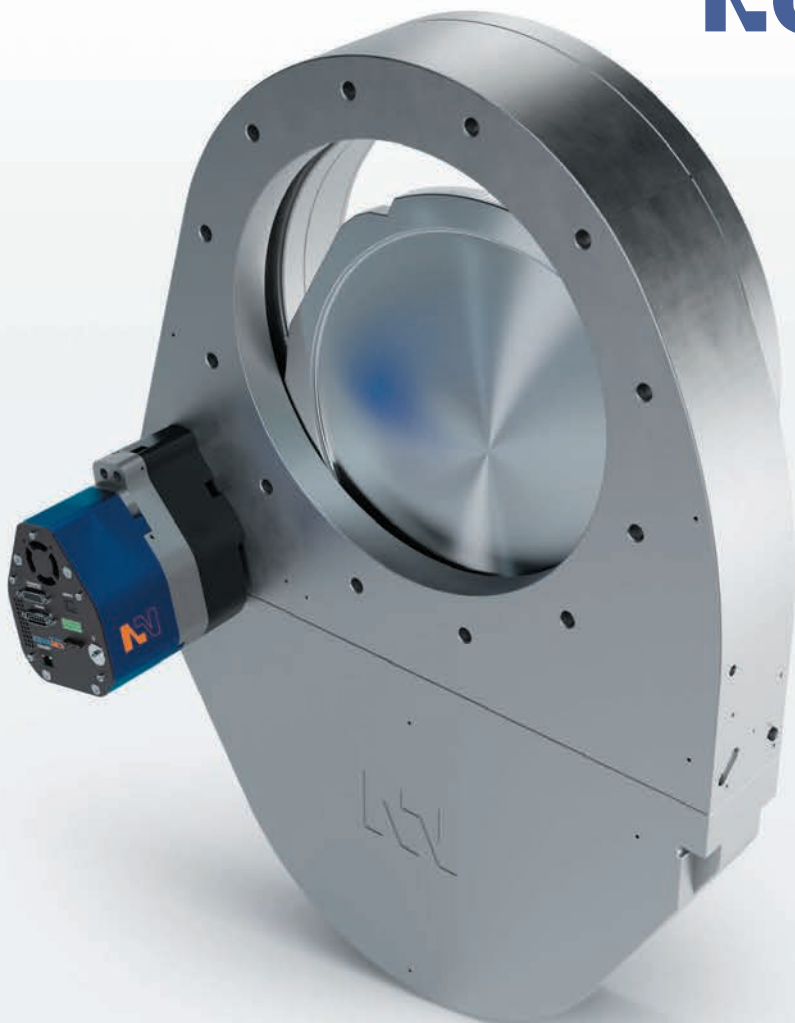


# Vacuum Control Valves

**NOVASEN**

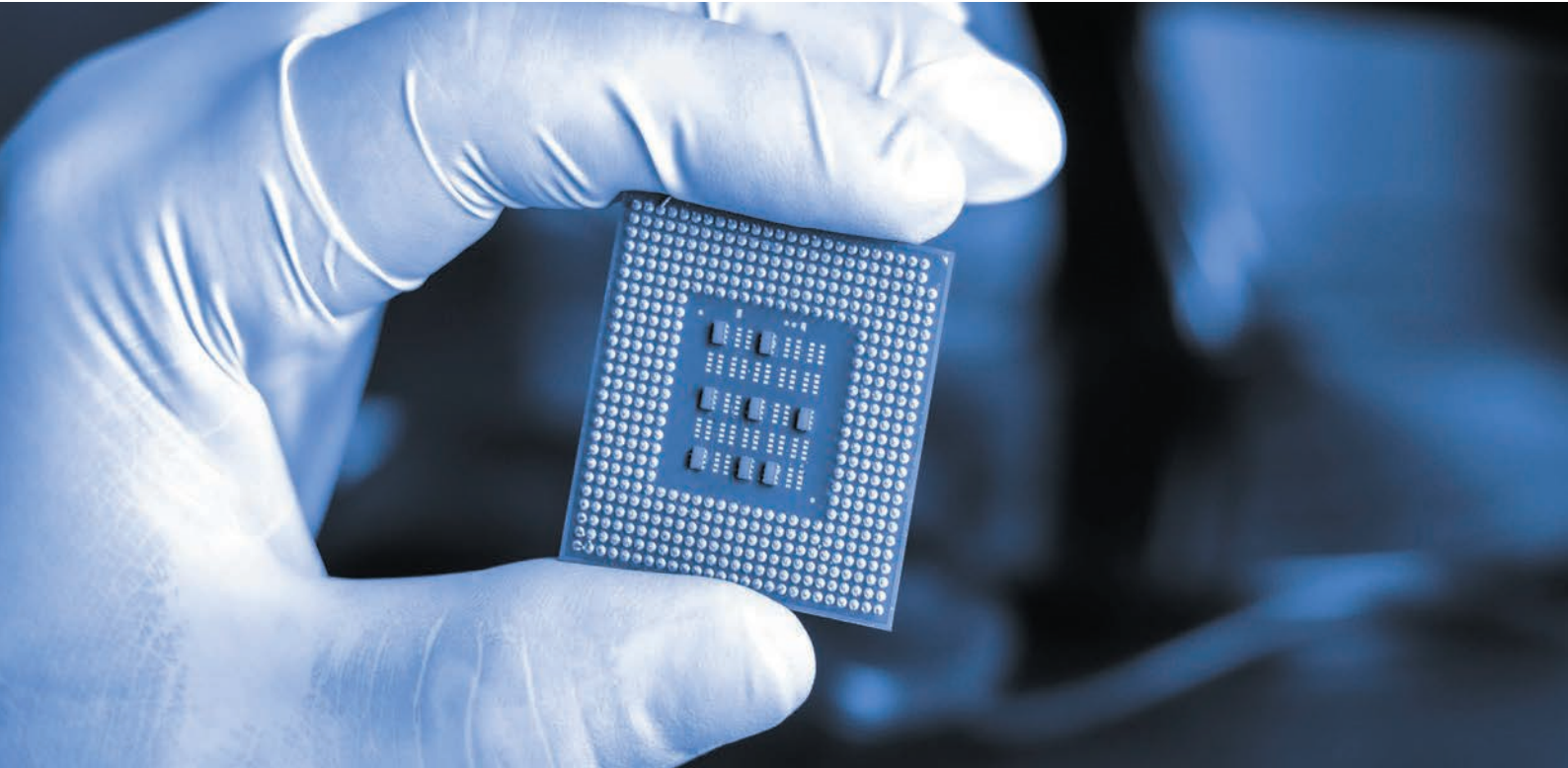


# Make it Best or Not !

CUSTOMER

CREATION

HUMANITY



## Content

|                            |    |
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| - DN100 / DN160            | 07 |
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| - DN250                    | 09 |
| - DN320                    | 10 |
| - DN350                    | 11 |

# Product Selection Guide

A

P

X

350

F

B

—

LO

—

B

—

1

Quantity of Sensors

1 : 1 Sensor

2 : 2 Sensor

Power Option\*

B : Basic

S : with SPS

P : with PFO

D : with SPS and PFO

E : Basic with VC master

F : with SPS and VC master

G : with PFO and VC master

H : with SPS, PFO and VC master

Communication Interface

R2 : RS-232

R3 : RS-232(Analog output)

R4 : RS-485

LO : Logic

DN : DeviceNet®

PB : Profibus

EN : Ethernet

CC : CC-Link

EC : EtherCAT

Body Finishing

B : Blank

N : Nickel-Coated

H : Hard-anodized

Method of Contract

J : JIS

F : ISO-F

Flange Size

100 : DN100

160 : DN160

200 : DN200

250 : DN250

320 : DN320

350 : DN350

400 : DN400

500 : DN500

Heating Type

X : No Heating

H : Heating

Valve Type

P : Pendulum

Valve Model

A : APC

\* SPS = ±15V DC Sensor Power Supply  
PFO = Power Failure Option (Valve closes or opens automatically at power failure)

