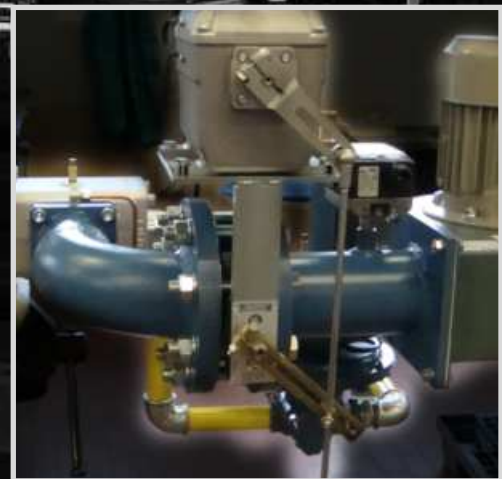


## Valves



Butterfly valves  
manual and motorized

EBV-M & EBV-CMAP (E1305 rev. 02 - 07/04/2011)



## GENERAL WARNINGS:



■ All installation, maintenance, ignition and setting must be performed by qualified staff, respecting the norms present at the time and place of the installation.

■ To avoid damage to people and things, it is essential to observe all the points indicated in this handbook. The reported indications do not exonerate the Client/User from observing general or specific laws concerning accidents and environmental safeguarding.

■ The operator must wear proper DPI clothing (shoes, helmets...) and respect the general safety, prevention and precaution norms.

■ To avoid the risks of burns or high voltage electrocution, the operator must avoid all contact with the burner and its control devices during the ignition phase and while it is running at high temperatures.

■ All ordinary and extraordinary maintenance must be performed when the system is stopped.

■ To assure correct and safe use of the combustion plant, it is of extreme importance that the contents of this document be brought to the attention of and be meticulously observed by all personnel in charge of controlling and working the devices.

■ The functioning of a combustion plant can be dangerous and cause injuries to persons or damage to equipment. Every burner must be provided with certified combustion safety and supervision devices.

■ The burner must be installed correctly to prevent any type of accidental/undesired heat transmission from the flame to the operator or the equipment.

■ The performances indicated in this technical document regarding the range of products are a result of experimental tests carried out at ESA-PYRONICS. The tests have been performed using ignition systems, flame detectors and supervisors developed by ESA-PYRONICS. The respect of the above mentioned functioning conditions cannot be guaranteed if equipment, which is not present in the ESA-PYRONICS catalogue, is used.

## DISPOSAL:



To dispose of the product, abide by the local legislations regarding it.

## GENERAL NOTES:



■ In accordance to the internal policy of constant quality improvement, ESA-PYRONICS reserves the right to modify the technical characteristics of the present document at any time and without warning.

■ It is possible to download technical sheets which have been updated to the latest revision from the [www.esapyronics.com](http://www.esapyronics.com) website.

## CERTIFICATIONS:



### EN746-2

The products manufactured by ESA-PYRONICS have been created in conformity to the **UNI EN 746-2:2010** Norms: Equipment for industrial thermal process - Part 2: Safety requirements for combustion and the movement and treatment of combustible elements. This norm is in harmony with the Machine Directive **2006/42/CE**. It is certified that the products in question respect all the requirements prescribed by the above mentioned Norms and Directives. These have been designed, produced, controlled and tested in accordance to the company's internal procedures for quality control, certified in conformity with the **UNI EN ISO 9001:2008** Norm by DNV Italia s.r.l.



Conforms to the **2006/95/CE** (low voltage) Directive.



The products conform to the Russian market requirements according to the **GOST** and **GOSGORTEKHNAZOR** certification.

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The EBV butterfly valve series are suitable for the adjustment of cold or hot air flow in low pressure ducts.

### APPLICATIONS

- Air and fume flow adjustment.
- Air interception.
- Air and fume partializing.
- Manual control or with electric motor unit.

### CHARACTERISTICS

#### VALVE:

- Maximum working pressure: 210 mbar
- Maximum fluid temperature: 450°C
- Drawing capacity with closed valve: about 2%
- Available sizes: from DN65 PN16 to DN150 PN16
- Coupling flanges: excluded
- Flange gaskets: excluded

#### ELECTRIC MOTOR UNIT:

- Model: ECON-O
- Couple: 20Nm (opzioni 4Nm/7Nm/15Nm)
- Voltage supply: 24/115/230Vac +10 ÷ -5%
- Frequency supply: 50 ÷ 60Hz
- Command signal: open/close or proportional
- Proportional command type: 0-10V 4-20mA  
(only for ECON-O 24 Vac)
- Functioning temperature: -10°C ÷ +60°C
- Storage temperature: -20°C ÷ +80°C
- Absorbtion: 7VA
- n° 2 auxiliary switch flow: 5A/250Vac
- Feedback resistor open/close mod.:  
nr.1 1000 Ohm  
(options 150 Ohm/1000 Ohm/2500 Ohm)
- Feedback signal proportional mod.: 0-10Vdc
- Rotation angle: 90°
- Rotation period at 90°: 60 sec.  
(options from 7 sec. to 120 sec.)
- Lever shaft connection: panel 9,5 mm
- Control station AUTO-MAN: included
- Protection degree: IP54
- Mass: 2,5 Kg
- Electric cable inlet: nr. 2 threaded inlets PG 13,5
- Mounting position: any
- Work environment: Not appropriate in explosive or corrosive environments

#### MATERIAL COMPOSITION:

- Valve body: Cast iron G40
- Lens holder shaft: AISI316
- Valve disc: AISI304
- Manual activation lever: aluminium (M version)
- Motor unit case: die-cast aluminium
- Motor unit support plate: Fe360
- Motor unit coupling rod: Fe360

