

Carino 09

The power and precision of a high-pressure metering with dual drives, high chemical resistance and universal application

- Nano metering pump up to 5 ml/min and 750 bar
 - Micro metering pump up to 10 ml/min and 600 bar
 - Prep.-metering pump up to 40 ml/min and 300 bar

Carino-09 high-pressure pumps are specialized, highly accurate piston pumps for the analytical and preparative applications and HPLC-technique, but also Micro- and Nano metering pumps in low and high pressure applications for laboratory, research and development and process optimization.

They are characterized by their versatile material equipment, their **dual drive technology** with two independently working metering pistons and their flexible software.

Available with **3 pump head sizes** of 1 ml / min up to 50 ml / min and 3 pressure versions of 150 up to 750 bar.

With **easy operation** via touch panel and TFT color screen, direct entry of dosing parameters, menu selection, purge and setup functions.

Application-specific materials with **stainless steel-, Hastelloy-, Titanium- and PEEK pump heads**.

With **titanium pump head and ceramic sensor** for inert applications with maximum biocompatibility.

In **1- or 2- pump head design** for pulse-free or dual metering in filling-reaction or other high-pressure processes.

With **working and auxiliary piston** used for all analytical and HPLC applications.

With **piston back flushing** to avoid solid deposits and piston wear.

Integrated pressure control with programmable pressure Pmin and Pmax.

Process- and automation capable control and flexible integration capability with **extensive connectivity options**.

Metering pumps – exactly matching your needs

- High pressure pumps for analytical and HPLC technique
- High pressure pumps for R & D in laboratory and process technology
- Dual high-pressure pumps for two independent fluids
- Dual high-pressure pumps in Master-/Slave-Control
- Pneumatic high-pressure metering pumps
- Heated and cooled metering pumps
- Mixing pumps/-chambers
- OEM designs according to customer requirement
- Nano metering pump
- Dispensers and diluters
- Degasser
- Flowmeter
- High- and low-pressure valve actuators
- Multichannel- / distribution valves
- Autosampler



Specification: High pressure pumps

Carino 09EK *Dosing pump with one pump head (with or without pressure sensor) for filling or Conti-metering in an autoclave, reactor or high-pressure process.*

1-piston design



Pump version construction	2-150	2-400	5-750	5-150	5-400	5-600	20-100	20-200	20-300
	Nano metering pump			Micro metering pump			Prep.-metering pump		
max. metering capacity (ml/min)	2,5	2,5	2,5	5	5	5	20	20	20
min. metering capacity (µl/min)*	5	5	5	10	10	10	50	50	50
min. metering capacity (µl/min)**	1	1	1	1	1	1	5	5	5
max. pressure outlet (bar)	150	400	750	150	400	600	100	200	300
stroke volume (µl)	36	36	36	72	72	72	288	288	288
stroke (mm)	9	9	9	9	9	9	9	9	9
piston diameter (mm)	2,24	2,24	2,24	3,176	3,176	3,176	6,35	6,35	6,35
min. stroke duration (10µl/min)	0,85	0,85	0,85	0,85	0,85	0,85	0,85	0,85	0,85
max. stroke duration (10µl/min)	428	428	428	428	428	428	428	428	428
max. suction lift (m)	0,3	0,3	0,3	0,3	0,3	0,3	0,5	0,5	0,5
max. viscosity (mPas)	80	80	80	100	100	100	120	120	120

Carino 09DK *Dosing pump with two independently controlled pistons in a compact, space-saving and investment-saving design for metering of 2 liquids.*