## Product List



## Setup & Management S/W

Status Monitoring

Position and Pressure Control  
Change Graph Watch and Save

Position and Pressure Control



# Pendulum

## Product Specifications

|  |                        |                        |   |
|--|------------------------|------------------------|---|
| Pressure range at 20°C <sup>1)</sup>           | Blank aluminum         |                        | 1 × 10E-8 mbar to 1.2 bar (abs)               |
|  | Hard anodized aluminum |                        | 1 × 10E-6 mbar to 1.2 bar (abs)               |
| Leak rate to outside at 20°C <sup>1)</sup>     | Valve body :           | Blank aluminum         | 1 × 10E-9 mbar l/s                            |
|  |                        | Hard anodized aluminum | 1 × 10E-5 mbar l/s                            |
|  | Valve Seat :           | Blank aluminum         | 1 × 10E-9 mbar l/s                            |
|  |                        | Hard anodized aluminum | 1 × 10E-4 mbar l/s                            |
| Cycles until first service <sup>1)</sup>       | Pressure control       |                        | 1 million                                     |
|  | Closing / Opening      |                        | 200,000 (unheated and under clean conditions) |
| Admissible operating temperature <sup>2)</sup> | Valve body             |                        | ≤120℃   |
|  | Controller             |                        | max. 50℃ (≤ 35℃ recommended)                  |
| Mounting position                              | DN100 ~ 250            |                        | Any <sup>3)</sup>                             |
|  | DN320 ~ 500            |                        | horizontal only <sup>3)</sup>                 |
| Material                                       | Valve body, plate      |                        | 6061-T6                                       |
|  | Sealing ring           |                        | 6061-T6                                       |
|  | Other parts            |                        | SUS 316L                                      |
| Seal (Bonnet, plate, body, feedthrough)        |                        |                        | FKM(Viton®)                                   |
| Feedthrough                                    | Actuator               |                        | rotary feedthrough                            |
|  | Sealing ring           |                        | shaft feedthrough                             |

1) Unheated on delivery.

2) Maximum values : depending on operating conditions and sealing materials.

3) Valve seat on chamber side recommended.

|   |  |                           |
|---|--|---------------------------|
| Power input <sup>1)</sup>                         | +24 VDC (±10%) @ 0.5V pk-pk max.[connector: POWER]   |                           |
| Power Consumption                                 | 60 W max. (operation of valve with max. load) without PFO <sup>4)</sup>                        |                           |
| Sensor power supply <sup>2)</sup>                 | +24 VDC (±10%) / 36 W max. [connector : POWER]<br>±15 VDC (±5%) / 1A max. [connector : SENSOR] |                           |
| Input<br>Output                                   |  |                           |
| Sensor input                                      | 0-10 VDC<br>100 kΩ<br>0.23 mV<br>10 ms   |                           |
| Signal input                                      |  |                           |
| Input resistance                                  |  |                           |
| ADC resolution                                    |  |                           |
| Sampling time                                     |  |                           |
| Digital inputs <sup>3)</sup>                      | ±24 VDC max.   |                           |
| Digital outputs <sup>3)</sup>                     | 70 VDC or 70 V peak max.<br>0.5 ADC or 0.5 A peak max.<br>10 W max.                            |                           |
| Input voltage                                     |  |                           |
| Input current                                     |  |                           |
| Breaking capacity                                 |  |                           |
| Ambient temperature                               | +50 °C max. (<35 °C recommended)   |                           |
| Pressure control accuracy                         | 0.1% of sensor full scale  |                           |
| Position resolution / position control capability | 13,000 steps (full stroke)   |                           |
| Time throttling only                              | closing  | 1.1 ~ 1.5 s (full stroke) |
|   | opening  | 1.1 ~ 1.5 s (full stroke) |

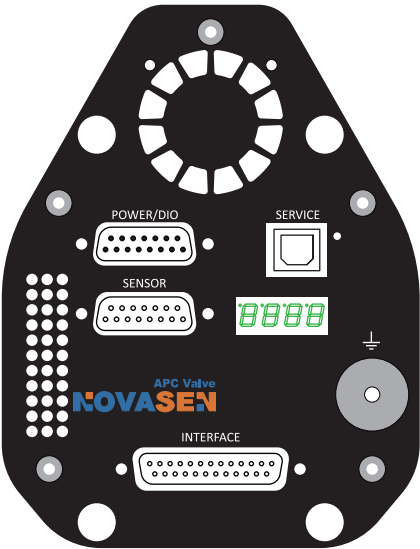
1) Internal overcurrent protection by a PTC device.

2) Refer to chapter «Sensor supply concepts» for details.

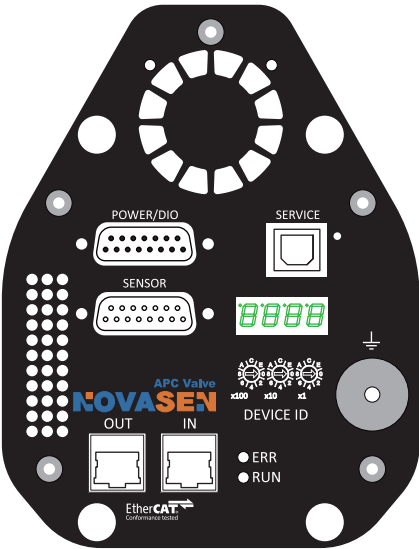
3) Refer to chapter «Schematics» for details.