#### EBV-M



F130503

#### EBV-CMAP



F130504

- Valve command lever: brass (CMAP version)
- Surface treatment: zinc coated

## DESCRIPTION

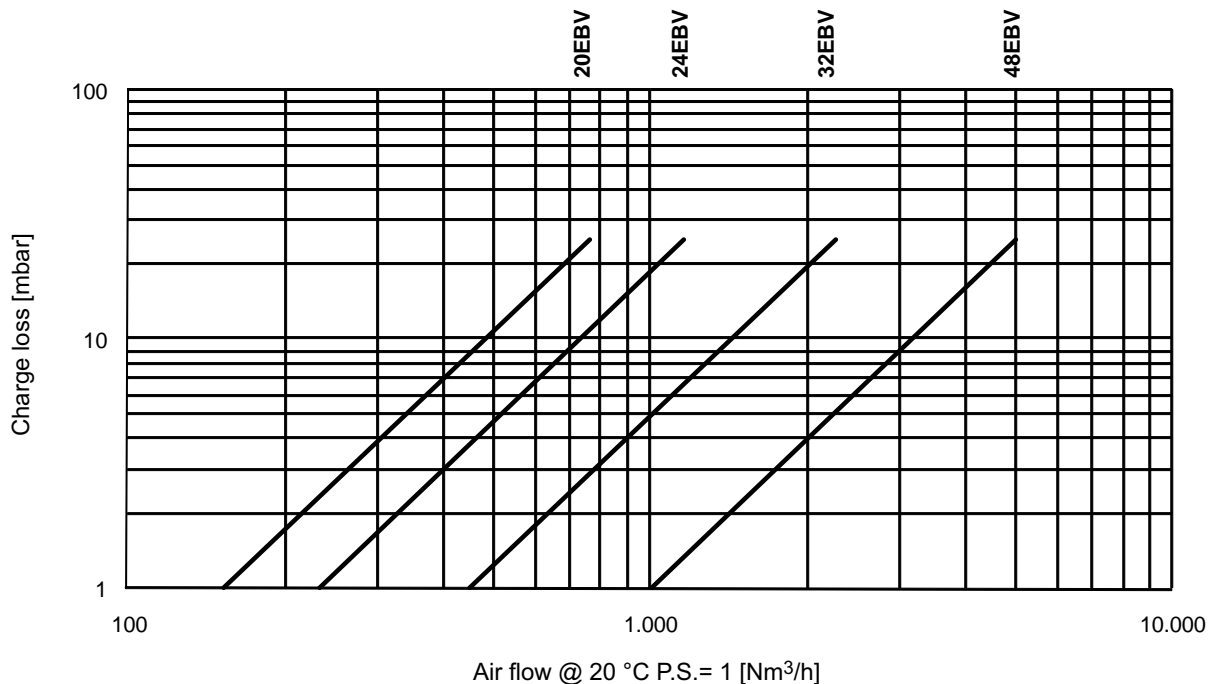
The EBV butterfly valve series is subdivided into two categories: manual valves that can be identified with the suffix **M** and automatic valves with an electric motor unit, identifiable with suffix **CMAP**. The EBV-M valves have been created to facilitate the use by the operator. They are composed of a butterfly valve body and a manual lever placed on top, including an opening block device in various positions. The EBV-CMAP are used in automatic applications in which the opening and closing of the butterfly element is controlled by an electric motor unit. The motor unit is mounted on a support plate and is connected to the valve stem by a jointed lever system, adjusta-

ble rods and couplings, for better calibration according to the application needs. The holes in the support plate allow the mounting of various types of motor units if the ECON-O model is not applicable. ESA-PYRONICS supplies the EBV-CMAP valves with ECON-O motor units which are predisposed for an adjustment of  $0 \div 90^\circ$ . All the motor units have a manual command station, two auxiliary switches set at  $10^\circ$  and  $80^\circ$  and a signal for the feedback of the point reached. In particular, for the models with the open/close command, feedback takes place via an ohm resistor. While in the models with the proportional command a similar signal is available in volts.

## FLOW CHART

**EBV valves must be chosen according to their desired use: the valve used as an interception device must have the same diameter as the pipe, meanwhi-**

**le if it is used as an adjustment organ, it must guarantee a charge which is compatible with an adequate adjustment.**



G130501

## WARNINGS

■ Make sure that the working pressure and the fluid temperature are lower than the maximum allowed values.

■ The EBV series valves are supplied without coupling flanges or gaskets. The flanges and gaskets to be applied must be suitable for the type of valve and its application.

■ Check the correct installation of the valve before starting the flow in the pipeline.

■ Check the correct electric connections. Before activating the electric supply to the motor unit, make sure that the voltage, frequency and command signal are correct. Check that the users' absorption is not higher than the maximum flow of the auxiliary switch contacts.

■ The motor unit is intended to be electrically connected on a permanent basis. Inverting the connection phase/neutro can compromise the safety of the system.

Do not use different phases among the various voltage inlets and do not apply voltage on the outlet clamps.

■ Intervene on the motor unit and its connected devices only in the absence of voltage supply (electric current disconnected). Number the conductors before disconnecting the device.

■ To avoid damaging the internal adapter, do not rotate the motor unit shaft neither by forcing the lever nor with tools.

■ In case of valve or motor unit malfunctioning, follow the instructions in the "MAINTENANCE" chapter of the present manual, or contact ESA-PYRONICS assistance service.

■ Any modification or repair done by third parties may compromise the application safety and will automatically cause the general warranty conditions to expire.

## INSTALLATION

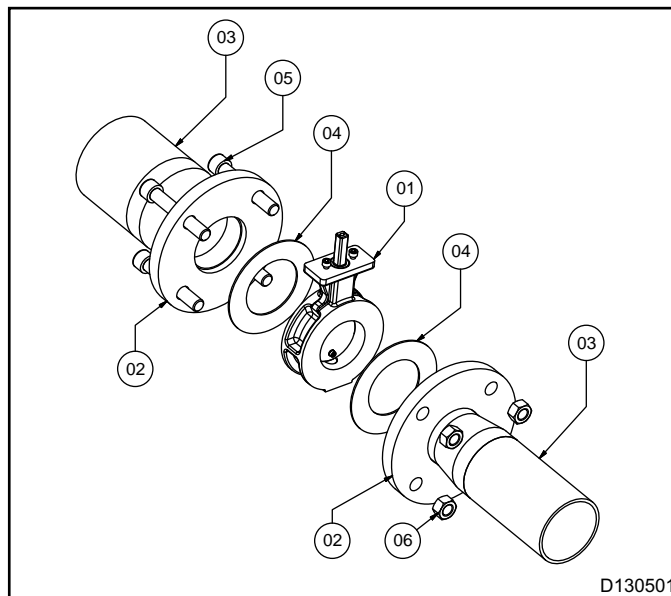
To install, carefully follow the instructions below:

