DATA SHEET

HLCi
Load cell with integrated electronics

SPECIAL FEATURES

- Interfaces
  - RS-485
  - CANopen
  - IO-Link
  - Current output (4 ... 20 mA)
  - Voltage output (0 ... 10 V)
- Hermetically encapsulated (IP68, IP69K)
- Maximum capacities: 110 kg … 4.4 t
- Stainless materials
- Low height of construction
- Legal for trade as per OIML R60 to 3000 divisions
- 2 digital I/Os for setting as either input or output (RS485, CANopen)
- Filters with short settling times and scaling of the measurement signal



MEASURING AMPLIFIERS

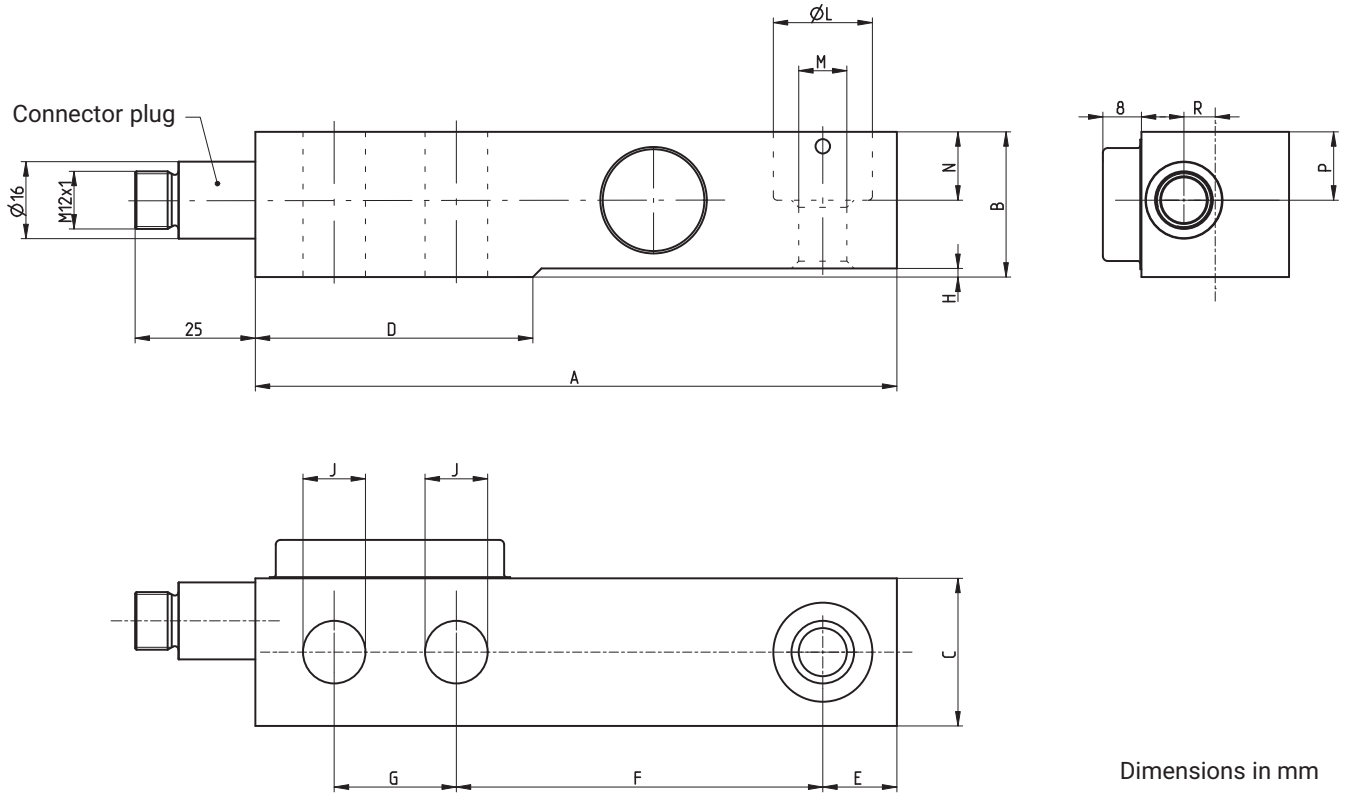
The technical data of the measuring chain is in accordance to the technical data of the connected load cell, if not specified in the table bellow.

