

*made to measure*

# PDES Series

## Versatile Pressure Ejection Units



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  $2 \text{ bar (29 psi)}$ ) for drug application with micropipettes. Analog or digital timers and a remote control unit facilitate the use of these instruments. They are available with up to four application channels. One channel instruments can also be equipped with a holding channel. All PDES units can be operated with internal valves as well as with external valves in order 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 ( $1 \text{ V / bar}$  or  $0.1 \text{ V / psi}$ ).

- Ref.: Garaschuk et al., (2006) Targeted bulk-loading of fluorescent indicators for two-photon brain imaging in vivo. Nat Protoc. 1(1):380-386  
 Eichhoff et al. (2011) Two-photon imaging of neural networks in a mouse model of Alzheimer's disease. Cold Spring Harb Protoc.10:1206-16. doi: 10.1101/pdb.prot065789  
 Sylantsev et al. (2013) Sub-millisecond ligand probing of cell receptors with multiple solution exchange. Nat Protoc. 8(7):1299-306. doi: 10.1038/nprot.2013.075  
 Kleinhans et al. (2014) Multi-photon intracellular sodium imaging combined with UV-mediated focal uncaging of glutamate in CA1 pyramidal neurons. J Vis Exp. 2014 Oct 8;(92)  
<https://www.jove.com/video/52038/multi-photon-intracellular-sodium-imaging-combined-with-uv-mediated>  
 Losi G, et al. (2015) A brain slice experimental model to study the generation and the propagation of focally-induced epileptiform activity. J Neurosci Methods, doi:10.1016/j.jneumeth.2015.04.001

### Features:

- ⇒ one or two channel versions (one channel versions can be upgraded)
- ⇒ analog or digital timers
- ⇒ analog or digital manometers
- ⇒ internal or external valves
- ⇒ extremely precise with *microJECT* valve (PDES-EHM) and digital timer
- ⇒ optionally with holding pressure (DHX)
- ⇒ also available as module for the EPMS-07 system



*microJECT*

## Technical Data

### Source gas:

air, nitrogen, helium etc.,  
no aggressive, combustible or explosive gases,  
filtered by a 5  $\mu$ 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)  
hold pressure (PDES-DXH)  
control range: 1-140 mbar (0.015-2 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. 15 ms  
with *microJECT*: <1 ms

### Digital timer:

100  $\mu$ s - 10 s set by five digit switch (0000.1 - 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 $\Omega$

### Timing output (BNC connector):

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

### Pressure output (BNC connector):

pressure monitor:, sensitivity: 1 V / bar or 0.1 V / psi,  
output impedance: 249  $\Omega$

### Remote control (option):

toggle switch and status LED for each channel, size: 2.5 x 4 x 10 cm  
or push button (one channel versions only)

### 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-OX-(U)Y(E)-M-LA-Z

X = number of channels (1 or 2)

U = upgrade

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])

### PDES-DXH-(E)-LA-Z

DXH = one ejection channel (2 bar [29 psi] or 4 bar [58 psi]) with holding pressure  
(1-140 mbar, 0.015-2 psi)

### External valve options:

- PDES-OX-BOX (for standard "slow" valve)

X = number of channels (1 or 2)

- PDES-EHM (for "fast" *microJECT* valves)  
for one channel

### Typical application times:

- internal valve: 100 ms or longer

- external „slow“ valve: 20 ms or longer

- external „fast“ *microJECT* valve: <5 ms

### General:

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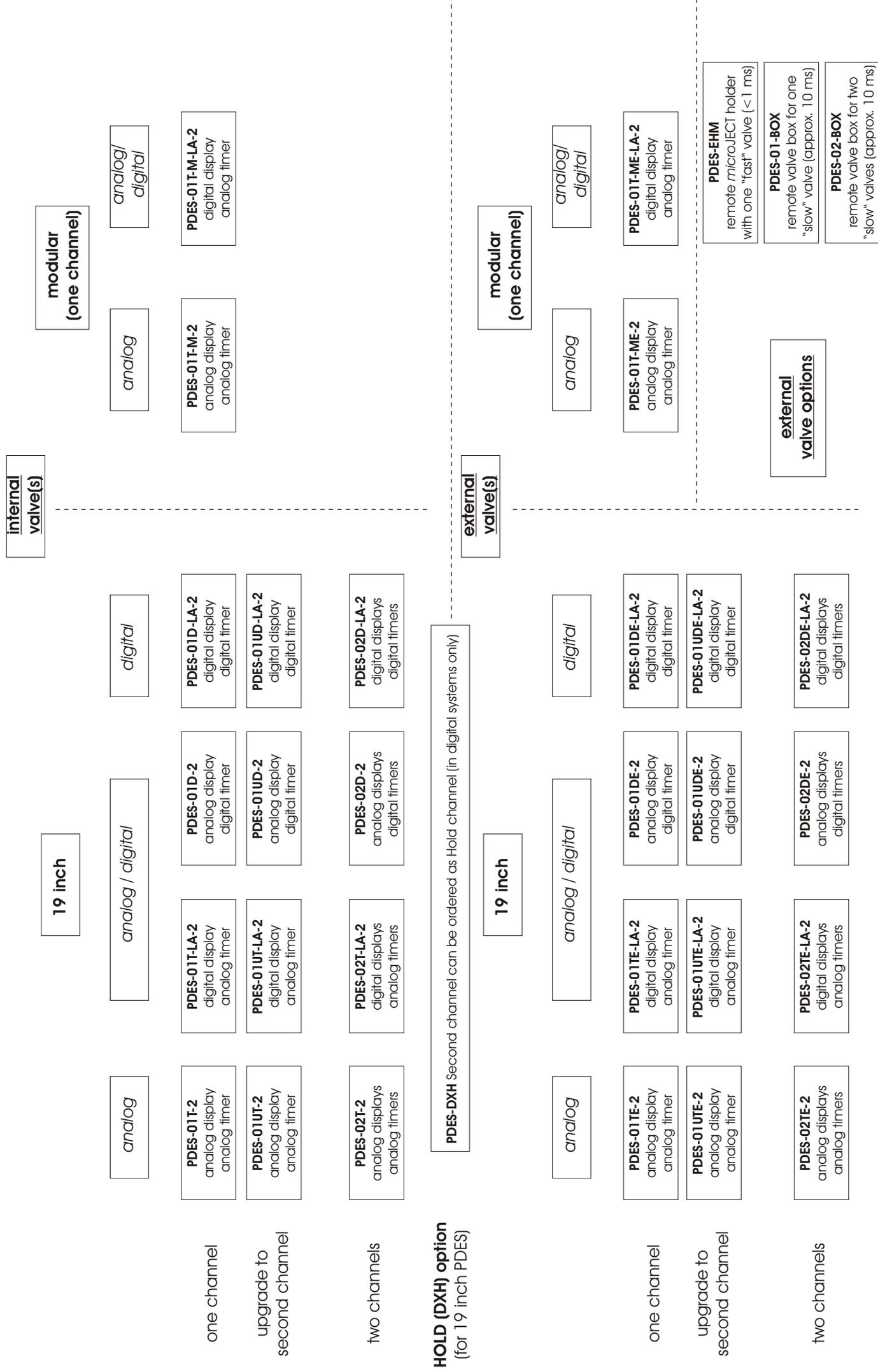
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## Examples

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



PDES-DXH, one channel with hold, digital manometers and timer



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



PDES-02TX-2, two channels, analog manometers and timers



"Slow" external  
valve box



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