### ASSEMBLY

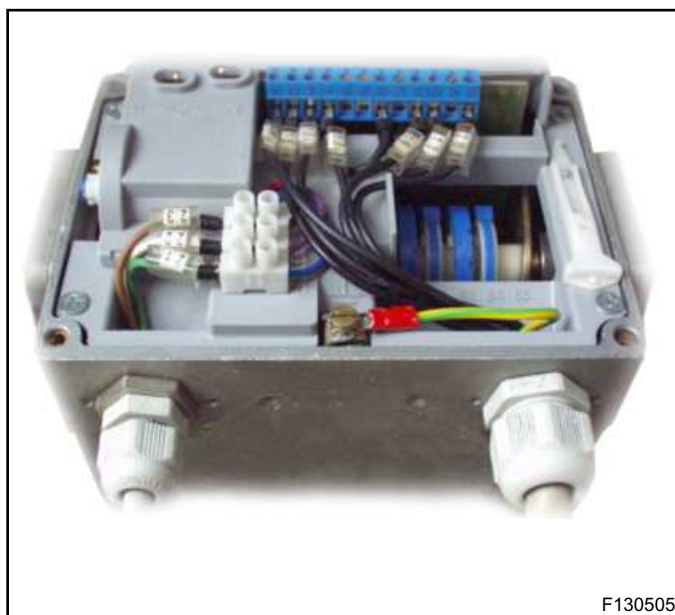
- 1 - Arrange the EBV valves far from excessive heat sources and products such as: liquids, solvents or corrosive gases.
- 2 - The valve (**pos. 01**) can be installed in any position. Maintain a certain distance from the surrounding elements allowing air to circulate freely.
- 3 - Check that the flanges (**pos. 02**), gaskets (**pos. 04**) and pipes (**pos. 03**) are compatible with the valve and fluid.
- 4 - Check the correct alignment of the pipe fittings and check the correct distance between the pipes and the assembly (flanges/gaskets/valve body), to avoid exerting tension on the pipes during the tightening phase.
- 5 - Weld the flanges (**pos.2**) at the ends of the pipes, eliminating possible welding dribbles.
- 6 - Make sure that there are no foreign objects inside the valve or in the pipes before proceeding to assemble. If necessary remove the impurities.
- 7 - Position the valve between the two flanges (**pos. 04**), bolts (**pos.05**), washers and nuts (**pos. 06**).
- 8 - Using appropriate instruments, progressively screw the bolts on crossing them over each other, avoiding excessive tightening.

### ELECTRICAL CONNECTION

- 1 - Check that the motor unit is compatible with the control system, both for voltage supply as well as for the type of command.
- 2 - Use the inlets that have already been placed on the motor unit for the passage of the electric cables, without making other holes in the case. Install cable glands or



- conduit fittings made to warrantee a protection degree equal or not inferior to IP40. For systems used in open air the minimum protection degree must be equal to IP54. The degree of protection can also be guaranteed by the container in which the device has been inserted.
- 3 - The command signal cable of the proportional motor unit must be screened and the drafting must be done separately from the power supply lines, the motor controls (inverter) and the network voltage; in particular, multipole cables must not be used.
- 4 - If the power feed system is a phase-phase type, it is necessary to install an insulating transformer with a secondary earthing connection.
- 5 - When connecting the electricity refer to the technical documentation, respecting the polarity between phase and neutral. The electrical connection clamps are screw on type and can accept section conductors from 0.5 to 2.5mm<sup>2</sup>; the choice of conductors and their location must be suitable for the application. The numbering and the use of appropriate terminals on these conductors is suggested.
- 6 - Always make sure that the earthing protection is connected to the relative clamps and to the motor unit box by conductors with appropriate sections.
- 7 - After the connection procedure make sure that the conductors do not interfere internally with the motor unit's gear system. Close the lid, checking the correct position of the gasket and verifying that the conductors do not remain squashed between the lid and the box.



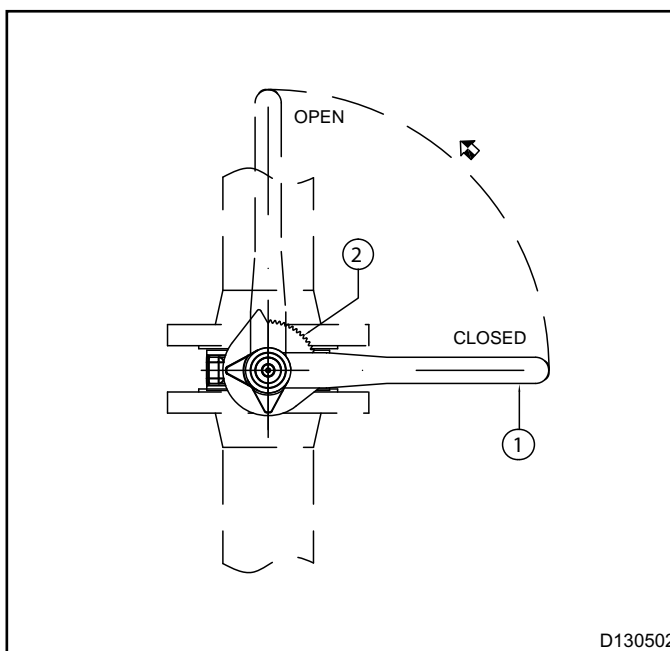
## ADJUSTMENT - SETTING

The operations indicated in the following chapter must be carried out by technically qualified and expert staff. During the adjustment phase monitor the pipe flow using flow measurement devices (calibrated flanges, differential pressure gauges, etc...)

### EBV-M VALVE

The adjustment and setting of the EBV-M manual valves takes place using, as a reference, the dented metallic disc placed under the adjustment lever, on which the opening and closing limits are indicated.

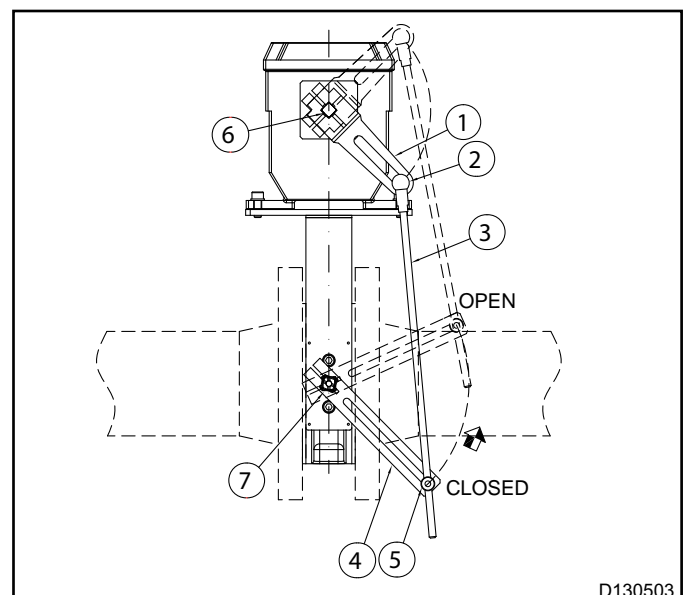
- 1 - Grip the handle (**pos. 01**) placed on top of the valve and lift the arm underneath so as to unhook the block device from the dented disc (**pos. 02**).
- 2 - Rotate the lever (**pos. 01**) until reaching the new desired adjustment position. The rotation angle of the valve is 90° and when the lever is in the transversal position compared to the piping, the valve is CLOSED. Otherwise, when it is in the longitudinal position compared to the piping the valve is OPEN.
- 3 - Let go of the arm underneath the lever (**pos. 01**), checking that the block device hooks onto the dented disc (**pos. 02**), blocking the valve in its new position.
- 4 - If more than one valve is adjusted on a shunt from the same pipe, at the end of the adjustment procedure, check the setting of the first valves to make sure it has not altered. Otherwise re-adjust them again.

