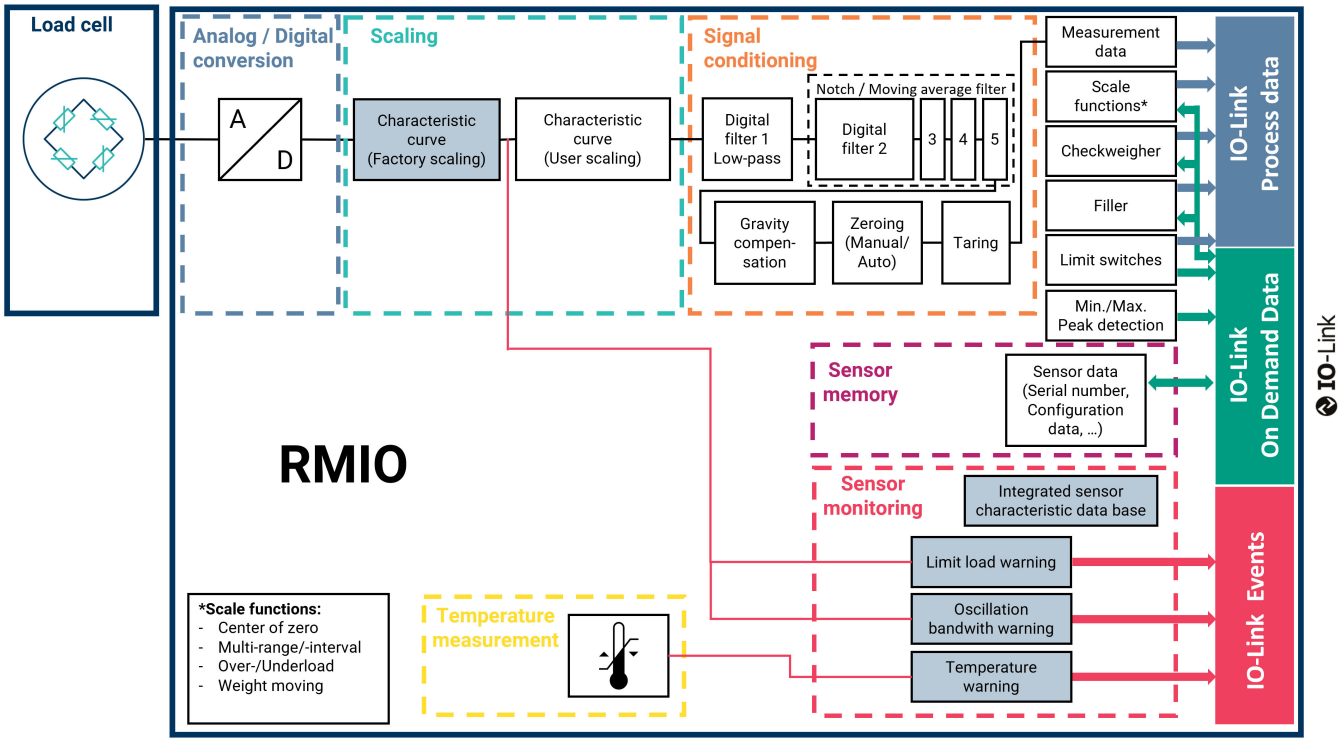
Ordering code for the LCMC is stored in the load cell's data sheet.

Special features

- High accuracy and signal resolution based on fast 24 bit A/D converter (2 kHz sample rate)
- Optimized precision-adjustable filters for dynamic production and weighing applications



