Electronic Pressure Regulator
EPDN4
EPDN4-MP
EPDN8-MP series

Catalogue PDE2529TCUK-ab

Home

Electronic Pressure Regulator EPDN

Function
The electronic pressure regulator is designed to quickly and accurately adjust and maintain the output pressure from the unit, regardless of flow, in relation to an electronic control signal. The medium can be compressed air or an inert gas.

Construction
The electronic pressure regulator comprises:
- an electronically controlled 3/3-way, poppet valve with spring return to the mid position,
- a semiconductor pressure sensor,
- control electronics
- integrated volume booster.

Operation
The electronic pressure regulator features a closed control loop design, which means that the outlet pressure is constantly measured by a pressure sensor and compared with the required outlet pressure value (setpoint value).

- Whenever the outlet pressure is lower than the required pressure, the electronically controlled 3/3-way valve is shifted out of the spring loaded and closed mid position to feed air until the two pressure values are equal.

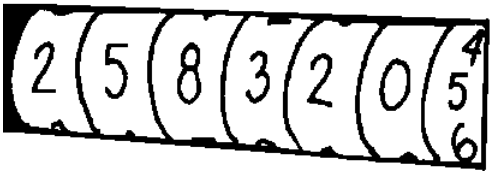
- Whenever the outlet pressure is higher than the required pressure, the electronically controlled 3/3-way valve is shifted to exhaust air until the two pressure values are equal again.

- To give higher flow capability, the pressure regulator operates an air operated volume booster.

- The pressure sensor measures the outlet pressure of the volume booster

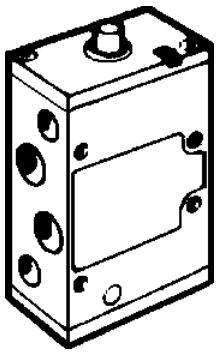
Applications
- spot welding: control of clamping force spot welding electrodes,
- ships winches: control of the brake power on the cable drums,
- marine engines: control of the number of revolutions,
- air conditioning in buildings etc.: control of heating, cooling, ventilation etc.
- glass and plastic industry: control of expending pressures,
- medial techniques: monitoring and adjusting for varying pressures resulting from human movements in relation to breathing, etc.
- mechanical engineering: the balancing of loads.
- General purposes

High Reliability



Valves easily comply with the requirements for component reliability in accordance with the EU Machinery Directive standards EN292-2 and N983. In the EPD range high molecular weight plastics with self-lubricating properties make it suitable for use with, or without supplementary lubrication. The design principles also guarantee many years of lifetime lubrication reliable operation.

Simple maintenance

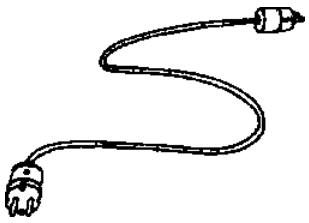


Since the EPD proportional valves have such reliable function, long service life and low price, there is in general no preventive maintenance required but in case of failure we can offer a very interesting exchange system.

Low noise level

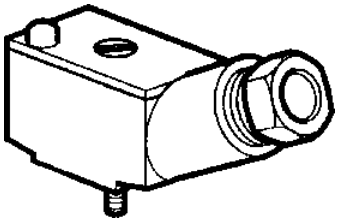
The exhaust air from the pilot valves is exhausted through a silencer (optional) located in the bottom, to give the lowest possible noise level. This is particularly important for industries where low noise levels are required. The silencers make it possible for the valves to comply with the EU Machinery Directive, Noise 1.5.8.

High protection class



The solenoid valves are protection class IP 65 with the standard cable plug.

Several types of cable plugs

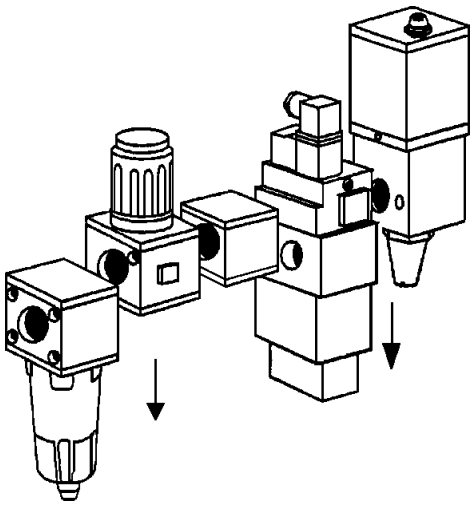


For connection to your own cables or with moulded cable. A large selection allows you to choose cables to meet your requirements.

Insensitive to dirt air

Thanks to large flow passage areas and the large flow diameter the EPD range can be used in normal industrial or mobile environments without any problems of blocking. However the service life of the valve depends on the cleanliness of the air. Please refer to ISO 8573.

Flexible multiple installation



There is a (building) system modular available were you can put in the EPD, this system is called frame block.

If more information, concering this frame-block, required, please contact your local Parker Sales Office.

Pneumatics

Working medium
Compressed air or inert gasses, filtered to min. 50µ, lubricated or non-lubricated, dried or un-dried, above dewpoint.

Supply pressure
Primary (input pressure): 16 bar: 0 - 12 B output range
12 bar: 0 - 7 B output range
7 bar: 0 - 2 B output range
(others on request)

Pressure control range
Available in three pressure ranges, 0-2 bar, 0-7 bar or 0-12 bar. (See “how to order” on page 4)
Other ranges on request.