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
RM42	4 … 20 mA	Analog electronics with current output
RM43	0 … 10 V	Analog electronics with voltage output

Amplifier box is IP67 protected.

DIMENSIONS

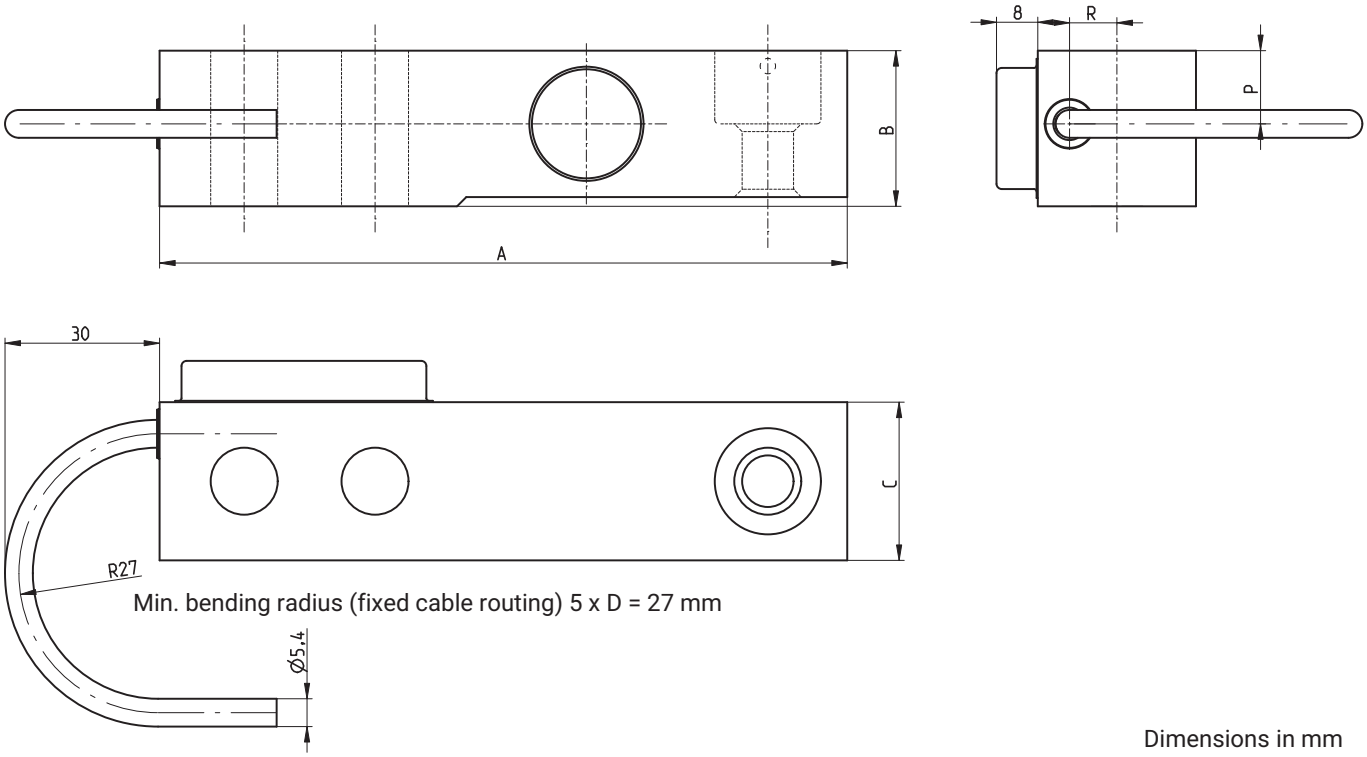
Version with male connector



Dimensions in mm

Maximum capacity (E_{max})	A	B	C	D	E	F	G	H	J	ØL	M	N	P	R
110 kg; 220 kg; 550 kg; 1.1 t	133.4	30.2	30.7	51.7	15.4	76.2	25.4	1.7	13	20.6	M12	14.2	14.2	6.5
1.76 t	133.4	30.2	30.7	51.7	15.4	76.2	25.4	1.7	13	20.6	M12	14.2	14.2	6.5
2.2 t	171.5	36.5	36.8	76.2	19.1	95.3	38.1	2.5	20.5	30.2	M20	17.0	17	9.7
4.4 t	171.5	42.9	42.9	76.2	19.1	95.3	38.1	2.5	20.5	30.2	M20	20.1	20.2	12.7