Function diagram



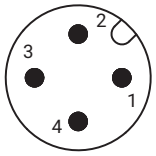
SPECIFICATIONS

Accuracy		
Accuracy class		0.01
Effect of temperature on amplification	%/10K	0.01
Effect of temperature on zero point	%/10K	0.01
Rated electrical output		
Sensitivity (with max. (rated) capacity)	kg	E_{max} of load cell in kg
Output signal; interface		COM3, to IO-Link standard, class A
Min. cycle time (max. output rate)	ms	1.0
Sample rate (internal)	Hz	2000
Cut-off frequency (-3 dB)	kHz	2
Reference supply voltage	V	24
Supply voltage range	V	19 - 30
Max. power consumption	mW	3200
Filter		
Digital filters, up to 5 cascadable	Hz	IIR low pass: 0.1 … 30 FIR low pass: 3 … 30 Moving average: 1 … 100 Comb filter: 1 … 100
Device functions		
Weighing functions		Checkweigher with pre- and post-trigger, trigger either levelcontrolled or via external photoelectric sensor; Filling with coarse and fineflow control as well as automatic optimization of target weight
Limit value switches		2 limit value switches. Invertible, freely adjustable hysteresis. Output via process data or digital output
Digital IO		According to IO-Link Smart Sensor Profile, 1 permanently available digital input/output,
Peak value memory		Yes
Peak-to-peak memory		Yes
Warning functions		Warning on exceeding limit load; nominal (rated) temperature
Temperature		
Nominal temperature range	°C	-10 … +50
Operating temperature range	°C	-10 … +60
Storage temperature range	°C	-25… +85
Reference temperature	°C	23
Maximum impact load to IEC 60068-2-6		
Number		1000
Duration	ms	3

Connector pinning

Pin	Assignment
1	Supply voltage +
2	Digital output (DI/DO pin function)
3	Supply voltage/reference potential
4	IO-Link data (C/Q)

Class A

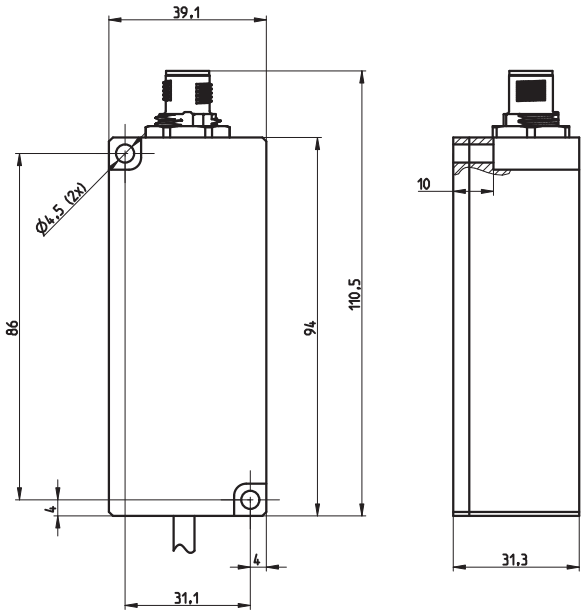


Connector plug M12,
A coded

OPTION 105C (CAN) OR 105R (RS485)

Special features

- Protective housing for amplifier electronic with M12 connector
- Digital filtering and scaling of the measurement signal
- Limit value output with hysteresis
- Power fail safe parameter storage
- Freely configurable I/O
- Intuitive and user-friendly PanelX software for parameter setup, configuration, measurement and analysis, including extensive online documentation



SPECIFICATIONS

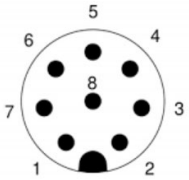
Type		
Maximum number of load cell verification intervals with an accuracy of ≥ 0.5 µV/d	d	3,000
Sensitivity (with max. (rated) capacity)	d	1,000,000
Rated electrical output		
Measurement signal resolution	bit	24
Sample rate (adjustable)	Hz	200 ; 100 ; 50 ; 25 ; 12 ; 6 ; 3 ; 2 ; 1
Cut-off frequency of digital filter, adjustable ; at -3dB	Hz	20 ... 0.01
Supply voltage	V	+7 ... +30, nominal 24 V
Supply current	mA	≤70
Interface CAN		
CAN interface		CANopen, CiA DS301
Max. number of bus nodes		90
Baud rate	kBit/s	10 ... 1,000
Maximum cable length	m	≤5,000 (10 kBaud) ... ≤100 (500 kBaud) ... ≤25 (1 MBaud)
Interface RS485		
RS485 interface		2-wire (half duplex)
Max. number of bus nodes		90
Baud rate	kBit/s	1.2/2.4/4.8/9.6/19.2/38.4/57.6/115.2
Maximum cable length	m	50
Digital input		
Number		1 signal
Functions		Tare, Trigger, Stop Filler, Start Filler, Sync Follower
Input signal range (PLC level) [1)]	V	0 ... 30
Maximum permitted input signal range	V	30
Low input status	V	0 ... 6
High input status	V	10 ... 30

Input signal range (HCMOS level) Low level High level	V V V	0 ... +12 <1 >4
Input resistance (nominal)	kΩ	8.4
Digital output		
Number		1
Type		Open collector output (OC)
Functions		Limit value switch, Filler alarms, Filler valve control, Sync Leader
Switching time	ms	6
Input voltage (24 V nominal) U_{IN}	V	6 ... 30
Output switching current, max.	mA	60
Voltage level, minimum	V	3
Cable length, max.	m	100