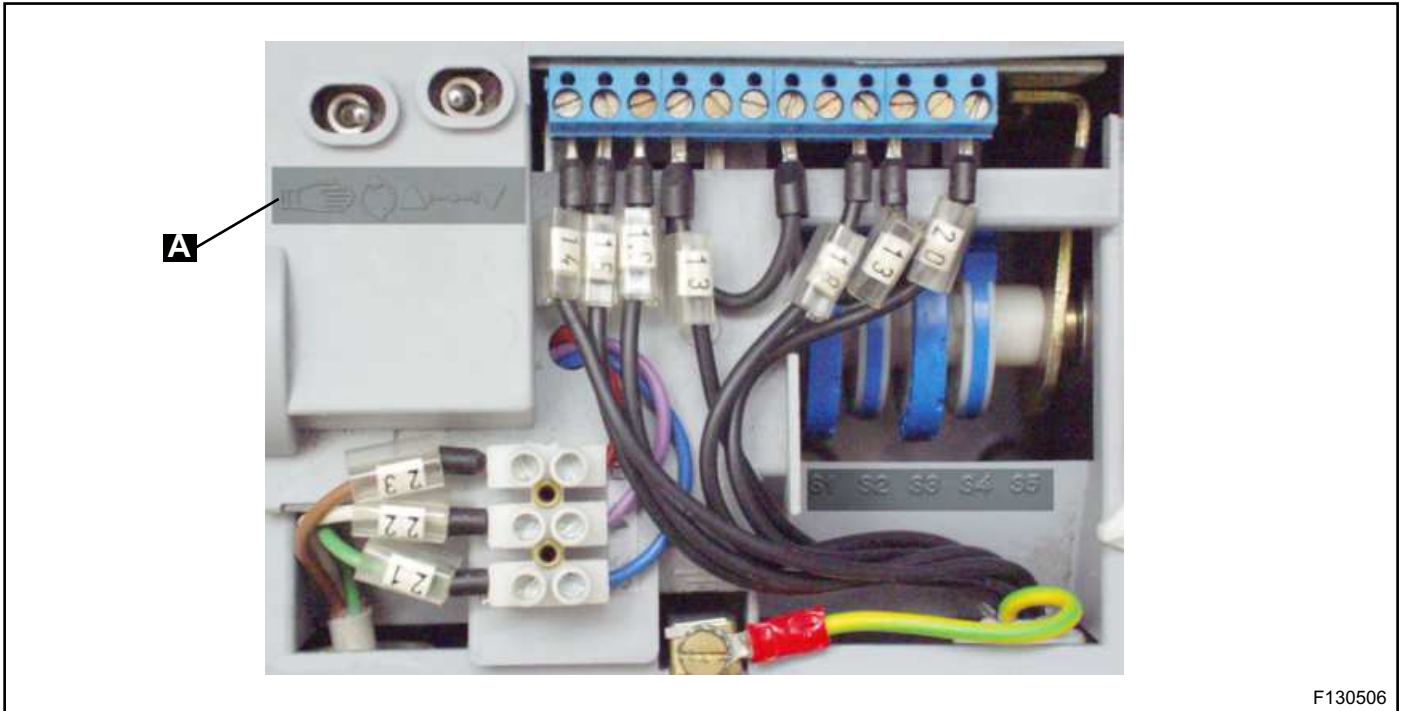


### EBV-CMAP VALVE

The adjustment and setting of the motorized EBV-CMAP valves defines the minimum and maximum opening of the valve controlled by the motor unit. The two limit positions of the valve movement must correspond to the minimum and maximum flow desired in the case of an adjustment valve, whilst in the case of an interception valve (factory adjustment) the limit positions must correspond to open or closed valve. Adjustment takes place by varying the rotation angle of the valve compared to the motor unit, acting on levers and return joints. The reduction of the motor unit's stroke is not advised for models with open/close command and is not possible for proportional motor units.

- 1 - Open the lid of the motor unit to get access to the manual command station. Place the AUTO/MAN commutator in the manual position indicated with the hand **A** (see pag. 8), and then supply electrical connection to the motor unit.
- 2 - Place the OPEN/CLOSE switch on the ▼ symbol (closed), so that the shaft rotates in the clockwise direction allowing the valve to close completely. The S1 cam defines the closing position limit.
- 3 - Loosen the rod locking grain which is placed on the valve joint (**pos. 05**). Manually adjust the minimum opening of the valve making the rod slide (**pos. 03**) inside the joint moving the valve through its appropriate jointed lever (**pos. 04**) obtaining the minimum flow requested. At the end fasten the locking grain.
- 4 - Place the OPEN/CLOSE switch on the ▲ symbol (open), so that the shaft rotates in the anticlockwise direction allowing the valve to open completely. The S2 cam defines the opening position limit. Check the adjusted flow rate of the valve during the passing from minimum to maximum opening positions.





F130506

- 5 - Consider the adjustment made by the valve on the flow: if the maximum flow rate has been reached before the motor unit gets to the maximum opening, the valve stroke must be reduced, otherwise it must be increased.
- 6 - Put the valve back to the minimum opening position (see point 2) until the motor unit stops working.
- 7 - Change the position of the joints (**pos. 02** and **pos. 05**) making them slide into the appropriate jointed levers (**pos. 01** and **pos. 04**). To decrease the valve stroke compared to the motor unit it is necessary to bring the joint (**pos. 02**) closer to the motor unit pivot (**pos. 06**), or move the joint (**pos. 05**) away from the valve pivot (**pos. 07**). The difference between the two actions is that, with equal displacement, the one carried out on the jointed lever motor unit (1) changes the valve opening angle the most.
- 8 - Adjust the minimum opening again according to the description in point 3.
- 9 - Check the new adjustment of the valve repeating the operations indicated between step 4 and 8 until obtaining the requested flow regulation.
- 10 - Place the AUTO/MAN commutator on the automatic position checking that the motor unit respects the system's control commands. Finally, close the lid again, checking the correct positioning of the gasket and making sure that the conductors do not remain squashed between the lid and the box.

The ECON-O motor units are supplied by the factory already prepared for a 90° rotation, with the S3 and S4 auxiliary switches respectively adjusted at 10° (S3 minimum opening) and 80° (S4 maximum opening).