Version with fitted cable RM42 (current output), RM43 (voltage output)



Min. bending radius (fixed cable routing) 5 x D = 27 mm

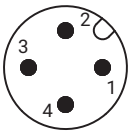
Dimensions in mm

Maximum capacity (E_{max})	A	B	C	P	R
110 kg; 220 kg; 550 kg; 1.1 t	133.4	30.2	30.7	14.2	6.5
1.76 t	133.4	30.2	30.7	14.2	6.5
2.2 t	171.5	36.5	36.8	17	9.7
4.4 t	171.5	42.9	42.9	20.2	12.7

PIN ASSIGNMENT RMIO (IO-LINK)

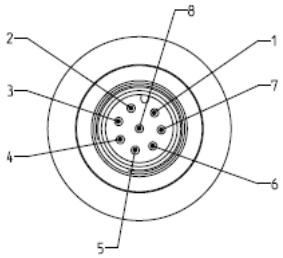
Pin	Assignment
1	Supply voltage +
2	Digital output (DI/DO pin function)
3	Supply voltage -, reference potential
4	IO-Link data (C/Q)

Class A



Connector plug M12
male connector,
4-pin, A-coded

PIN ASSIGNMENT RM42 (CURRENT OUTPUT), RM43 (VOLTAGE OUTPUT)



M12 male connector, 8-pin

Pin	Version AD105D RS485	Version AD105D CAN	Version RM42 (current output)	Version RM43 (voltage output)	KAB159, KAB192 connection cable wire assignment
1	Supply voltage 0 V (GND)				White
2	Digital IN	Digital IN	Calibration control input		Brown
3	TA/RA	CAN-HIGH IN	Zeroing control input		Green
4	Digital OUT	Digital OUT	Vacant		Yellow
5	TB/RB	CAN-LOW IN	OUT 4 ... 20 mA	OUT 0 ... 10 V	Gray
6	frei	CAN-LOW OUT	Vacant	OUT GND	Pink
7	frei	CAN-HIGH OUT	Vacant		Blue
8	Supply voltage				Red

CABLE ASSIGNMENT 6-PIN RM42 (CURRENT OUTPUT), RM43 (VOLTAGE OUTPUT)

Cable wire assignment with fixed cable	Version AD105 RS485	Version RM42 (current output)	Version RM43 (voltage output)
White	Supply voltage 0 V (GND)		
Black	TB/RB	Calibration control input	
Green	Digital OUT	Zeroing control input	
Gray	Digital IN	OUT 4...20 mA	OUT 0-10 V
Blue	TA/RA	Vacant	OUT GND
Red	Supply voltage		

RMIO SPECIFICATIONS RMIO (IO-LINK)

Type			HLCi
Module type			**RMIO (IO-Link)**
Maximum capacity	E_{max}		110 kg; 220 kg; 550 kg; 1.1 t; 1.76 t; 2.2 t; 4.4 t
Accuracy			0.03
Temperature coefficient of zero signal	TC_0	% of Cn/10K	±0.0140
Temperature coefficient of sensitivity	TC_S		±0.0140
Relative reversibility error	d_{hy}	% of Cn	±0.0300
Non-linearity	d_{lin}		±0.0300
Creep upon loading over 30 min.	d_{cr}		±0.0300
Minimum dead load output return	MDLOR		±0.0300
Rated electrical output			
Rated output (nominal)	C_n	d	1000000
Sensitivity tolerance		%	±0.1

