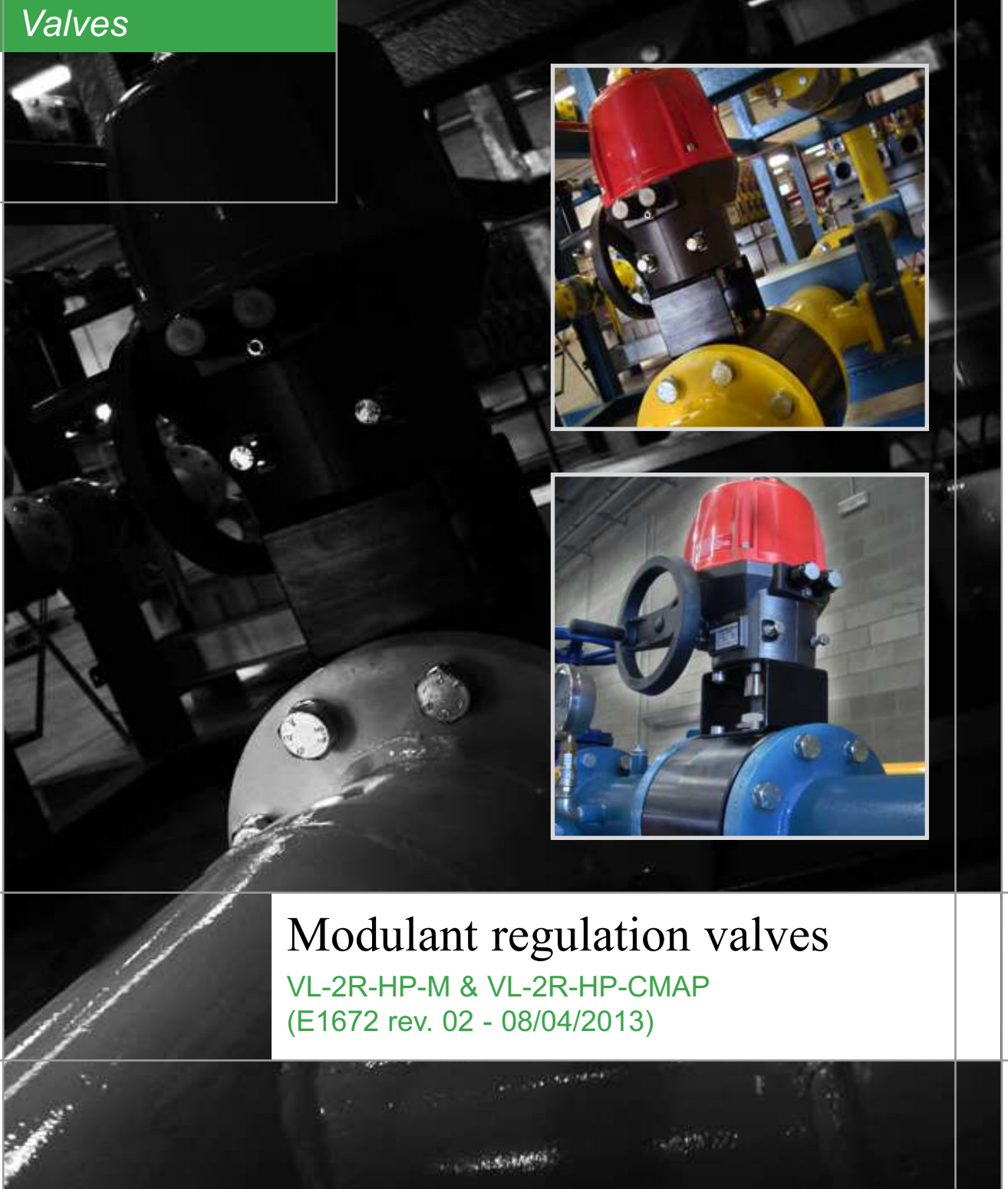


Valves



Modulant regulation valves

VL-2R-HP-M & VL-2R-HP-CMAP
(E1672 rev. 02 - 08/04/2013)

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** website.

■ 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.

■ Certified in conformity with the **UNI EN ISO 9001** Norm by DNV GL.

CERTIFICATIONS:



Conforms to the **2014/35/UE** (low voltage) Directive.



Conforms to American & Canadian Standards **UL CSA C US**.



The products conform to the requests for the Euroasia market (Russia, Belarus and Kazakhstan).

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The VL-2R-HP series valves are suitable for gaseous and liquid fluid flow regulation in high and low pressure ducts.