Burst pressure of sensor
2 x F.S.*

Air consumption
No consumption in stably regulated situation.

Display
The regulator is provided with an display, indicating the output pressure (except the digital version).

Electronics

Supply voltage
24 VDC +/- 10%

Current consumption
Max. 200 mA with unloaded signal outputs

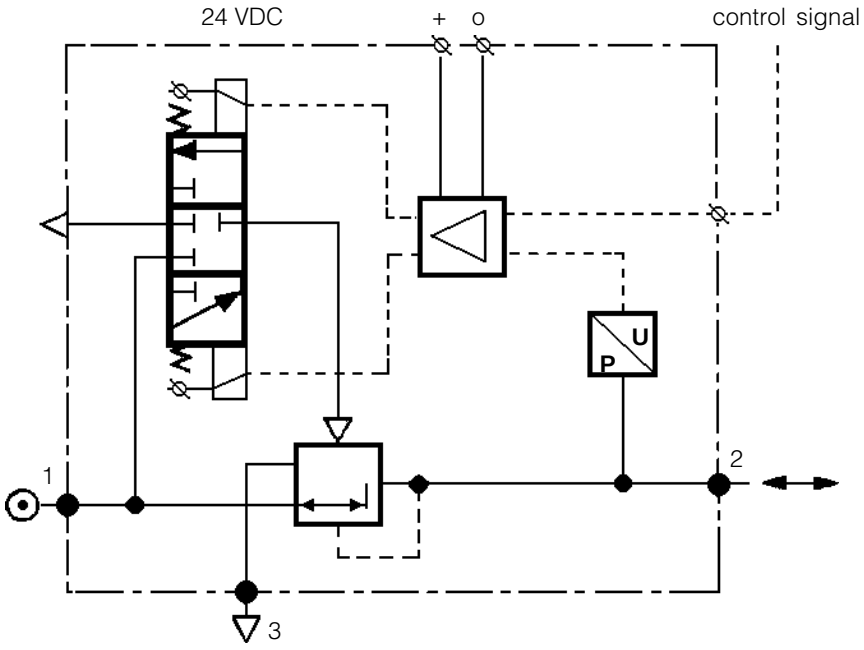
Control signals
The electronic pressure regulator can be externally controlled through an analogue control signal of either 0-10V or 4-20mA, or a digital control (See “how to order” on page 4).

Output signals
As soon as the output pressure is within the signal band a signal is given of 24V DC, PNP Ri = 1 K ohm
Outside the signal band this connection is 0V.

Optional
Proces value outlet signal order separately proces value board. (Except EPDN4-MP series)

Connections
Central M12 connector 4-pole or others
(See "how to order).

Schematic



*F.s. = Full scale = chosen max. output pressure = 100% pressure control range.

Technical Data

Dead band
The dead band is preset at 1,1% F.S.

Accuracy
Hysteresis is equal to the dead band setting (1,1% F.S.)
Linearity: = < 0,3% F.S.

Signal band
The signal band is preset at 5% F.S.

Proportional band
The proportional band is preset at 10% F.S.

Fail safe operation
After interrupting the power supply the present output pressure is maintained at approximately the same level. After switching on the power supply again the pressure can be adjusted immediately by giving a new control signal. (Not available on the M12-version)

Full exhaust
Complete exhaust of the regulator is obtained at 1% of F.S.

Temperature range: -10°C up to +50°C

Degree of protection: IP 65

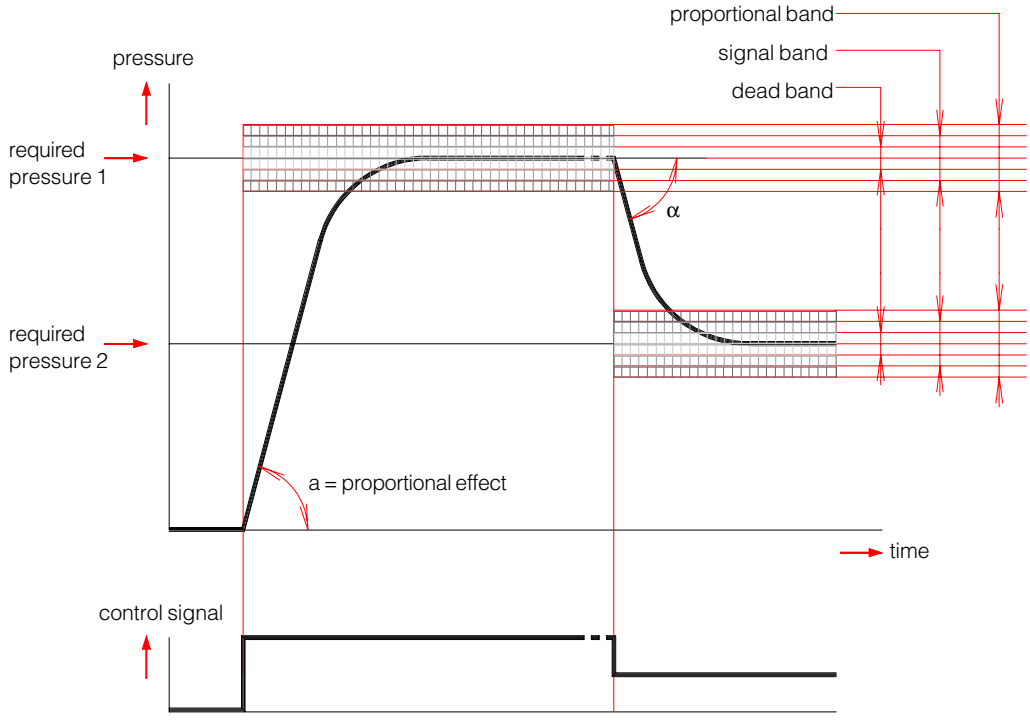
CE/EMC: according to directive 89/336/EEC

Mounting position
Preferably vertically, with the cable gland on top.