Type			HLCi
Module type			**RMIO (IO-Link)**
Zero signal		d	0 ± 10,000
Output signal; interface			COM3, to IO-Link standard, class A
Min. cycle (max. output rate)		ms	0.9
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		W	1
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			Filling and batching for filling or emptying, with coarse and fine flow control as well as automatic optimization of target weight
Limit value switches			2 limit value switches. Reversible, freely adjustable hysteresis. Output via process data or digital output
Digital input/output			According to IO-Link Smart Sensor Profile, 1 permanently available digital input/output, 1 output can be set to data output, then no measurement is possible
Function for "lagging" display			Yes
Peak value memory			Yes
Storage rate peak-to-peak			Yes
Warning functions			Warning on exceeding of limit load, nominal temperature
Temperature			
Nominal (rated) range of the ambient temperature	B_T	°C	-10 … +40
Operating temperature range	B_{tu}		-10 … +60
Storage temperature range	B_{tl}		-25 … +85
Characteristic mechanical quantities			
Limit load	E_L	% of E_{max}	150 (for 1.76 t: 171% of E_{max})
Lateral loading limit	E_{lq}		100
Breaking load	E_d		300
Relative permissible oscillation stress (oscillation width (peak-to-peak) as per DIN 50 100)	F_{srel}		70 (for 1.76 t: 600 kg up to 2 t)
Rated displacement at E_{max}, approx.	s_{nom}	mm	0.5 (1.76 t = 1.4 mm)
General information			
Weight, approx.	G	kg	0.9 (110 kg - 1.76 t); 1.6 (2.2 t); 2.2 (4.4 t)
Degree of protection as per EN 60529 (IEC 60529)			IP68 (test conditions 1 m water column /100 h) IP69 K (water at high pressure, steam cleaning)
Measuring body material			Stainless steel, hermetically welded
Male connector			M12, 4-pin, A-coded, male
Max. cable lengths		m	20

SPECIFICATIONS 105R (RS485), 105C (CANOPEN)

Type			HLCi	
Module type			**RM43 (voltage output)**	**RM42 (current output)**
Maximum capacity	E_{max}		110 kg; 220 kg; 550 kg; 1.1 t; 1.76 t; 2.2 t; 4.4 t	
Accuracy			0.05	
Temperature coefficient of zero signal	TC_0	% of Cn/10K	±0.1	
Temperature coefficient of sensitivity	TC_S		±0.1	
Relative reversibility error	d_{hy}	% of Cn	±0.0500	
Non-linearity	d_{lin}		±0.0500	
Creep upon loading over 30 min.	d_{cr}		±0.0500	
Minimum dead load output return	MDLOR		±0.0500	
Rated electrical output				
Rated output (nominal)	C_n		10 V	16 mA
Sensitivity tolerance		%	±0.1	
Output signal			0 … 10 V	4 … 20 mA
Zero signal			0 V ± 0.1 V	4 mA ± 0.16 mA
Output signal range			-0.3 … 11 V	3 … 21 mA
Cut-off frequency (-3 dB)		kHz	1000	
Supply voltage		V	19 … 30	
Nominal (rated) supply voltage		V	24	
Max. power consumption		W	1	
Temperature				
Nominal (rated) range of the ambient temperature	B_T	°C	-10 … +40	
Operating temperature range	B_{tu}		-20 … +60	
Storage temperature range	B_{tl}		-25 … +85	
Characteristic mechanical quantities				
Limit load	E_L	% of E_{max}	150 (for 1.76 t: 171% of E_{max})	
Lateral loading limit	E_{lq}		100	
Breaking load	E_d		300	
Relative permissible oscillation stress (oscillation width (peak-to-peak) as per DIN 50 100)	F_{srel}		70 (for 1.76 t: 600 kg up to 2 t)	
Rated displacement at E_{max}, approx.	s_{nom}	mm	0.5 (1.76 t = 1.4 mm)	
General information				
Weight, approx.	G	kg	0.9 (110 kg ... 1.76 t); 1.6 (2.2 t); 2.2 (4.4 t)	
Degree of protection as per EN 60529 (IEC 60529)			IP 68 (test conditions 1 m water column /100 h) IP 69K (water at high pressure, steam cleaning)	
Measuring body material			Stainless steel, hermetically welded	
Available cable lengths **Male connector**		m	3 m PVC gray M12, 8-pin, A-coded, male	
Max. cable lengths		m	30	

ACCESSORIES

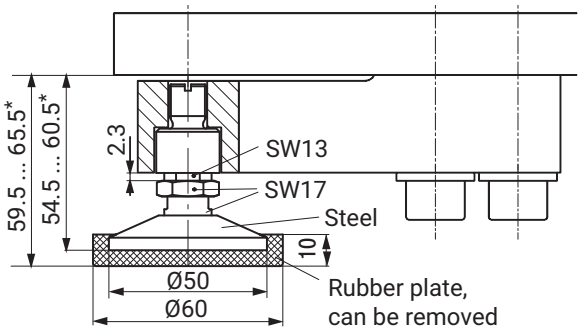
To minimize error effects from load application, HBM offers different tried and tested load application elements for this type of load cell, according to the mounting conditions:

- **HLCB/ZFP/...T** Oscillating loading foot
- **HLCB/PCX/1.76T** Oscillating loading foot (height adjustable)
- **HLCB/...T/ZEL** Elastomer bearing
- **HLCB/ZDP/...T** Elastomer bearing ***Easy Top***
- **HLC/ZPU/...T** Mounting base / mounting kit

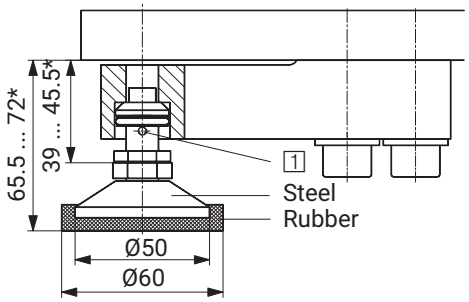
Connection cable for current and voltage output RM42 (current output) and RM43 (voltage output)	Ordering number
Connection cable with M12 F male connector, 8-pin, IP67, PUR cable sheath, 5 m long	1-KAB168-5
Connection cable with M12 F male connector, 8-pin, IP67, PUR cable sheath, 20 m long	1-KAB168-20
Connection cable with M12 F male connector, 8-pin, IP67, PUR cable sheath, 3 m long, 120 Ω characteristic impedance	1-KAB192-3
Connection cable with M12 F male connector, 8-pin, IP67, PUR cable sheath, 6 m long, 120 Ω characteristic impedance	1-KAB192-6

ACCESSORIES FOR HLC **B** ... (TO BE ORDERED SEPARATELY; DIMENSIONS IN MM)

HLCB/PCX/1.76 t - Oscillating loading foot (stainless steel) for HLC **B** / 110 kg ... 1.76 t, suitable up to accuracy class C6:



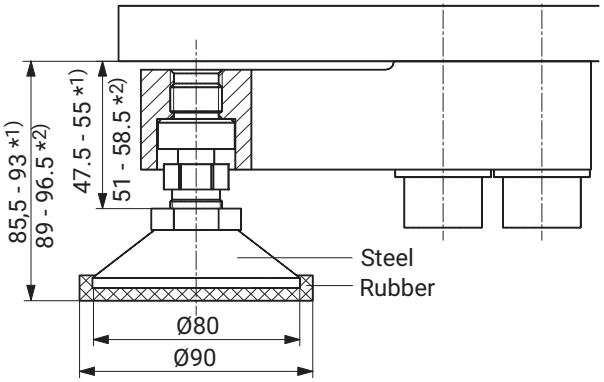
HLCB/ZFP/1.76 T - Oscillating loading foot (stainless steel) for HLC **B** / 110 kg ... 1.76 t:



1 Loading foot secured in load cell with supplied bracket

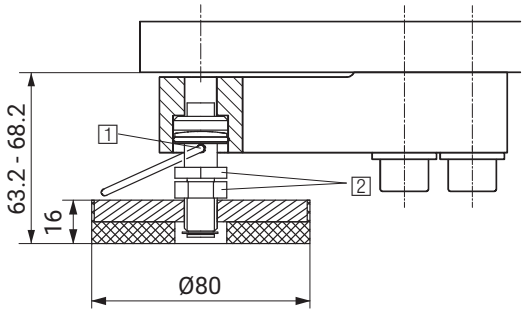
* Height adjustment

HLCB/ZFP/4.4 T - Oscillating loading foot (stainless steel) for HLC **B** / 2.2 t + 4,4 t:



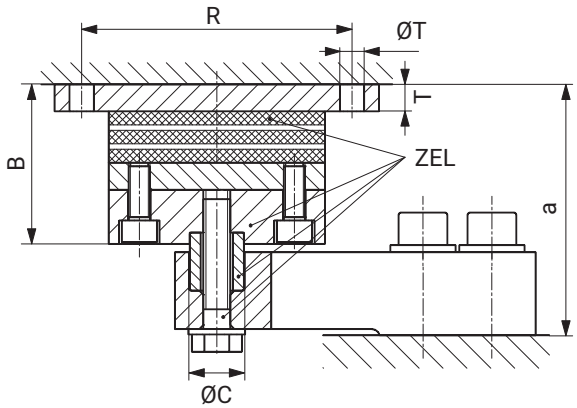
* Height adjustment,
(1) = Maximum capacity 2.2 t / 2) = Maximum capacity 4.4 t)