For the open/close motor units the resistor is prepared for a 90° angle rotation. If the motor unit's rotation angle is reduced, the resistance variation will be proportionally reduced, whereas if the angle is increased, there will be no further increase of the resistance. For the motor units that have a proportional command, all calibrations have already been set by the factory and therefore any intervention on the cam limits (S1 e S2) and resistor is unadvisable. To adjust the S3 and S4 auxiliary switches follow the following indications:

- 1 - Open the motor unit lid to get access to the manual command station. Place the AUTO/MAN commutator on the manual position indicated with hand **A**.
- 2 - Via the OPEN/CLOSE switch place the valve in the desired position, corresponding to the activation of the auxiliary switch.
- 3 - Adjust the auxiliary switches' cam using the straight part of the special lever: insert the rod in one of the holes situated on the sides of the mobile corona of the cam and drag it to the desired position. If the mobile corona is in a completely withdrawn position, use the curved part of the lever to drag it into a more suitable position for adjustment.
- 4 - Take the lever away before starting the motor unit. Via the OPEN/CLOSE switch move the motor unit, checking that the activation of the auxiliary switch is in the correct position.
- 5 - Finally place the AUTO/MAN commutator in the automatic position and close the lid again, checking the correct positioning of the gasket and the conductors.



## GENERAL MAINTENANCE PLAN

Operation	Type (*)	Suggested Schedule	Notes
<b>Gasket integrity</b>	O	annual	Check that there are no air or fume leaks towards the outside.
<b>Bolt fixing</b>	S	annual	In case there are vibrations, reduce to a half - yearly application.
<b>Motor unit cable connection integrity</b>	O	half yearly	Check the external insulation integrity as well as the absence of abrasions or the overheating of conductors.
<b>Valve movement</b>	O/S	half yearly	Check the absence of hindrance of the valve movement.
<b>Valve adjustment</b>	O/S	annual	Check the flow adjustment carried out by the valve.
<b>Electric motor unit</b>	O/S	annual	Check that the commands are respected and that the auxiliary switches and the feedback signals are correct.
<b>Maintenance of the butterfly valve</b>	S	annual	Check the state of the internal elements of the valve.

### NOTES:

Caption: O = ordinary / S = extraordinary

(\*) it is advised that you replace the gaskets after everytime you disassemble the valve.

## ORDINARY MAINTENANCE

For a correct maintenance of the EBV valves, scrupulously follow the instructions given below. Before carrying out any manouvre with the plant on, make sure that the process safety as well as that of the operator are in no way compromised, or else check and verify with the plant turned off.

### INTEGRITY CHECK

- The integrity of the gaskets can be checked visually. if the use of leak detector liquids is necessary, it is possible to check only if the flow inside the conductor is cold and in low pressure.
- The integrity of the electric cables can be checked visually. If it is necessary to operate on the conductors, not being totally visible, disconnect the power feed to the device before carrying out any type of operation. Before replacing the motor unit, make sure that the actual motor unit is in fact the cause of the malfunctioning.

### VALVE MOVEMENT

- The test to see that there is nothing hindering the valve movement takes place by carrying out a complete excursion, visually checking that there are neither friction nor stroke limitations. If the valve is for air or fume interception, before carrying out the operation, turn the connected burners off.

### VALVE ADJUSTMENT - ELECTRIC MOTOR UNIT

- Check with burners off but with flow present in the duct. Check that the adjustment made by the valve is correct, if necessary repeat all the steps in the "ADJUSTMENT - SETTING" chapter.
- The motor unit must be checked when the burners are off and can be done with or without flow. Make sure that the commands sent by the control system are carried out by the motor unit and that the feedback position and auxiliary switch signals send the control system correct indications. If necessary repeat all the steps in the "ADJUSTMENT - SETTING" chapter.

## EXTRAORDINARY MAINTENANCE

For a correct maintenance of the EBV valves, scrupulously follow the following instructions that are to be carried out with the plant off.

### BOLT TIGHTENING

- Bolt tightening must be checked when the plant is off and cold.

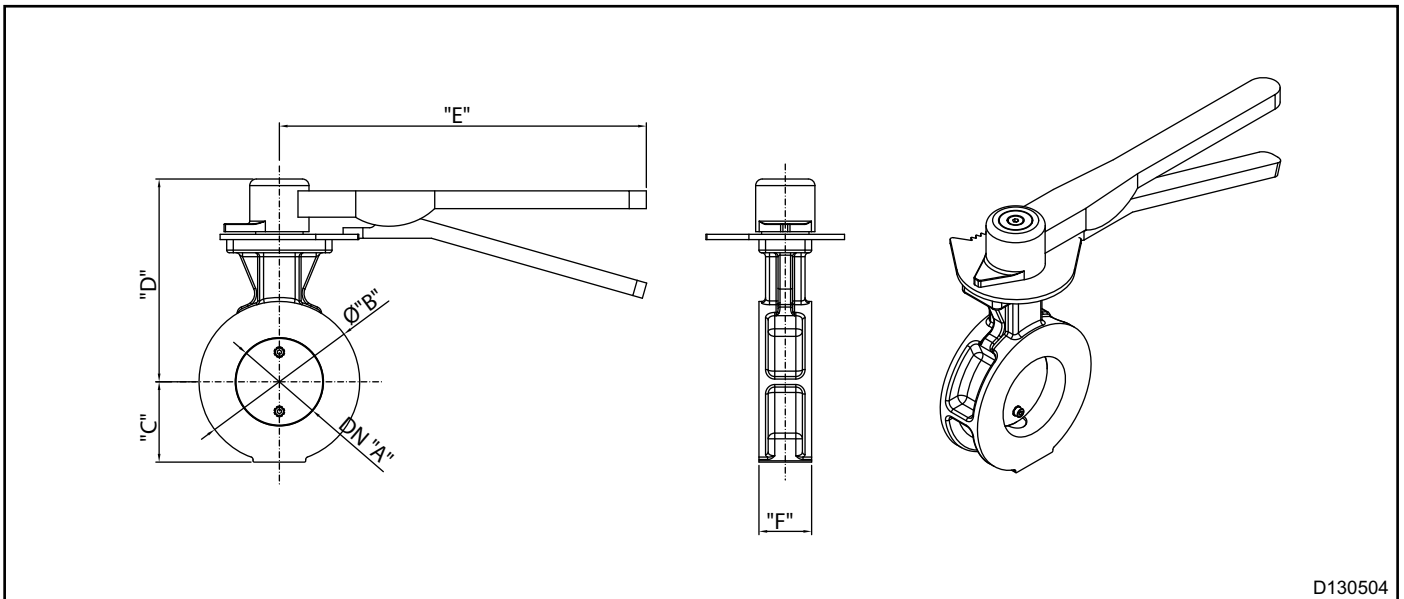
### BUTTERFLY VALVE MAINTENANCE - GASKET REPLACEMENT

- 1 - Close the interception valve upstream the piping and make sure there is no flow in the duct.
- 2 - Place the valve in the completely closed position, otherwise it will not be possible to extract the piping.
- 3 - Progressively unscrew the screws which fix the valve in a crossed position. Extract the valve and check the state of the internal components.
- 4 - Clean the inside of the valve body and the butterfly group with a clean cloth and compressed air. Do not use tools that could damage the internal parts.
- 5 - Check the correct tightening of the butterfly fixing screws on the lens holder shaft.
- 6 - Make sure that the butterfly moves freely without friction. If necessary lubricate with mineral oil which is suitable for high temperatures.
- 7 - Replace the gaskets and reassemble the valve in its place, following the steps indicated in the "INSTALLATION" section.
- 8 - Finally check that the valve moves freely without hindrance.
- 9 - Check that the adjustment carried out by the valve is correct, if necessary repeat all the steps indicated in the "ADJUSTMENT - SETTING" chapter.