Materials
Parts in contact with the working medium:
- magnet core: steel
- solenoid valve poppet: FPM
- core housing: brass
- solenoid valve housing: plastic
- regulator housing: anodised aluminium / plastic
- valve: Polyurethane
- seats and auxiliary piston: Delrin, Brass
- remaining seals: NBR

Parts in contact with the atmosphere: aluminium anodised.

Regulation characteristics



Advanced functionality

Air consumption
Under normal conditions and in steady state there is no air consumption.

Enable (only on EPDN with DIN connector)
The enable function provides the possibility to accept or not accept a change in control signal and resets the fail-safe mode.

A high enable signal	10 - 30V DC will accept a new control signal
A low enable signal	0 - 6V DC will block a new control signal
An enable signal between	6 - 10V DC is neglected.

In this version of the proportional valve, the enable function is continuously held high through an internal resistor and jumper.

Connect the enable line (pin 4) to GND for a low enable signal.
Enable input Ri = 5K.
With closed “held high” jumper, current to GND = 6mA.
On EPDN-MP range a auto enable functionality is installed.

Fail safe (in respect of the enable input, not valid on EPDN-MP)
When the supply voltage drops below 19VDC, the electronic control is knocked out of function and locked in the fail-safe mode. The latest known output pressure is maintained at approximately the same level (this depends on air consumption).

After return of the supply voltage the digital display in the hood of the valve blinks and indicates a non-realistic value. The manual override buttons are in effect. Input control signals are not accepted and output pressure is maintained as above. As long as the enable signal is low, the valve will stay in this fail-safe mode.

When the enable signal is high (= default) then, upon return of the supply voltage, the valve will get out of fail-safe mode and the output pressure will immediately follow the control signal from that moment. The display stops blinking and shows the actual output pressure. The manual override buttons are set out of function.

When the required output pressure can not be achieved because of a lack of input pressure the unit will open continuously after 5 seconds. The output pressure will then approximately be equal to the inlet pressure. As soon as the input pressure is back on the required level the normal control function follows.

Response times
For a volume of 330 cm^3 directly on the outlet of the regulator:

Pressure increase from 2 to 4 bar	»	32 msecs
Pressure increase from 2 to 8 bar	»	137 msecs
Pressure decrease from 4 to 2 bar	»	64 msecs
Pressure decrease from 8 to 2 bar	»	159 msecs

For a volume of 330 cm^3 on a distance of 20 meters from the regulator
(connected with tubing - inner Ø10 mm)

Pressure increase from 2 to 4 bar	»	56 msecs
Pressure increase from 2 to 8 bar	»	200 msecs
Pressure decrease from 4 to 2 bar	»	69 msecs
Pressure decrease from 8 to 2 bar	»	196 msecs

Settings
The regulator is pre-set at the factory. If required, adjustments can be made.

Process output value
As option we can supply the complete regulators range of valve's with a process output value board, which gives the possibility to get a feedback signal in volts (0-10V) of the actual pressure. In this cases the enable or alarm functionality will be replaced by this function. Standard available on EPDN-MP range

Directional standard EPDN 1/2"

With M12 connector	Order code
EPDN4-0-12B-0U10-11-1	**3087000**
EPDN4-0-12B-4I20-11-1	**3087100**
EPDN4-0-7B-0U10-11-1	**3087200**
EPDN4-0-7B-1I20-11-1	**3087300**
EPDN4-0-2B-0U10-11-1	**3087400**
EPDN4-0-2B-1I20-11-1	**3087500**

With DIN 43651 connector	Order code
EPDN4-0-0-12B-4I20-10-1-4	**3069100**
EPDN4-0-0-10B-0U10-10-1-4	**3073700**
EPDN4-1.2B-0U10-11-0	**3079100**
EPDN4-0-12B-4I20-11-1	**3081800**
EPDN4-1.2-12B-0U10-11-0	**3091000**
EPDN4-0-12B-4I20-11-1	**3091100**