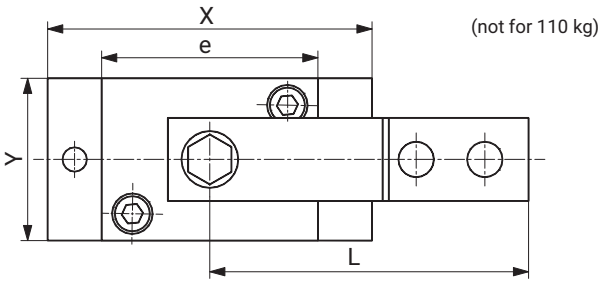
HLCB/ZAK/1.76T - Oscillating loading foot, height adjustable (stainless steel) for HLC **B** ≤ 1.76 t



1 Loading foot secured in load cell with supplied bracket
2 19 across flats

HLCB/...T/ZEL - Rubber-metal bearing (galvanized; HLCB/1.76T/ZEL**R** made of rust-resistant material) for HLC **B**

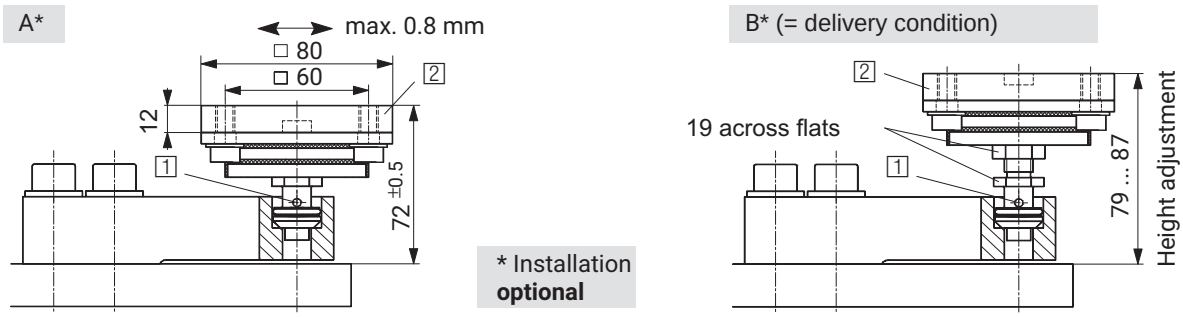




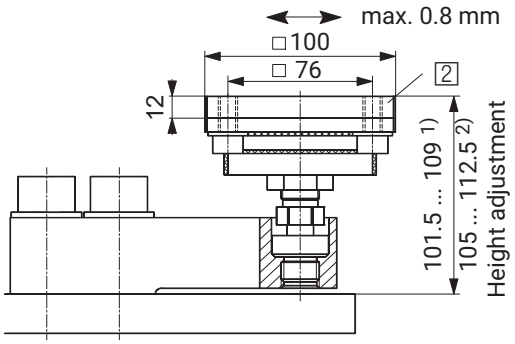
Max. allowed lateral displacement
(when loaded with maximum capacity):
HLCB/1.76T/ZEL: 4.5 mm
HLCB/4.4T/ZEL: 8 mm
HLCB/10T/ZEL: 9.5 mm

Type	Maximum capacity	B	ØC$_{-0.1}$	L	R	ØT	X	Y	T	a	e
HLCB/1.76T/ZEL **HLCB/1.76T/ZELR**	220 kg ... 1.76 t	58.8	20	118	100	9	120	60	10	92	80
HLCB/4.4T/ZEL	2.2 t	71.2	30	152.4	125	11	150	100	10	113	100
HLCB/4.4T/ZEL	4.4 t	71.2	30	152.4	125	11	150	100	10	116	100

HLCB/ZDP/1.76 T *Easy top* - Rubber-metal bearing for HLC **B** / 220 kg ... 1.76 t
(Load application: stainless steel, welding plate: galvanized)



HLCB/ZDP/4.4 T *Easy top* - Rubber-metal bearing for HLC **B** / 2.2 t + 4.4 t
(load application, stainless steel, welding plate: galvanized)