2-piston design



Pump version construction	2.2-150	2.2-400	2.2-750	5.2-150	5.2-400	5.2-600	20.2-100	20.2-200	20.2-300
	Nano metering pump			Micro metering pump			Prep.-metering pump		
max. metering capacity (ml/min)	je 2,5	je 2,5	je 2,5	je 5	je 5	je 5	je 20	je 20	je 20
min. metering capacity (µl/min)*	je 5	je 5	je 5	je 10	je 10	je 10	je 50	je 50	je 50
min. metering capacity (µl/min)**	je 1	je 1	je 1	je 1	je 1	je 1	je 5	je 5	je 5
max. pressure outlet (bar)	150	400	750	150	400	600	100	200	300
stroke volume (µl)	36	36	36	72	72	72	288	288	288
stroke (mm)	9	9	9	9	9	9	9	9	9
piston diameter (mm)	2,24	2,24	2,24	3,176	3,176	3,176	6,35	6,35	6,35
min. stroke duration (10µl/min)	0,85	0,85	0,85	0,85	0,85	0,85	0,85	0,85	0,85
max. stroke duration (10µl/min)	428	428	428	428	428	428	428	428	428
max. suction lift (m)	0,3	0,3	0,3	0,3	0,3	0,3	0,5	0,5	0,5
max. viscosity (mPas)	80	80	80	100	100	100	120	120	120

technical design for all pumps images this double page:

max. fluid temperature (°C/°F)	60°C/140°F
ambient temperature (°C/°F)	40°C/104°F
flow rate accuracy (%)	< 1% (0,5 ml/min and 12 MPa)
repeat accuracy (%)	< 0,3% (0,5 ml/min and 12 MPa)
pulsation (%)	frequency dependent, < 0,5% (0,5ml/min u. 12 MPa)
material pump head	Stainless steel, Hastelloy, titanium, PEEK
material piston	sapphire
material valves	balls -> ruby; holder -> sapphire; casing -> PEEK
pressure sensor	with and without pressure sensor
input voltage (V)	85-260 V
power consumption (W)	50
safety class	IP 30
control	RS 232, LAN, USB, analogue control 0-10 V / 4-20 mA, start/stop
max. dimensions (L x W x H) (mm)	250x260x100
weight (kg)	3 - 5

Pulse-free metering pumps

Carino 09HK-PF *Pulse-free metering pump with working- / auxiliary piston for all analytical and HPLC applications and for pulsefree dosing processes.*

**pulse-free
HPLC-pump**



Pump version	2-150	2-400	2-750	5-150	5-400	5-600	20-100	20-200	20-300
construction	Nano metering pump			Micro metering pump			Prep.-metering pump		
max. metering capacity (ml/min)	2,5	2,5	2,5	5	5	5	20	20	20
min. metering capacity (µl/min)*	5	5	5	10	10	10	50	50	50
min. metering capacity (µl/min)**	1	1	1	1	1	1	5	5	5
max. pressure outlet (bar)	150	400	750	150	400	600	100	200	300
stroke volume (µl)	36	36	36	72	72	72	288	288	288
stroke (mm)	9	9	9	9	9	9	9	9	9
piston diameter (mm)	2,24	2,24	2,24	3,176	3,176	3,176	6,35	6,35	6,35
min. stroke duration (10µl/min)	0,85	0,85	0,85	0,85	0,85	0,85	0,85	0,85	0,85
max. stroke duration (10µl/min)	428	428	428	428	428	428	428	428	428
max. suction lift (m)	0,3	0,3	0,3	0,3	0,3	0,3	0,5	0,5	0,5
max. viscosity (mPas)	80	80	80	100	100	100	120	120	120

Carino 09DK-PF *Pulse-free metering pump with 2 alternating pistons for pulse free Conti dosages in reactors or other high-pressure processes.*

