



Electronic Instruments
for the Life Sciences

PDES Series

Versatile Pressure Ejection Units



Ref.: Marandi et al., (2002) Two-photon chloride imaging in neurons of brain slices. Pflugers Arch. 445:357-365
Brecht et al., (2004) Novel approaches to monitor and manipulate single neurons in vivo. J Neurosci. 24 (42):9223-9227
Garaschuk et al., (2006) Targeted bulk-loading of fluorescent indicators for two-photon brain imaging in vivo. Nat Protoc. 1(1):380-386

Pressure ejection is a convenient method for applying both ionic and non-ionic solutions from micropipettes. First, it can apply to almost all solutions. Second, the amount of the ejected solution can be monitored by viewing the tip of the micropipette under a microscope. npi PDES units are designed for pressure ejection of drugs in physiological and pharmacological studies. PDES systems can be equipped with pressure outputs ($P_{max} = 4 \text{ bar (58 psi)}$ or 2 bar (29 psi)) for drug application with micropipettes. Analog or digital timers and a remote control unit facilitate the use of these instruments. They are available with one or two application channels. One channel instruments can also be equipped with a retain channel. All PDES units can be operated with internal valves as well as with external valves to reduce the minimal application time to less than one millisecond. Each channel consists of a precision pressure regulator, pressure display, electronically controlled valves, control electronics, and a regulated power supply. Ejection of drugs can be activated manually or through a TTL input. The operational status is indicated by a red / green LED. Each system is equipped with a monitor BNC connector that reflects the opening time of the pressure valve. In digital systems the pressure is monitored at a BNC connector as well (1 V / bar or 0.1 V / psi).

Features:

- ⇒ one or two channel versions (one channel versions can be upgraded)
- ⇒ analog or digital timer
- ⇒ analog or digital manometers
- ⇒ precise pressure regulators
- ⇒ internal or external valves
- ⇒ extremely precise with *microJECT* valve and digital timer
- ⇒ optional remote control
- ⇒ with status / eject time indicator
- ⇒ also available as module for the EPMS-07 system



microJECT



● ● ● ● ● ● ● ●

npi

Electronic Instruments for the Life Sciences

Technical Data

Source gas:

air, nitrogen, helium etc.,
no aggressive, combustible or explosive gases,
filtered by a 5 μ m filter element

Pressure range:

input pressure: max. 5 bar (72 psi)
pressure control range: 0-2 bar (0-29 psi) or
0-4 bar (0-58 psi)
residual air pressure: 10 mbar (0.145 psi)
to 100 mbar (1.45 psi)

Input and output couplings:

quick connect type

Tubes:

input: 6 mm OD
output: 4 mm OD

Mode selection:

three position toggle switch, (TIMER, CONT., EXT.)

Minimum valve switch time:

standard valve: approx. 10 ms
dependent on the tubing length
with *microJECT*: <1 ms

Digital timer:

100 μ s - 10 s set by five digit switch (0000.0 - 9999.9 ms)

Analog timer:

0.001 - 0.1 s, 0.01 - 1 s, 0.1 - 10 s and 1 - 100 s
linear control, range set by toggle switch time base selector
(0.01 s, 0.1 s, 1 s, 10 s)

Pulse input (BNC connector):

for external operation:
TTL (LO = 0-2.5 V, HI = 3-5 V), input impedance: 10 k

Timing output (BNC connector):

TTL (LO = 0-2.5 V, HI = 3-5 V), output impedance: 249 Ω

Pressure output (BNC connector):

pressure monitor:, sensitivity: 1 V / bar or 0.1 V / psi,
output impedance: 249 Ω

Remote control (option):

toggle switch and status LED for each channel, size: 2.5 x 4 x 10 cm

Dimensions:

19" rackmount cabinet, 19" (483 mm), 10" (250 mm), 3.5" (88 mm)

The various configurations of PDES systems are reflected in the part number

PDES-0X-Y(E)-M-LA-Z

where

X = number of channels (1 or 2)

Y = type of timer (T=analog; D=digital)

E = configuration with external valve(s), blank = configuration with internal valve(s)

M = module

LA = configuration with digital display(s), blank = configuration with analog display(s)

Z = maximum pressure (2 bar [29 psi] or 4 bar [58 psi])

External valve options:

- PDES-0X-BOX (for "slow" valves [ca. 10 ms])

where:

X = number of channels (1 or 2)

- PDES-EHM (for "fast" *microJECT* valves [<1 ms])

for one channel

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PDES Series

internal valve(s)

modular (one channel)

19 inch

analog

digital

analog / digital

analog

PDES-01T-M-LA-2
digital display
analog timer

PDES-01D-LA-2
digital display
digital timer

PDES-01T-LA-2
digital display
analog timer

PDES-01D-LA-2
digital display
digital timer

PDES-01T-2
analog display
analog timer

PDES-01T-ME-2
analog display
analog timer

PDES-01UD-LA-2
digital display
digital timer

PDES-01ME-2
analog display
analog timer

PDES-01UD-LA-2
digital display
digital timer

PDES-01ME-2
analog display
analog timer

PDES-02D-LA-2
digital displays
digital timers

PDES-02T-LA-2
digital displays
analog timers

PDES-02D-2
analog displays
digital timers

PDES-02T-LA-2
digital displays
analog timers

PDES-02T-2
analog displays
analog timers

one channel

upgrade to second channel

two channels

external valve(s)

modular (one channel)

19 inch

analog

digital

analog / digital

analog

PDES-01T-ME-LA-2
digital display
analog timer

PDES-01DE-LA-2
digital display
digital timer

PDES-01TE-LA-2
digital display
analog timer

PDES-01DE-LA-2
digital display
digital timer

PDES-01TE-2
analog display
analog timer

PDES-01T-ME-LA-2
digital display
analog timer

PDES-01UDE-LA-2
digital display
digital timer

PDES-01UDE-2
analog display
digital timer

PDES-01UDE-LA-2
digital display
analog timer

PDES-01UDE-2
analog display
analog timer

PDES-EHM
remote microJECT holder
with one fast valve (< 1 ms!)

PDES-01-BOX
remote valve box for one
slow valve [ca. 10 ms!]

PDES-02DE-2
analog displays
digital timers

PDES-02TE-LA-2
digital displays
analog timers

PDES-02TE-2
analog displays
analog timers

two channels

external valve options

PDES-EHM
remote microJECT holder
with one fast valve (< 1 ms!)

PDES-01-BOX
remote valve box for one
slow valve [ca. 10 ms!]

PDES-02-BOX
remote valve box for two
slow valves [ca. 10 ms!]



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Examples

PDES-01D-2, one channel, analog manometer, digital timer



PDES-01T-2, one channel with retain, analog manometer, analog timer



PDES-01D-LA-2, one channel, digital manometer, digital timer



PDES-02D-LA-2, two channels, digital manometer, digital timer



Slow external
valve box



PDES-01T-M
one channel,
analog timer,
analog manometer,
module for the
EPMS-07 System