4) PFO = Power Failure Option. Refer to «3.4 Behaviour in case of power failure» for details.

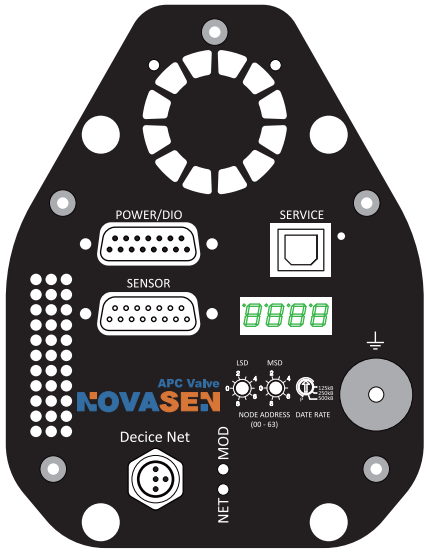
# Electrical connections



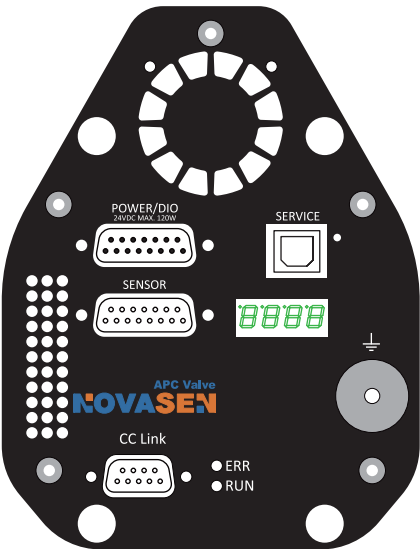
RS232, RS485, LOGIC



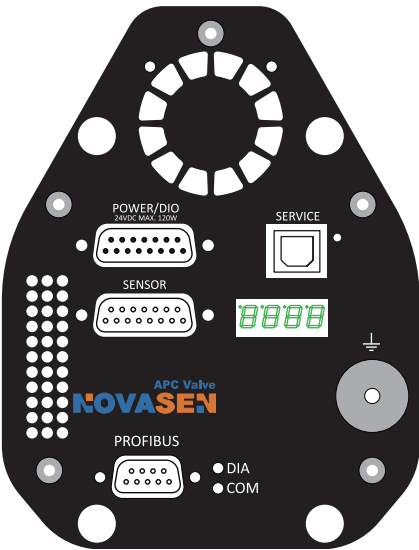
EtherCAT



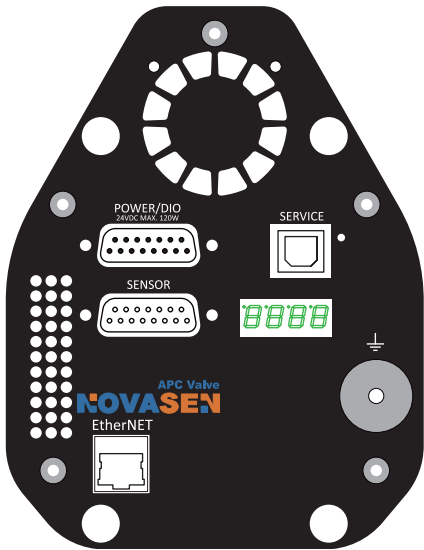
DeviceNet



CC-Link



Profibus



Ethernet

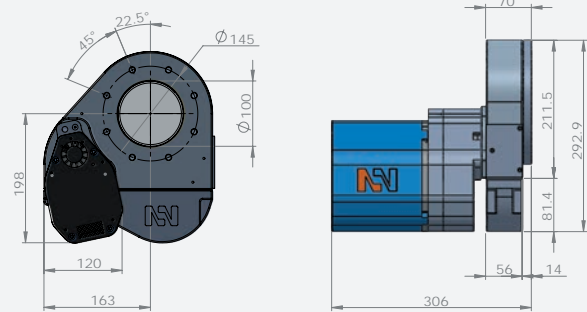
## ELECTRICAL CONNECTIONS

|             | CONNECTION                 | TYPE                  |
|-------------|----------------------------|-----------------------|
| POWER       | Power input                | DB-9 male             |
| SENSOR      | Sensor input               | DB-15 female          |
|             | Sensor power supply        |                       |
| INTERFACE   | RS232, Logic, RS422, RS485 | DB-25 female          |
|             | DeviceNet®                 | Micro-style male      |
|             | Ethernet                   | RJ-45                 |
| BUS Modules | Profibus                   | DB-9 female           |
|             | CC-Link                    | 5-pole terminal screw |
|             | EtherCAT                   | RJ-45 x 2             |