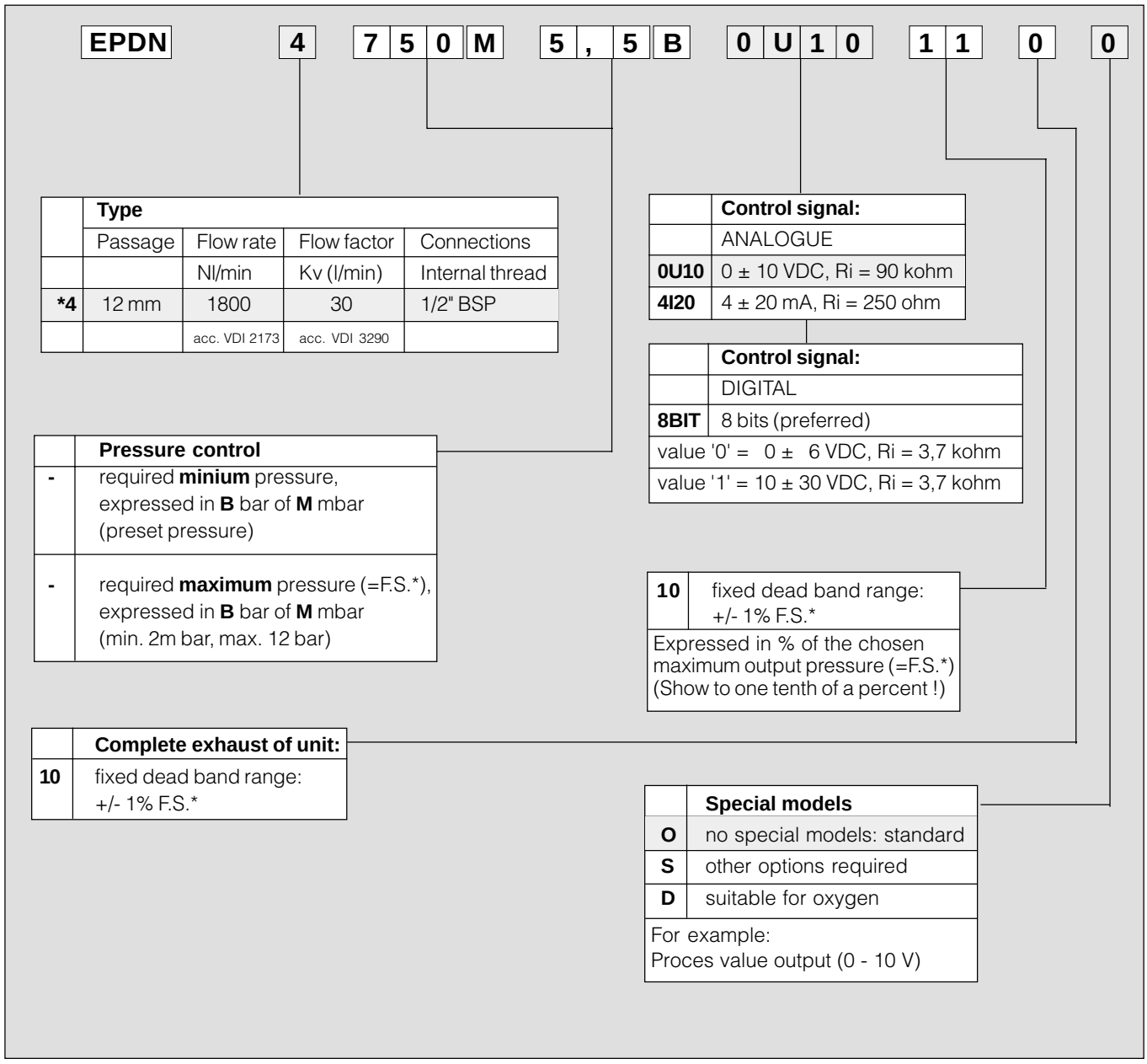
With Harting connector; HAN3+PE*	Order code
EPDN4-0-0-2B-0U10-11-1-D	**3085700**
EPDN4-0-12B-0U10-11-1-D	**3092000**

* suitable for oxygen gas

Digital	Order code
EPDN4-0-0-012B-7BIT-07	**on request**
EPDN4-0-0-12B-7BIT-07	**on request**

Accessoires	Order code
Cable with plug DIN43651	**5068625**
Flangeset 1/2"	**3017600**
Procesvalue print	**5079140**

Order key Specials



	Type			
	Passage	Flow rate	Flow factor	Connections
		Nl/min	Kv (l/min)	Internal thread
*4	12 mm	1800	30	1/2" BSP
		acc. VDI 2173	acc. VDI 3290	

	Control signal:
	ANALOGUE
0U10	0 ± 10 VDC, Ri = 90 kohm
4I20	4 ± 20 mA, Ri = 250 ohm

	Control signal:
	DIGITAL
8BIT	8 bits (preferred)
value '0' = 0 ± 6 VDC, Ri = 3,7 kohm	
value '1' = 10 ± 30 VDC, Ri = 3,7 kohm	

	Pressure control
-	required **minium** pressure, expressed in **B** bar of **M** mbar (preset pressure)
-	required **maximum** pressure (=F.S.*), expressed in **B** bar of **M** mbar (min. 2m bar, max. 12 bar)

10	fixed dead band range: +/- 1% F.S.*
Expressed in % of the chosen maximum output pressure (=F.S.*) (Show to one tenth of a percent !)	

	Complete exhaust of unit:
10	fixed dead band range: +/- 1% F.S.*

	Special models
O	no special models: standard
S	other options required
D	suitable for oxygen
For example: Proces value output (0 - 10 V)	

*** For other models, range or special demands, please contact your local Parker sales office.**

General information

Description Proportional valve (Electronic pressure regulator)
Type example EPDN4-MP-1,2-12B-0U10
Code example 3505100 (see page 12)

Description

EPDN4	=	Proportional valve 1/2”
MP	=	Micro processor
1,2-12B	=	Output pressure range: 1,2 to 12 bar
0U10	=	Control signal: 0-10 Volt (0 - 1V will be ignored)
....	=	Customer identification if neccesary

- Connector DIN 43651 (Plug and cable are not supplied)
- Alarm output signal 24VDC when required pressure is reached
- Fits in the Parker Pneumatic Frame-block (air service unit)

Working medium

Compressed air or inert gases, filtered to min. 50µ, lubricated or non-lubricated, dried or non dried, above dewpoint.