1 ***Easy top*** secured in load cell with supplied bracket

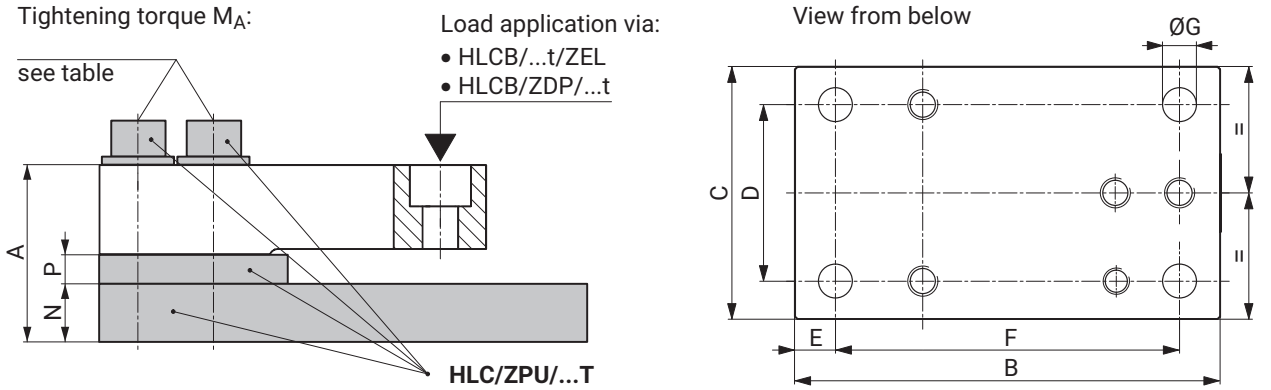
2 Welding plate (schematic top view)



ZPU/1.76T: 4x M8
ZPU/2.2T + 4.4T: 4x M10

1) Maximum capacity 2.2 t
2) Maximum capacity 4.4 t

HLC/ZPU/...T - Mounting base / mounting kit (galvanized) for HLC B



Type	Maximum capacity	Breaking load	A	B	C	D	E	F	G	N	P	M_A
HLC/ZPU/1.76T	110 kg ... 1.76 t	3.52 t	60.5	168	100	70	16	136	13.5	20	10	130 Nm
HLC/ZPU/2.2T	2.2 t	4.4 t	81.5	212	120	84	18	175	14	25	20	400 Nm
HLC/ZPU/4.4T	4.4 t	8.8 t	88	212	120	84	18	175	14	25	20	400 Nm

PRODUCT DESIGNATION (OVERVIEW)

K-HLCi			
1	**Code**	**Option 1: Mechanical design**	
	B2	HLCB2 (IP68)	
2	**Code**	**Option 2: Accuracy class**	
	C3	C3	[only with option 6 = 105R, 105C]
	3	0.03%	[only for option 6 = RMIO] (IO-Link)
	5	0.05%	[only for option 6 = RM42, RM43] (current output, voltage output)
3	**Code**	**Option 3: Maximum capacity**	
	110	110 kg	
	220	220 kg	
	550	550 kg	
	1100	1100 kg	
	1760	1760 kg	
	2200	2200 kg	
	4400	4400 kg	
4	**Code**	**Option 4: Explosion protection**	
	N	No explosion protection available	
5	**Code**	**Option 5: Cable**	
	3	3 m PVC cable	[not with option 6 = RMIO]
	M12A4	M12 A-coded, male, 4-pin	[only with option 6 = RMIO]
	M12A8	M12 A-coded, male, 8-pin	[not with option 6 = RMIO]
6	**Code**	**Option 6: Others**	
	N	None	
7	**Code**	**Option 7: Electronics**	
	105R	RS584 (200 S/s) 2-wire	
	105C	CAN (200 S/s)	
	RM42	Analog 4-20 mA	
	RM43	Analog 0-10 V	
	RMIO	IO-Link	
8	**Code**	**Option 8: Firmware version**	
	N	NA	[not with option 6 = RMIO]
	02	RMIO v1.0.7	[only with option 6 = RMIO] (IO-Link)

K-HLCi - **B** **2** - ☐☐ - ☐☐☐☐ - **N** - ☐☐☐☐☐ - **N** - ☐☐☐☐ - ☐☐

1 **2** **3** **4** **5** **6** **7** **8**

Not all codes can be combined with one another. Take note of the conditions in square brackets!

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