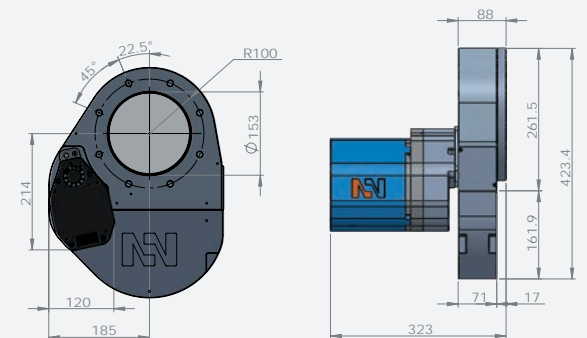
PENDULUM  
DN100/160



DN100



DN160

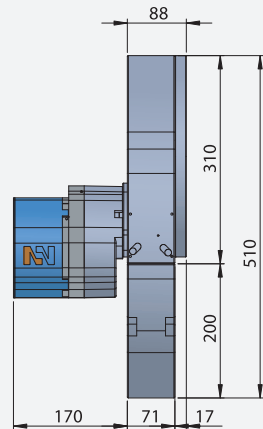
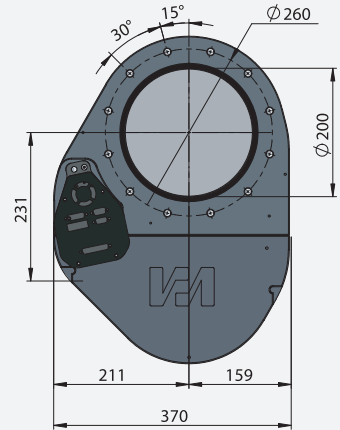
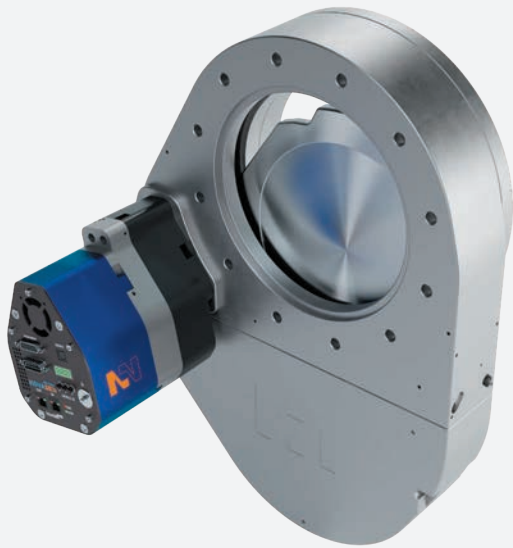


Product Specification

| DN<br>(nominal I.D.) |      | Conductance<br>in open position<br>(molecular flow) | Minimum<br>controllable<br>conductance<br>(molecular flow) | Max.<br>differential<br>pressure<br>on the plate | Max.<br>differential<br>pressure during<br>operation | Compressed air<br>min. - max.<br>overpressure |        | Operating<br>time for<br>throttling | Typical closing /<br>opening time<br>open -> closed | Typical closing /<br>opening time<br>closed -> open | Weight<br>(approx.) |     |
|----------------------|------|---|--|--|--|---|--------|-------------------------------------|---|---|---------------------|-----|
| mm                   | inch | ls-1  | ls-1   | mbar   | mbar   | bar   | psi    | s                                   | s   | s   | kg                  | lbs |
| 100                  | 4    | 1,700   | 3  | 1,200  | 30   | 4-7   | 58-102 | 0.7                                 | 3   | 4   | 12                  | 27  |
| 160                  | 6    | 5,000   | 5  | 1,200  | 10   | 4-7   | 58-102 | 0.8                                 | 3   | 4   | 18                  | 40  |