1) Factory setting

Connector pinning

Pin	Color	105R	105C
1	White	Supply voltage 0 V (GND)	
2	Brown	Digital IN	Digital IN
3	Green	TA/RA	CAN high IN
4	Yellow	Digital OUT	Digital OUT
5	Grey	TB/RB	CAN low IN
6	Pink	-	CAN low OUT
7	Blue	-	CAN high OUT
8	Red	Power supply +7 ... +30 V	



Connector plug M12, A coded

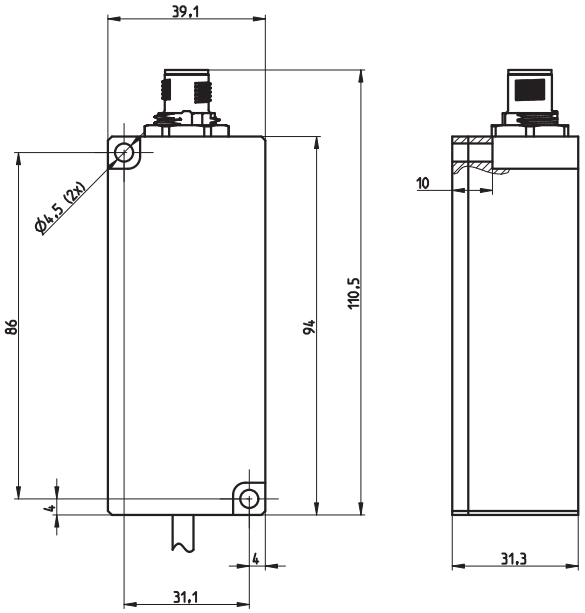
Cable accessories

- 1-KAB192-3 (M12 Connection cable 8-pin, 3 m), available from September 2024
- 1-KAB192-6 (M12 Connection cable 8-pin, 6 m), available from September 2024

OPTION 112C (CAN) OR 112R (RS485)

Special features

- Protective housing for amplifier electronic with M12 connector
- Digital filtering and scaling of the measurement signal
- Power fail safe storage of all parameters
- 2 freely programmable digital I/Os, e.g. for filling or monitoring applications
- Digital interfaces CANopen or RS485
- The intuitive and user-friendly software PanelX is available free of charge for configuration, measurement and analysis



SPECIFICATIONS

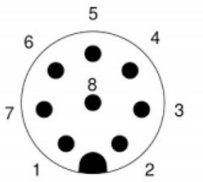
Type		
Maximum number of load cell verification intervals	d = e	3,000
Rated electrical output		
Transducer excitation voltage (carrier frequency 1.2 kHz)	V_{AC}	5 (square-wave)
Power supply Supply voltage U_B (DC) Power consumption (transducer and switching outputs) Max. current	 V W A	 +12…+30, nominal 24 V ≤3 1.1
Digital signal conditioning		
Measurement signal resolution	bit	24
Sample rate (adjustable)	1/s	4 … 1200
Cut-off frequency of digital filter, adjustable; at -3 dB	Hz	0.1 … 120
Tare range (subtractive)	% of meas. range	±100
Zeroing range	% of meas. range	±2
Interfaces		
Max. number of bus nodes		90
CANopen interface Bit rate Maximum cable length	 kBit/s m	Standard CiA DS301 10 … 1,000 ≤5000 (10 kbit/s) … ≤100 (500 kbit/s) … ≤25 (1 Mbit/s)
RS-485 interface Bit rate Maximum cable length	 kBit/s m	 1.2/2.4/4.8/9.6/19.2/38.4/57.6/115.2 50

Digital HCMOS input [2]		
Permissible input voltage	V	0 … +12
Low level	V	< 1
High level	V	> 4
Input resistance	kΩ	9
Digital PLC input [2]		
Permissible input voltage	V	0 … +30
Low level	V	< 6
High level	V	> 10
Input resistance	kΩ	9
Control outputs [2]		
External supply voltage	V	12 … +30
Max. current per output	A	< 0.5
General information		
Nominal (rated) temperature range	°C	-10 … +40
Operating temperature range		-10 … +50
Storage temperature range		-25 … +75
Permissible relative humidity	%	5 … 95 (non-condensing)

[2] The electronics have 2 digital I/Os that can each be connected as a control input or an output, as required. Additional information can be found in the operating manual and in the command documentation. Level switchable to HCMOS or PLC input.