Pressure range

Primary (Input pressure) max. 16 bar
Secondary (Output pressure) 0-12 bar
The output pressure is indicated on a built-in digital display.
Pressure drop input/output min. 0,5 bar

Supply voltage

24V DC ± 10% (-20% / +25% with decrease of specs).
Reverse protected
Max. 200 mA.

Temperature range -10°C - +50°C

Class of protection IP 65

Flow capacity 1/2" 1800 Nl/min (acc. VDI 2173)
1" 4000 Nl/min

Settings

Dead band: ± 1% of FS (= ± 0,12 bar) = Hysteresis
Proportional band: ±10% of FS (= ± 1,2 bar)
Signal band: ±10% of FS (= ± 1,2 bar)

Accuracy

Linearity : < 0,3% of F.S

Control signal

0 - 10V or 0 (4)-20mA, Ri = 100K (0 - 1V will be ignored)
The control signal can be changed (see page 11).

Alarm output signal

Within the signal band an output signal is available: 24VDC, PNP open collector, max 50mA, prevented against short-circuit, accepts inductive loads.

Air consumption

Under normal conditions and in steady state there is no air consumption.

Parameters.

Functonality of EPD can be manipulated by means of parameterset. This set can be changed by means of 3 buttons at the front side of the EPD.
For details look at page 13 ‘How to change parameters’, etc.

Behaviour control.

In this version we introduced a five steps behaviour control functionality. This gives the user the capability of changing the regulation speed and accuracy by means of one parameter. (P20). For details see page 13.

Auto_enable functie.

The enable function can be activated automaticly, and is activated when the enable input is made ‘high’ (24V), the first time after power on. For details see page 14

Hidden functions.

There are several additional functions to perform different tasks, for instance resetting the default settings, storing actual parameters as the default set.
For details see page 14.

Available options.

Analog output.
External analog input.
Infrared communication.

For additional information, consult referred section or please contact factory.

Pilot valve protection

When the required output pressure can not be achieved because of a lack of input pressure the unit will display “No.P”. The output pressure will then approximately be equal to the inlet pressure. As soon as the input pressure is back on the required level the normal control function follows.

Safety exhaust

This function is not used.

Response times

For a volume of 330 cm^3 directly on the outlet of the regulator:

Pressure increase from 2 to 4 bar	≈	32 msecs
Pressure increase from 2 to 8 bar	≈	137 msecs
Pressure decrease from 4 to 2 bar	≈	64 msecs
Pressure decrease from 8 to 2 bar	≈	159 msecs

For a volume of 330 cm^3 on a distance of 20 meters from the regulator (connected with tubing - inner ∅ 10 mm)

Pressure increase from 2 to 4 bar	≈	56 msecs
Pressure increase from 2 to 8 bar	≈	200 msecs
Pressure decrease from 4 to 2 bar	≈	69 msecs
Pressure decrease from 8 to 2 bar	≈	196 msecs

Settings

The regulator is pre-set at the factory as indicated on label. If required, adjustments can be made, see page 13.

Drawing

Attached is a drawing showing the dimensions and the pneumatic scheme.

Mounting

The unit preferably is to be mounted vertically with the electrical connection to the top.

Materials used

Body	: Anodised aluminium
Seals	: NBR
Valve	: Polyurethane
Inner parts	: Delrin, brass, aluminium

Electrical connections

Use plug DIN 43651 female 6+PE

The electrical connections are as follows:

Pin no.	Function		assembled cable color
1	0 volt	supply	Blue
2	24V	alarm signal output	Grey
3	+24V	supply	Brown
4	Enable	default not connected	Green
5	GDN	control signal	Pink
6	0 - 10 V	control signal Ri = 100K	White
7	PE	cable sleeve	Yellow

Change the control signal

From 0 - 10 V to 0 - 20mA (Ri = 500Ω): (Parameter 4)

From 0 - 10 V to 4 - 20mA (Ri = 500Ω): (Parameter 4 + 29)

Warning

Do not adjust any of the other parameters.These are factory settings. Any other change can have a big influence on the performance of the regulator.

Parker Pneumatic does not warranty units which have not been properly used and/or adjusted.

Directional standard EPDN/MP

With M12 connector - size 1/2"	Order code
EPDN4-MP-0-12B-OU10	**3505500**
EPDN4-MP-0-12B-4I20	**3505600**
EPDN4-MP-0-7B-OU10	**3505700**
EPDN4-MP-0-7B-4I20	**3505800**
EPDN4-MP-0-2B-OU10	**3505900**
EPDN4-MP-0-2B-4I20	**3506000**

With M12 connector - size 1"	Order code
EPDN8-MP-0-12B-OU10	**3508550**
EPDN8-MP-0-12B-4I20	**3508560**
EPDN8-MP-0-7B-OU10	**3508570**
EPDN8-MP-0-7B-4I20	**3508580**
EPDN8-MP-0-2B-OU10	**3508590**
EPDN8-MP-0-2B-4I20	**3508600**