PENDULUM  
DN200

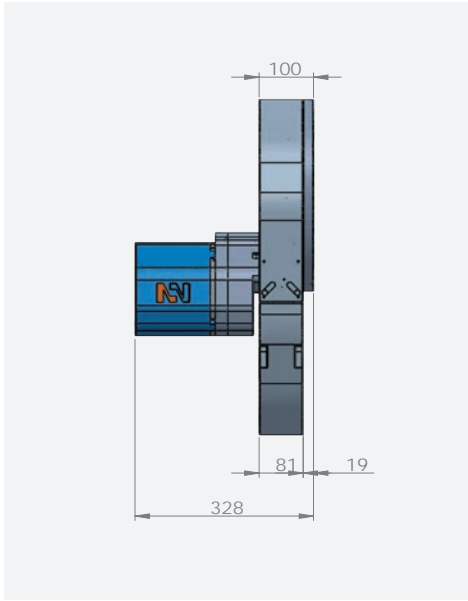
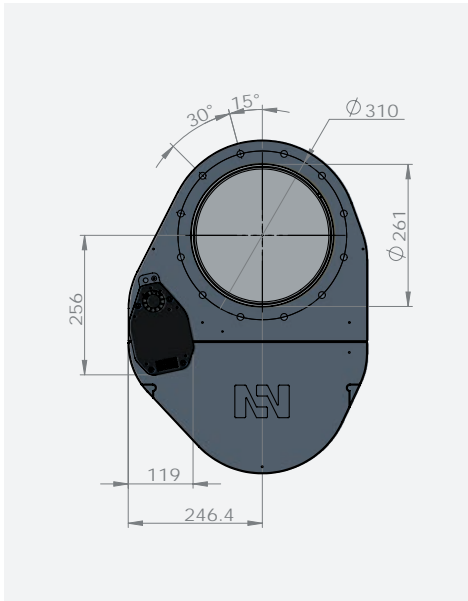
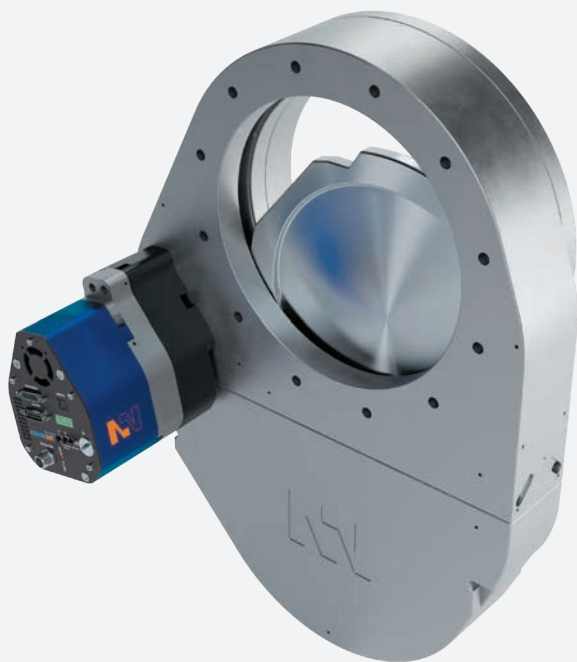


Product Specification

| DN<br>(nominal I.D.) |      | Conductance<br>in open position<br>(molecular flow) | Minimum<br>controllable<br>conductance<br>(molecular flow) | Max.<br>differential<br>pressure<br>on the plate | Max.<br>differential<br>pressure during<br>operation | Compressed air<br>min. - max.<br>overpressure |        | Operating<br>time for<br>throttling | Typical closing /<br>opening time<br>open -> closed | Typical closing /<br>opening time<br>closed -> open | Weight<br>(approx.) |
|----------------------|------|---|--|--|--|---|--------|-------------------------------------|---|---|---------------------|
| mm                   | inch | ls-1  | ls-1   | mbar   | mbar   | bar   | psi    | s                                   | s   | s   | kg    lbs           |
| 200                  | 8    |   |  |  |  | 4-7   | 58-102 | 0.8                                 | 3   | 4   |                     |