**2-piston
design**



Pump version	5-150	5-400	5-750	10-150	10-400	10-600	40-100	40-200	40-300
construction	Nano metering pump			Micro metering pump			Prep.-metering pump		
max. metering capacity (ml/min)	5	5	5	10	10	10	40	40	40
min. metering capacity (µl/min)*	5	5	5	10	10	10	50	50	50
min. metering capacity (µl/min)**	1	1	1	1	1	1	5	5	5
max. pressure outlet (bar)	150	400	750	150	400	600	100	200	300
stroke volume (µl)	36	36	36	72	72	72	288	288	288
stroke (mm)	9	9	9	9	9	9	9	9	9
piston diameter (mm)	2,24	2,24	2,24	3,176	3,176	3,176	6,35	6,35	6,35
min. stroke duration (10µl/min)	0,85	0,85	0,85	0,85	0,85	0,85	0,85	0,85	0,85
max. stroke duration (10µl/min)	428	428	428	428	428	428	428	428	428
max. suction lift (m)	0,3	0,3	0,3	0,3	0,3	0,3	0,5	0,5	0,5
max. viscosity (mPas)	80	80	80	100	100	100	120	120	120

All the above rated values have been carefully determined with reference fluid. If other fluids are metered, the above values may differ minimal.

* recommended metering rate

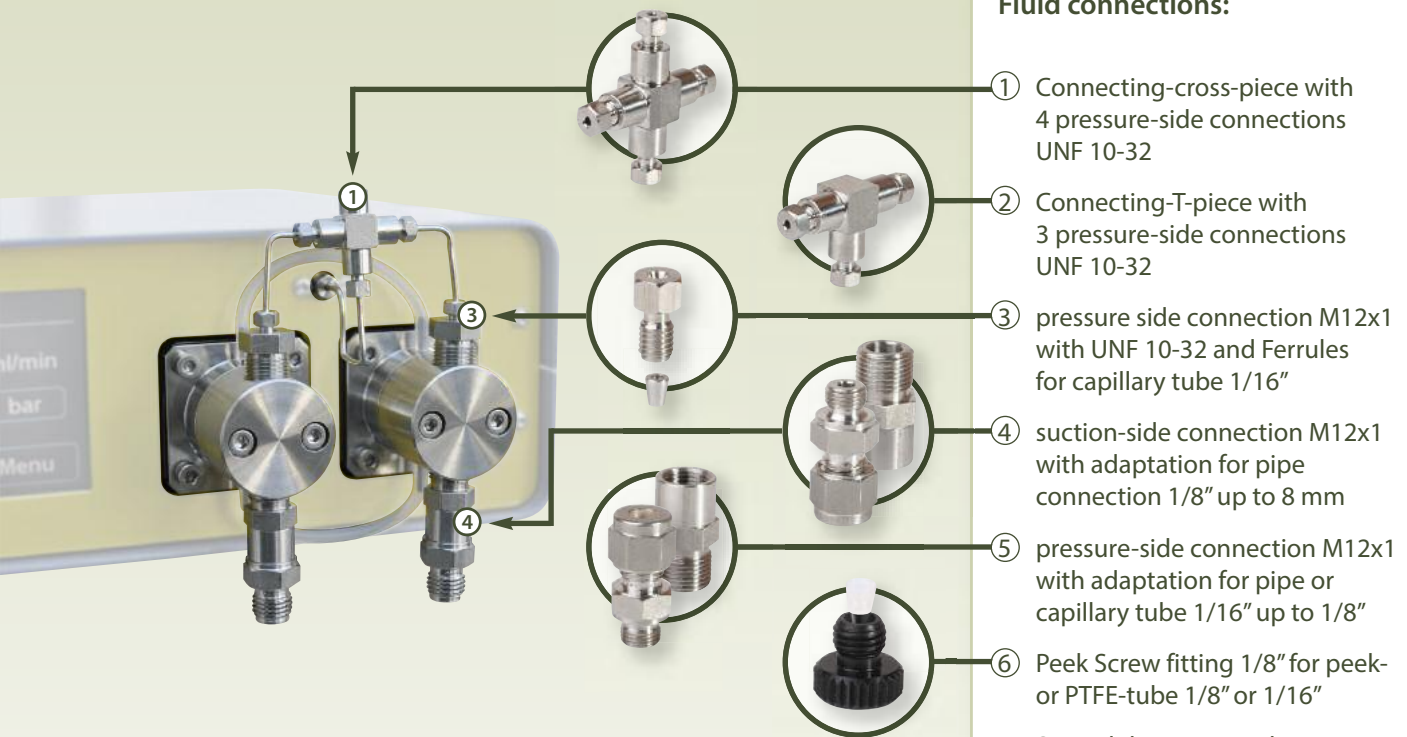