Connector pinning

Pin	Color	112R	112C
1	White	Supply voltage 0 V (GND)	
2	Brown	Digital IO1	Digital IO1
3	Green	RA (Rx-)	CAN high IN
4	Yellow	Digital IO2	Digital IO2
5	Grey	RB (Rx+)	CAN low IN
6	Pink	TA (Tx-)	CAN low OUT
7	Blue	TB (Tx+)	CAN high OUT
8	Red	Power supply +12 … +30 V	



Connector plug M12, A coded

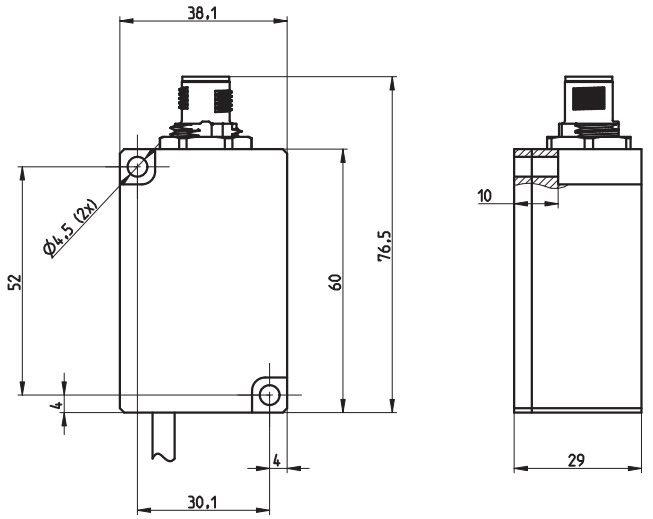
Cable accessories

- 1-KAB192-3 (M12 Connection cable 8-pin, 3 m)
- 1-KAB192-6 (M12 Connection cable 8-pin, 6 m)

OPTION RM42 (4...20 mA) OR RM43 (0...10 V)

Special features

- Available with 4 to 20mA output or 0 to 10V output
- Zero setting function
- Teach in with 25%, 50% or 100% load
- Reset to factory settings

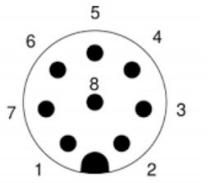


SPECIFICATIONS

Type			RM43	RM42
Nominal (rated) measuring range	E_{nom}		100%	100%
Accuracy				
Non-linearity	d_{lin}	%	0.5	0.5
Temperature coefficient of zero signal	TC_0	%/10 K	0.5	0.5
Temperature coefficient of sensitivity signal	TC_S	%/10 K	0.5	0.5
Characteristic electrical quantities				
Zero signal (signal at zero signal)			0 V	4mA
End signal (signal at end point)			10 V	20mA
Output signal spread			10 V	16mA
Output signal range			-0.3...11V	3...21 mA
External load resistance		Ohm	>10k	<500
Cut-off frequency (-1 dB)		Hz	1000	1000
Maximum current consumption (without loop current)		mA	20	20
Nominal (rated) range of the excitation voltage	$B_{U, G}$	V	19...30	19...30
Reference excitation voltage	U_{ref}	V	24	24
Control inputs IN1/IN2 l level		V	Active (high) > 10V Inactive (low) < 4 V	Active (high) > 10V Inactive (low) < 4 V
Connection			See pin assignment	See pin assignment
Ambient conditions (amplifier box)				
Nominal (rated) temperature range	$B_{T, nom}$	°C	-10...50	-10...50
Operating temperature range	$B_{T, G}$	°C	-20...60	-20...60
Storage temperature range	$B_{T, S}$	°C	-30...85	-30...85

Connector pinning

Pin	Color	RM43 (voltage output)	RM42 (current output)
1	White	Supply voltage 0 V (GND)	
2	Brown	Calibration control input	
3	Green	Zero control input	
4	Yellow	Not in use	
5	Grey	Output signal 0 ... 10 V	Output signal 4 ... 20 mA
6	Pink	Output signal 0	Not in use
7	Blue	Not in use	
8	Red	Voltage supply +10 ... +30 V	



Connector plug M12, A coded

Cable

- 1-KAB168-5 Connection cable, M12, 5 m, free ends
- 1-KAB168-20 Connection cable, M12, 20 m, free ends

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