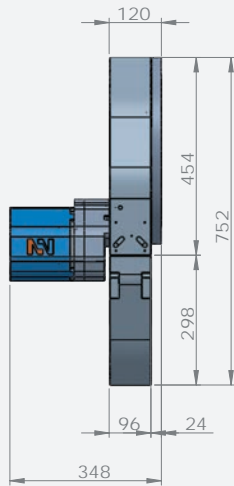
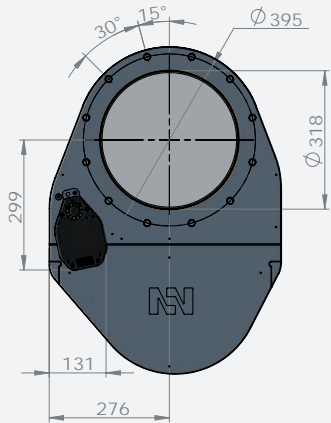
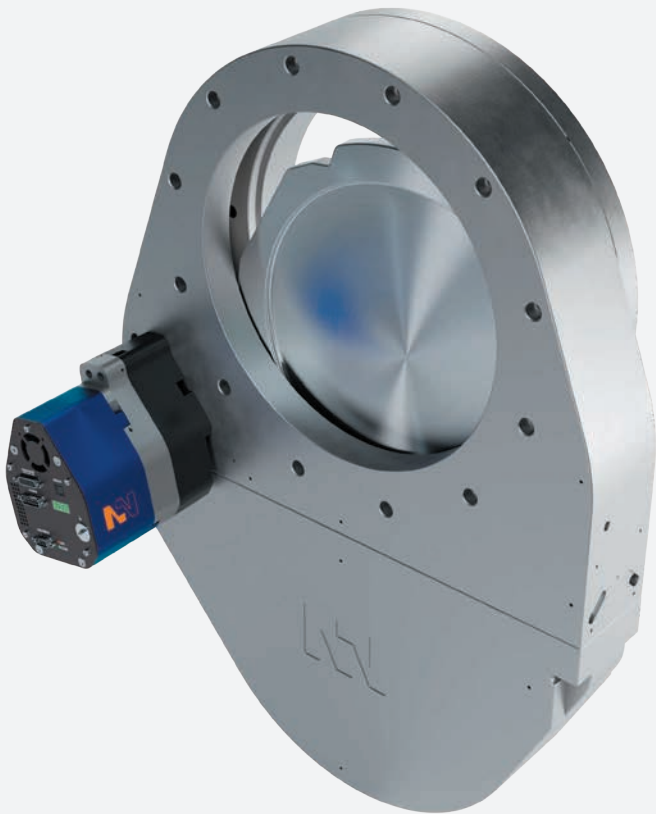
PENDULUM  
DN250



Product Specification

| DN<br>(nominal I.D.) |      | Conductance<br>in open position<br>(molecular flow) | Minimum<br>controllable<br>conductance<br>(molecular flow) | Max.<br>differential<br>pressure<br>on the plate | Max.<br>differential<br>pressure during<br>operation | Compressed air<br>min. - max.<br>overpressure |        | Operating<br>time for<br>throttling | Typical closing /<br>opening time<br>open -> closed | Typical closing /<br>opening time<br>closed -> open | Weight<br>(approx.) |     |
|----------------------|------|---|--|--|--|---|--------|-------------------------------------|---|---|---------------------|-----|
| mm                   | inch | ls-1  | ls-1   | mbar   | mbar   | bar   | psi    | s                                   | s   | s   | kg                  | lbs |
| 250                  | 10   | 22,000  | 15   | 1,200  | 5  | 4-7   | 58-102 | 0.9                                 | 3   | 4   | 29                  | 64  |