** adjustable metering rate

*** Based on methanol / water
80 / 20



**Easy operation via
touch panel**

- Easy operation via touch panel and TFT colour screen
- Direct input of dosing parameters, menu selection, purge and setup functions.



Fluid connections:

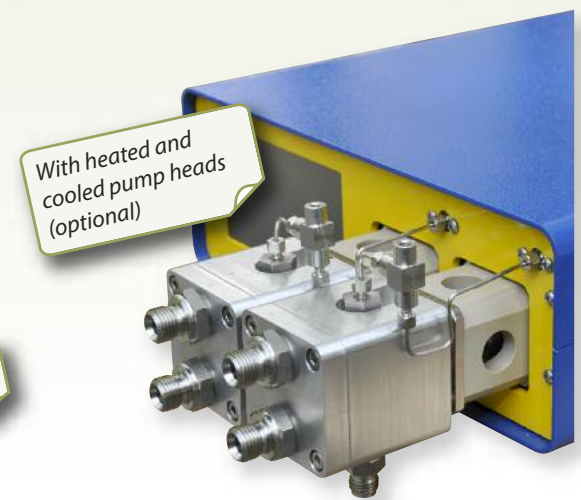
- ① Connecting-cross-piece with 4 pressure-side connections UNF 10-32
 - ② Connecting-T-piece with 3 pressure-side connections UNF 10-32
 - ③ pressure side connection M12x1 with UNF 10-32 and Ferrules for capillary tube 1/16"
 - ④ suction-side connection M12x1 with adaptation for pipe connection 1/8" up to 8 mm
 - ⑤ pressure-side connection M12x1 with adaptation for pipe or capillary tube 1/16" up to 1/8"
 - ⑥ Peek Screw fitting 1/8" for peek- or PTFE-tube 1/8" or 1/16"
- X. Special design according to customer



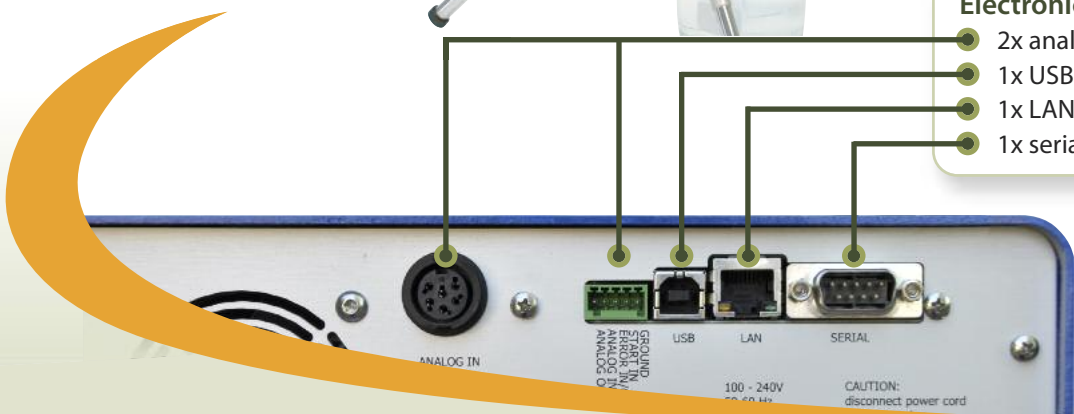
HPLC pump with open system integration capability



Flow meter C09-10vFlow



With heated and cooled pump heads (optional)



Electronic control:

- 2x analogue interface 4-20 mA
- 1x USB
- 1x LAN
- 1x serial interface RS232