Ordering-key Specials

EPDN | **4** | **MP** | **750M** | **5,5B** | **0U10** | **00**

Micro processor

	Type			
	Passage	Flow rate	Flow factor	Connections
		Nl/min	Kv (l/min)	Internal thread
4	12 mm	1800	30	1/2" BSP
8	25 mm	4200	70	1" BSP
		acc. VDI 2173	acc. VDI 3290	

	Pressure control
-	required **minium** pressure, expressed in **B** bar of **M** mbar (preset pressure)
-	required **maximum** pressure (=F.S.*), expressed in **B** bar of **M** mbar (min. 2m bar, max. 12 bar)

	Control signal:
	ANALOGUE
0U10	0 ± 10 VDC, Ri = 90 kohm
4I20	4 ± 20 mA, Ri = 250 ohm

	Control signal:
	DIGITAL
8BIT	8 bits (preferred)
value '0' = 0 ± 6 VDC, Ri = 3,7 kohm	
value '1' = 10 ± 30 VDC, Ri = 3,7 kohm	

	Special models
O	no special models: standard
S	other options required
D	suitable for oxygen

Parameter setting

Changeable user parameters*	Setting	Standard value	Description	Unit	Action	Result
0	0 1 2 3	0	n.u. n.u n.u green key		Back to factory settings	Back to normal settings
4	0 1	1	mA V		Set setpoint input to mA Set setpoint input to volt	0(4)-20mA, (P29) 0-10V
5	0 1	0	mA V		Set external input to mA Set external input to volt	0(4)-20mA, (P29) 0-10V
6	0 1	0	Alarm output Analog output		Set output to digital alarm output Set output to analog output	24V= in band 0-10V~P_out
7	0 to 20	0		% F.S.	Set analog output offset	offset = 0-2V
8	80 to 120	100		% F.S.	Set analog output span	span = 0-11V
12	50 to 250	100		x 10 mBar	Set proporitonal area	0,5 to 2,5 Bar
13	2 to 40	15		x 10mBar	Set deadband area	20 to 400 mBar
15	1 to 250	1		x 10 mBar	Set slow area	0 to 2,5 Bar
16	1 to 20	5		*****	Set slow steps	highest speed lowest speed
18	0 to 200	0		x 10 mBar	Set preset pressure (x10 mBar)	0 to 2 bar
19	0 to 100	100		% F.S.	Pressure correction	0 to P-max
20	0 1 2 3 4 5	3	Custom set Fastest Fast Normal Slow Slowest		Set behaviour control	P 12,13, 21
21	5 to 100	10			Set proportional value	fastest regulation slowest regulation
29	0 to 255	0			Set setpoint/external offset	(4mA~165)

***Other parameter settings are available. Consult factory.**

How to change parameters:

Pressing Accept key for more than 3 sec, will activate parameter change mode. User can select parameter by pressing up or down key on EPD.(display shows Pxx). When parameter number is correct, pressing accept again will enter parameter number.(display shows parameter value now). Pressing the up or down key will change the parameter itself now. (blinking display point shows parameter editing mode). Pressing the accept key will accept the new parameter value. (all digits will blink during acception). After releasing all keys , the next parameter number will be presented on the display. (you may evt. step to the next parameter). When no key is pressed, after ca. 3 sec the display will show the actual output pressure.

Hidden funtions EPDN4-MP

During startup unit. (Power goes on)

When keys DOWN and UP are pressed during startup, (connecting to the 24V power supply) manual modus is activated. This means that the user is able to in/decrease the output pressure of the EPD, by pressing the UP or DOWN key. During this action the display will blink, indicating that the manual mode is activated.

Pressing the UP and DOWN key again simultanously will cause the EPD to terminate manual modus.

After startup. (Power is on)

Parameter 0 = 3 (green_key function)
Entering this value in parameter 0 will store the calibrated factory data into the working parameters. (Default calibration data is used)

Auto enable function.

Default the auto enable function is deactivated. The unit will now respond to any new applied setpoint.

If the enable input is made high (24Vdc) for the first time, the auto enable function is activated.
The unit will now only respond to the new setpoint when the enable input is high.

If auto enable function is activated and the enable input is low. Pressing UP or DOWN will cause the unit to go in manual modus.The user is able to in/decrease the output pressure of the EPD, by pressing the UP or DOWN key.During this action the display will blink, indicating that the manual mode is activated.

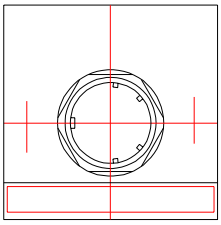
When the enable input becomes high, the new setpoint will overrule the manual setting, and will exit the manual mode directly. Also pressing the UP and DOWN key again simultanously will cause the EPD to terminate manual modus.

Behaviour control.