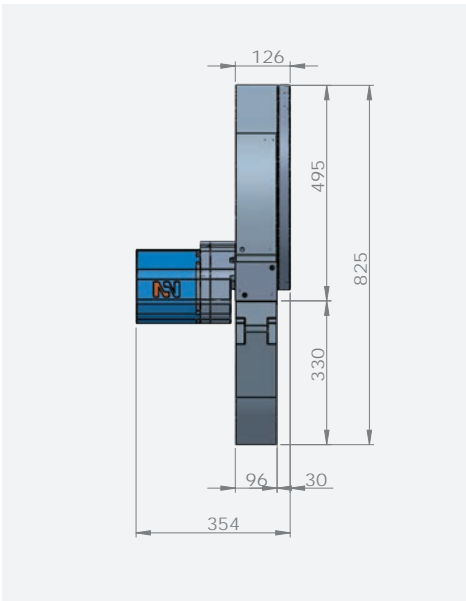
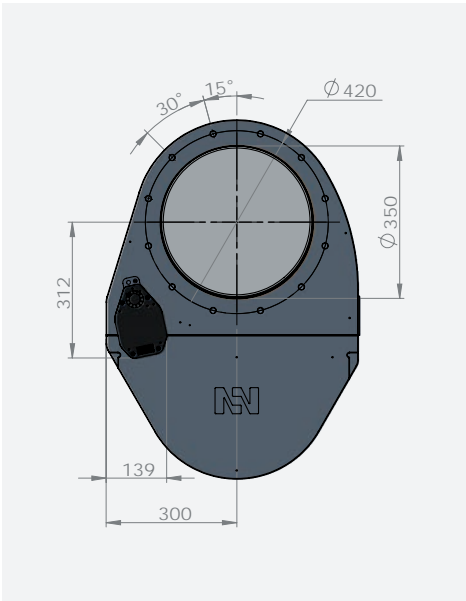
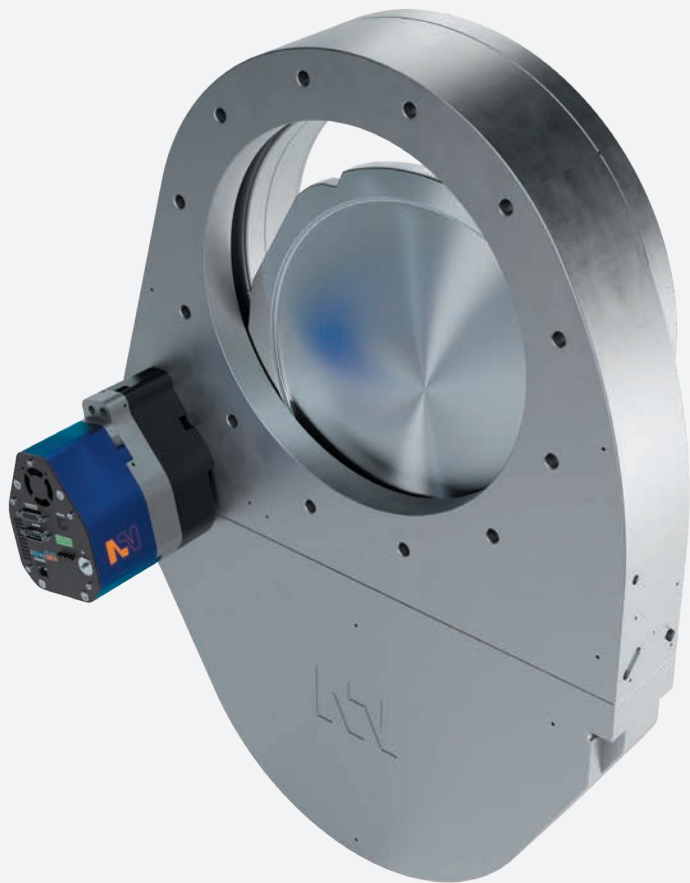
PENDULUM  
DN320



Product Specification

| DN<br>(nominal I.D.) |      | Conductance<br>in open position<br>(molecular flow) | Minimum<br>controllable<br>conductance<br>(molecular flow) | Max.<br>differential<br>pressure<br>on the plate | Max.<br>differential<br>pressure during<br>operation | Compressed air<br>min. - max.<br>overpressure |        | Operating<br>time for<br>throttling | Typical closing /<br>opening time<br>open -> closed | Typical closing /<br>opening time<br>closed -> open | Weight<br>(approx.) |     |
|----------------------|------|---|--|--|--|---|--------|-------------------------------------|---|---|---------------------|-----|
| mm                   | inch | ls-1  | ls-1   | mbar   | mbar   | bar   | psi    | s                                   | s   | s   | kg                  | lbs |
| 320                  | 12   | 30,000  | 22   | 1,200  | 5  | 4-7   | 58-102 | 1.1                                 | 5   | 6   | 48                  | 106 |

PENDULUM  
DN350



Product Specification

| DN<br>(nominal I.D.) |      | Conductance<br>in open position<br>(molecular flow) | Minimum<br>controllable<br>conductance<br>(molecular flow) | Max.<br>differential<br>pressure<br>on the plate | Max.<br>differential<br>pressure during<br>operation | Compressed air<br>min. - max.<br>overpressure |        | Operating<br>time for<br>throttling | Typical closing /<br>opening time<br>open -> closed | Typical closing /<br>opening time<br>closed -> open | Weight<br>(approx.) |     |
|----------------------|------|---|--|--|--|---|--------|-------------------------------------|---|---|---------------------|-----|
| mm                   | inch | ls-1  | ls-1   | mbar   | mbar   | bar   | psi    | s                                   | s   | s   | kg                  | lbs |
| 350                  | 14   | 43,000  | 25   | 1,200  | 5  | 4-7   | 58-102 | 1.3                                 | 5   | 6   | 59                  | 130 |



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