### MOTOR UNIT REPLACEMENT

- 1 - Make sure the motor unit is indeed the cause of malfunctioning and check that you have a spare unit motor which is the same as the one that needs replacing.
- 2 - Disconnect electric supply, remove the lid of the motor unit and then disconnect all electric connections from the clamp. Extract the conductors from their case being careful not to damage them.
- 3 - Unhook the jointed lever (**pos. 01**) from the motor unit rod (**pos. 06**) without loosening the joint adjustments (**pos. 02** and **pos.05**), so that afterwards the adjustment operations are facilitated (rod position of motor unit constant).
- 4 - Remove the motor unit fixing screws of the support plate and remove it.
- 5 - Secure the new motor unit onto the support plate, reconnect the jointed lever (**pos. 01**) to the motor unit rod (**pos. 06**) paying attention not to erroneously place the butterfly opening indicator.
- 6 - Reinsert the conductors back into the motor unit case and connect them to the clamp referring to the electric wiring diagram.
- 7 - Make sure that the commands sent by the control system are carried out by the motor unit and that the feedback position and auxiliary switch signals send the control system correct indications. If necessary repeat all the steps in the "ADJUSTMENT - SETTING" chapter.

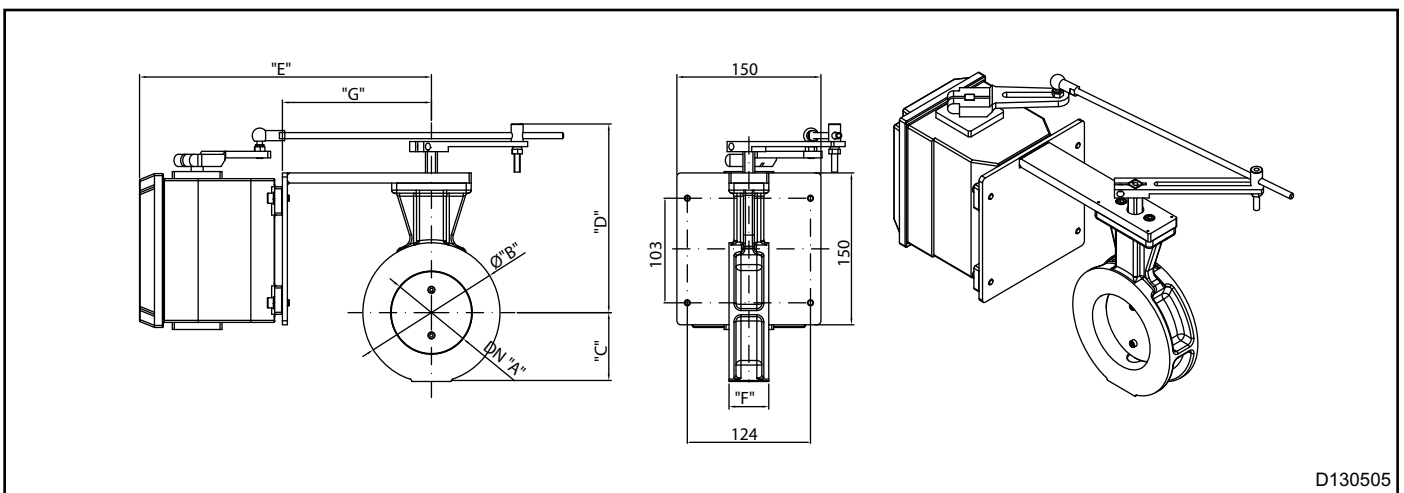
**OVERALL DIMENSIONS - EBV-M**



D130504

Model	DN "A"	Ø "B"	"C"	"D"	"E"	"F"	Mass kg
20EBV	DN65	122	60	154	313	40	3
24EBV	DN80	138	68	174	313	40	3.6
32EBV	DN100	158	81	184	313	46	4.95
48EBV	DN150	212	110	204	313	54	6.95