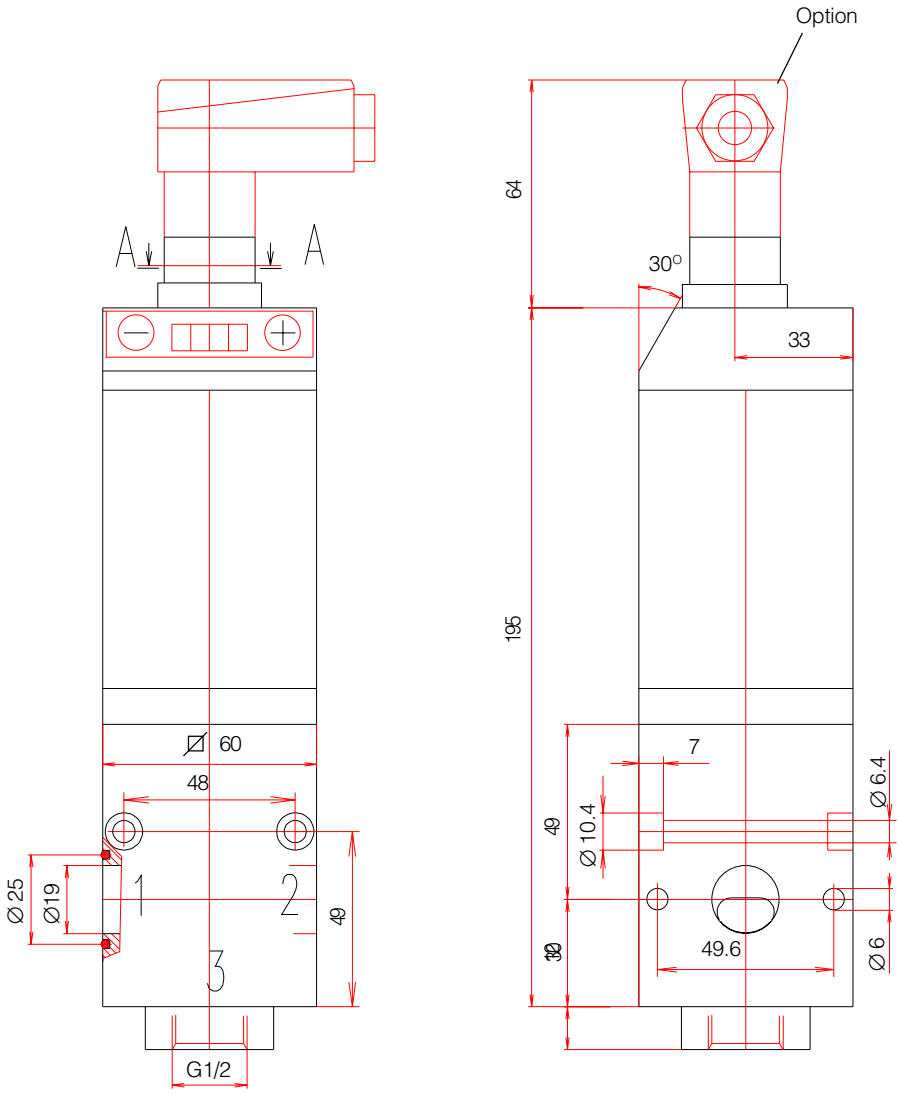
The regulation speed off the pressure regulator can be modified by means of one parameter. (P 20)
The value in this parameter has a range from 0-5, an higer value means slower regulation speed. (but more accurate).
When the value 0 is entered, you are able to create your own custom settings true parameters 12,13 and 21.