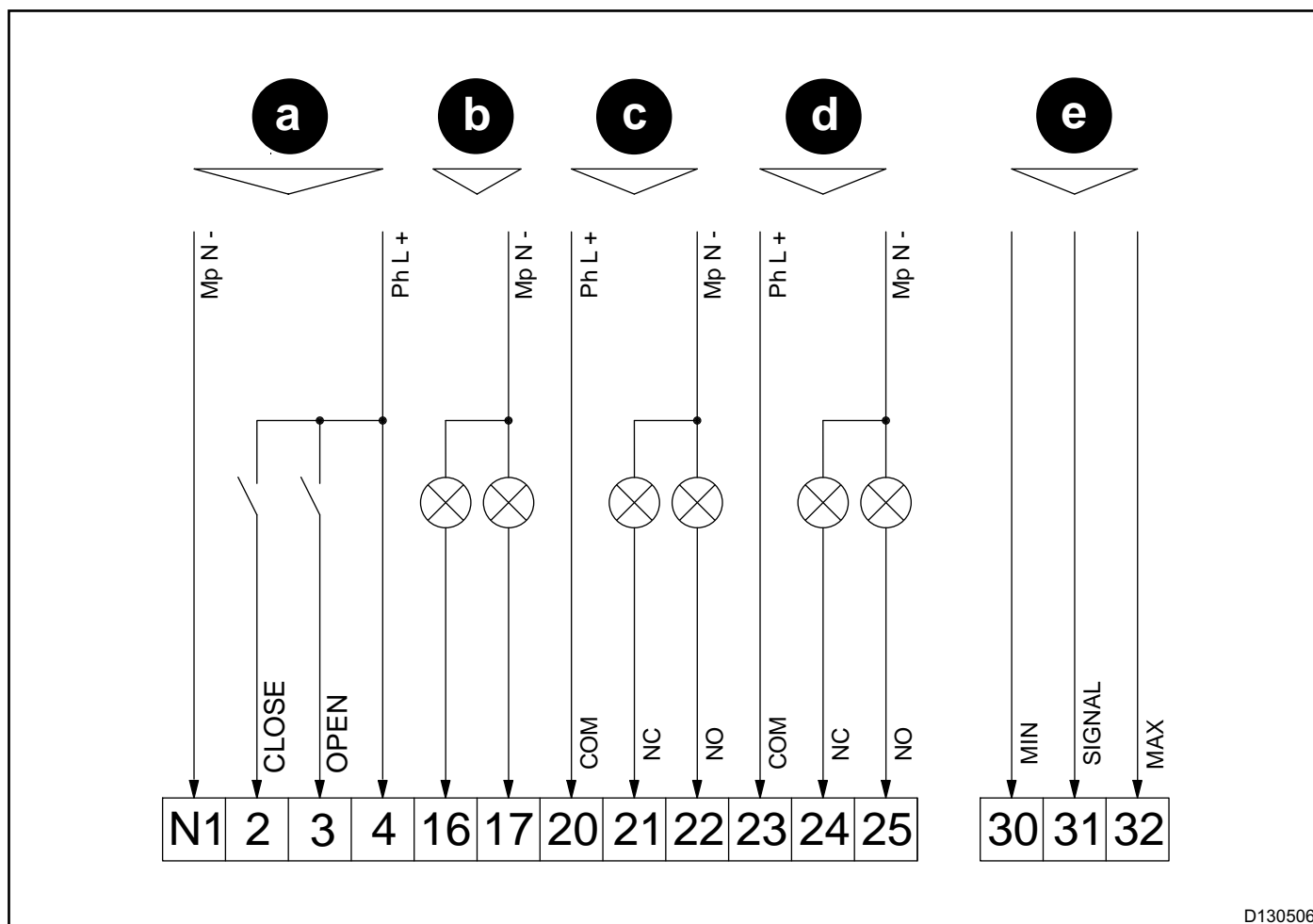
**OVERALL DIMENSIONS - EBV-CMAP**



D130505

Model	DN "A"	Ø "B"	"C"	"D" IS	"E"	"F"	"G"	Mass kg
20EBV-CMAP	DN65	122	60	160	295	40	150	6.5
24EBV-CMAP	DN80	138	68	180	295	40	150	7.1
32EBV-CMAP	DN100	158	81	190	405	46	260	8.45
48EBV-CMAP	DN150	212	110	210	405	54	260	10.7

**ELECTRIC CONNECTIONS - OPEN/CLOSE MOTOR UNIT**



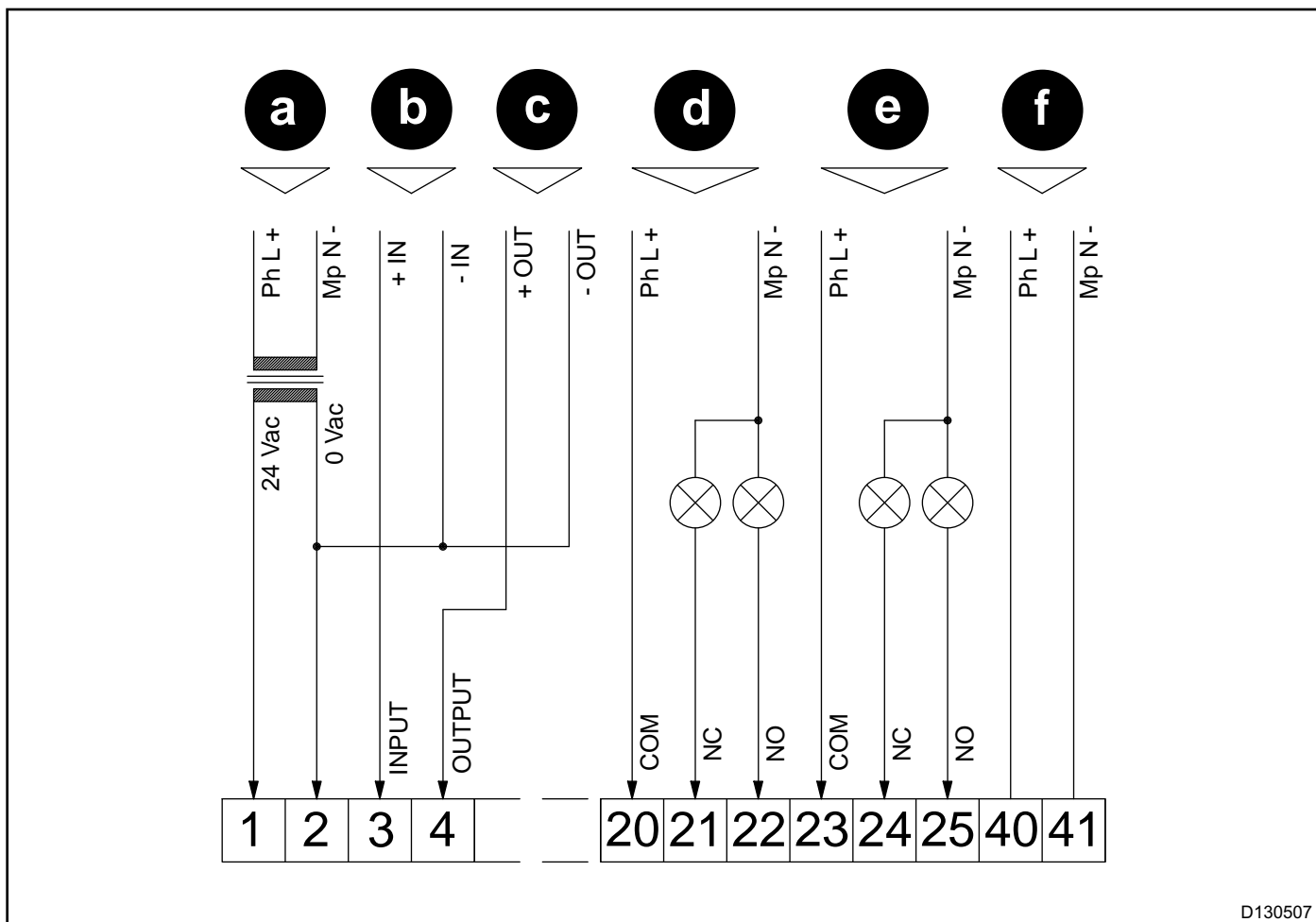
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Pos.	Description	Pos.	Description
a	Power feeding and rotation commands	d	S4 auxiliary switch outputs
b	Outputs for position limit reached	e	Resistor outputs feedback position
c	S4 auxiliary switch outputs		

**CLAMP CONNECTOR**

Pos.	Description	Pos.	Description
N1	Neutral feeding	22	Auxiliary switch output S3 (NO)
2	Closing command input (phase)	23	Auxiliary switch output S4 (COM)
3	Opening command input (phase)	24	Auxiliary switch output S4 (NC)
4	Power feeding phase	25	Auxiliary switch output S4 (NO)
16	Output for max. opening reached (phase)	30	Feedback resistor output (Minimum)
17	Output for min. opening reached (phase)	31	Feedback resistor output (Cursor)
20	S3 auxiliary switch output (COM)	32	Feedback resistor output (Maximum)
21	S3 auxiliary switch outlet (NC)		

**ELECTRIC CONNECTIONS - PROPORTIONAL MOTOR UNIT**



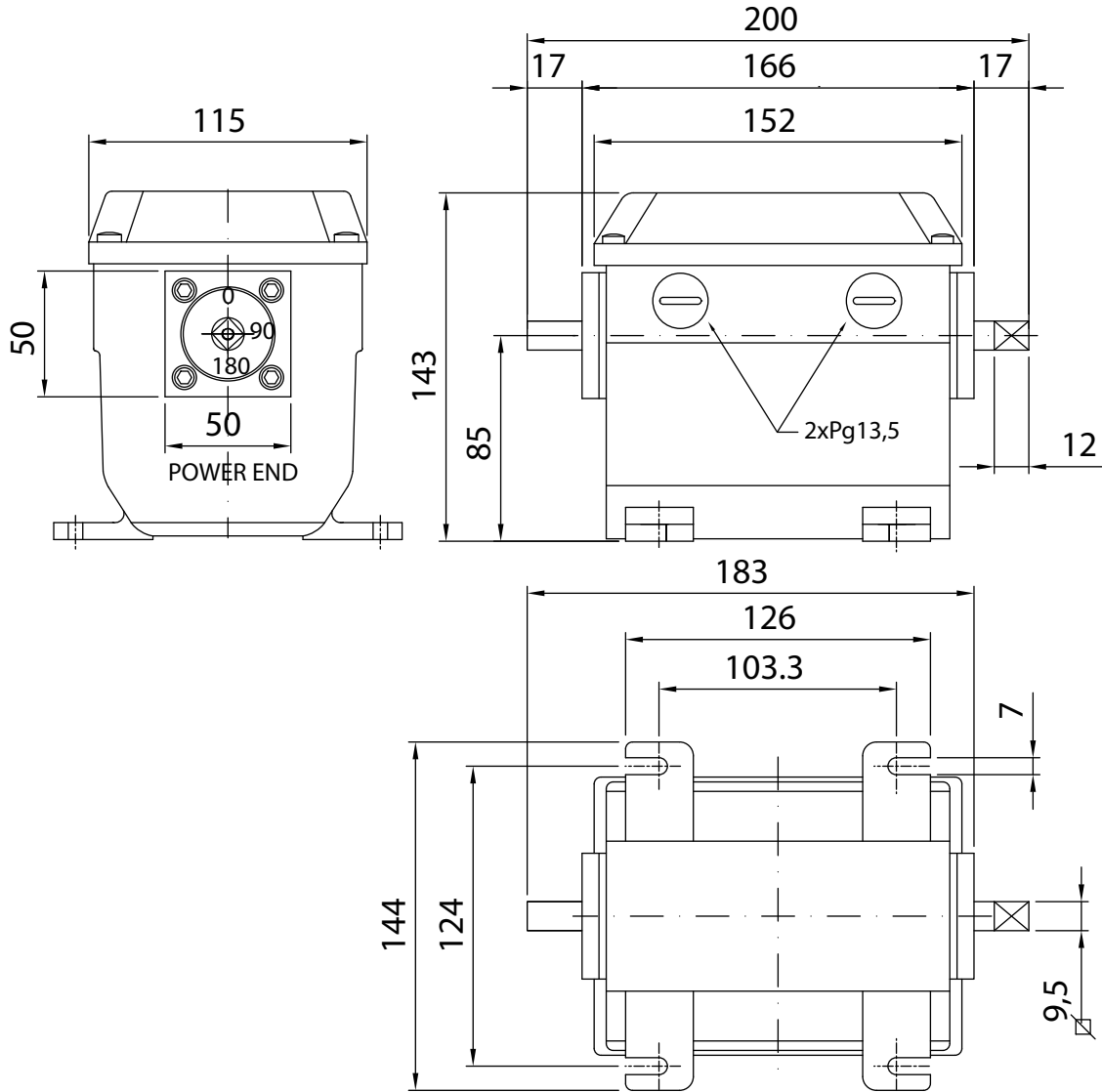
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Pos.	Description	Pos.	Description
<b>a</b>	Power 24Vac	<b>d</b>	S3 Auxiliary limit switch output
<b>b</b>	Analogical comand signal	<b>e</b>	S4 Auxiliary limit switch output
<b>c</b>	Analogical reverse action signal	<b>f</b>	Power feed of optional internal transformer

**CONNECTING CLAMPS**

Pos.	Description	Pos.	Description
<b>1</b>	Power inlet of 24Vac	<b>22</b>	Auxiliary limit switch output S3 (NO)
<b>2</b>	0Vac power feed inlet, negative analogical comand signal and negative reverse action analogical comand.	<b>23</b>	Auxiliary limit switch output S4 (COM)
<b>3</b>	Positive analogical comand signal inlet	<b>24</b>	Auxiliary limit switch output S4 (NC)
<b>4</b>	Positive reverse action analogical comand outlet	<b>25</b>	Auxiliary limit switch output S4 (NO)
<b>20</b>	Auxiliary limit switch output S3 (COM)	<b>40</b>	Power feed phase of optional internal transformer
<b>21</b>	Auxiliary limit switch output S3 (NC)	<b>41</b>	Neutral of optional internal transformer

**OVERALL DIMENSIONS - MOTOR UNIT**



D130508

**ORDERING INITIALS - EBV**



Model		01
DN65	<b>20</b>	
DN80	<b>24</b>	
DN100	<b>32</b>	
DN150	<b>48</b>	

Motor unit voltage feed		03
24Vac 50÷60Hz	<b>24V</b>	
115Vac 50÷60Hz	<b>115V</b>	
230Vac 50÷60Hz	<b>230V</b>	

Type		02
Manual	<b>M</b>	
Automatic with motor unit	<b>CMAP</b>	

(*)Command Type Proportional (only 24V)		04
In current	<b>4-20mA</b>	
In voltage	<b>0-10V</b>	

(\*) Not applicable for models with open/close command.

# ESA worldwide distribution



## AUTHORIZED DISTRIBUTION STAMP



*If you have any doubt about the qualification or identity of the distributor, please check that they appear on our website [www.esapyronics.com](http://www.esapyronics.com) in the Sales Contacts section, or contact us directly at [esa@esacombustion.it](mailto:esa@esacombustion.it)*



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