Dimensions

EPDN with DIN-connector

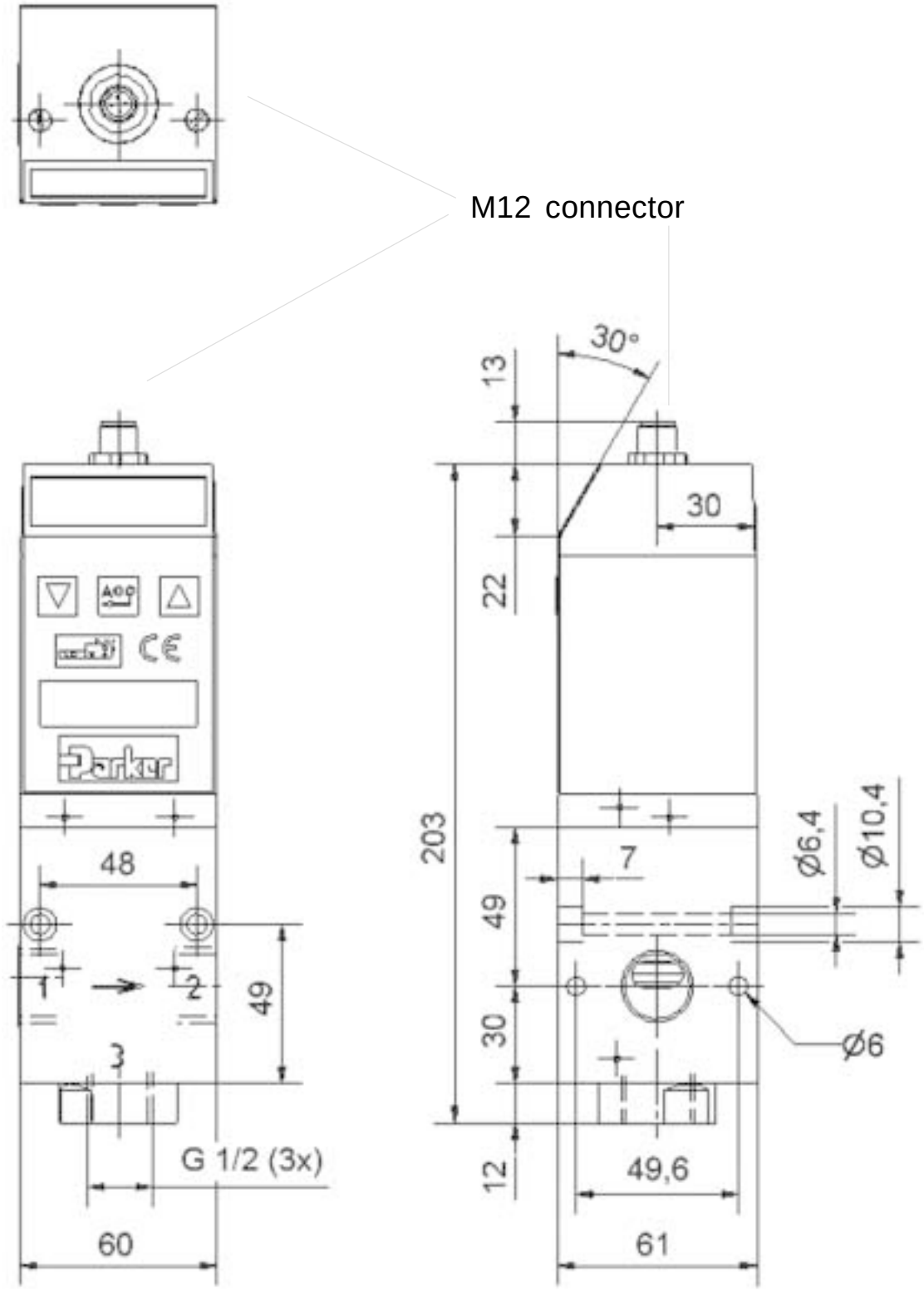


View AA



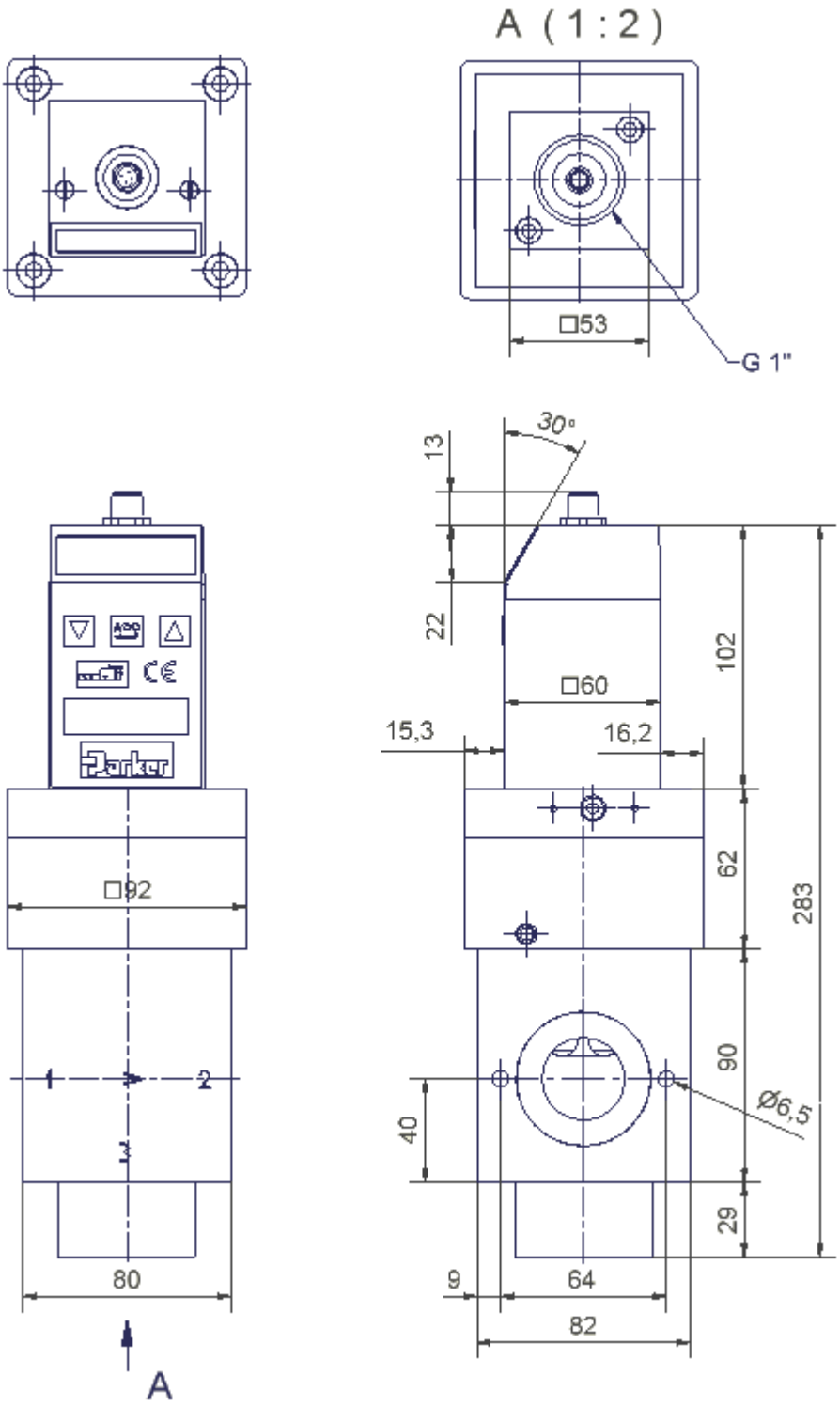
Dimensions

EPDN with M12 connector



Dimensions

EPDN8-MP with M12 connector



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