APPLICATIONS

- Flow regulation of combustion agents and fuel
- Partilization of combustion agents and fuel
- Manual or electric actuator control

CHARACTERISTICS

VALVE:

- Maximum working pressure: 16 bar
- Maximum fluid temperature: 100°C
- Leakage with closed valve: approx. 1 %
- Available sizes: from DN15 PN16 to DN125 PN16
- Coupling flanges: excluded
- Flange gaskets: excluded

ELECTRIC ACTUATOR:

- Model: W300
- Available versions: CE/UL/CSA/ATEX
- Couple: 300Nm
- Supply voltage: 24Vac/dc o 100-240Vac
- Supply frequency: 50 ÷ 60Hz
- Command signal: open/close or proportional
- Proportional command type: 0-10V 4-20mA (optional)
- Working temperature: -20°C ÷ +70°C
- Storage temperature: -20°C ÷ +80°C
- Absorption: 85VA
- n° 4 auxiliary limit switch flow: 5A/250Vac
- Feedback potentiometer open/close mod.: nr.1 1000 Ohm
- Feedback signal proportional mod.: 0-10Vcc 0÷20mA
- Rotation angle: 90°
- Rotation time on 90°: 50 sec.
- Attachment lever shaft: star 22 F07-F10 (ISO5211)
- Manual command: wheel-type
- Protection degree: IP67
- Weight: 5,6 Kg
- Electric cable inlet: nr. 2 threaded inlets ISO M20
- Mounting position: any
- Working environment: Not suitable in explosive or corrosive environments (ATEX version available on request)

MATERIAL COMPOSITION:

- Valve body: carbon steel/Stainless/brass
- Ball: brass
- Tightness: NBR
- Actuator support plate: Fe360
- Actuator coupling rod: Fe360



DESCRIPTION

The VL-2R-HP ball valves can be divided into two categories: manual valves identified by the suffix **M** and automatic valves with electric actuators identified by the suffix **CMAP**. The VL-2R-HP-M valves have been created and conceived to facilitate use by the operator. They consist of a valve body and a manual lever which is placed on the end of the valve. Each valve has a block device that can block the opening in various positions. The VL-2R-HP-CMAP are used for automatic applications, in which the valve opening and closing is controlled by an electric actuator. The actuator is directly connected to the valve stem and has a wheel-type handle to open and close the

valve in abnormal servomotor conditions. The holes in the support plate allow to mount different types of actuators if the W300 model should not be applicable. ESA-PYRONICS supplies the valves already predisposed for 0+ 90° regulation. All actuators have two auxiliary limit switches that are set at 10° and 80°, as well as a feedback signal for the position reached. In particular, in the models having the open/close command, feedback occurs via an ohmic potentiometer, whilst in proportional command models an analogical command in volts is available.

FLOW TABLE

Model	DN	PN	AIR FLOW [Nm ³ /h]							
			Inlet pressure [barg]							
			0,1	0,3	0,6	1	2,5	3	4	5
			Pressure drop [barg]							
			0,03	0,1	0,1	0,4	1	1	1	1
4VL-2R-HP	DN15	16	8,5	16,8	18,6	41,6	80,6	93,0	103,9	113,8
6VL-2R-HP	DN20	16	14,2	28,2	31,2	69,8	134,9	155,7	174,0	190,6
8VL-2R-HP	DN25	16	23,6	46,8	51,9	116,0	224,4	259,0	289,4	317,0
12VL-2R-HP	DN40	16	60,7	120,4	133,5	298,2	576,8	665,7	744,0	814,8
16VL-2R-HP	DN50	16	104,5	207,2	229,6	513,1	992,4	1145,4	1280,1	1402,0
20VL-2R-HP	DN65	16	174,9	346,8	384,4	858,8	1661,2	1917,1	2142,7	2346,7
24VL-2R-HP	DN80	16	401,8	796,7	883,0	1972,8	3816,1	4404,0	4922,2	5390,8
32VL-2R-HP	DN100	16	612,5	1214,7	1346,3	3007,9	5818,3	6714,7	7504,8	8219,2
40VL-2R-HP	DN125	16	971,4	1926,3	2135,0	4770,1	9227,1	10648,7	11901,7	13034,8
48VL-2R-HP	DN150	16	1391,8	2759,9	3058,9	6834,4	13220,1	15256,9	17052,1	18675,5

Conversion formula from air to other gases

Type of gas	Density [Kg/m ³]	K
Air	1,25	1,00
Natural gas	0,80	1,25
Oxygen	1,429	0,94
LPG	2,08	0,77

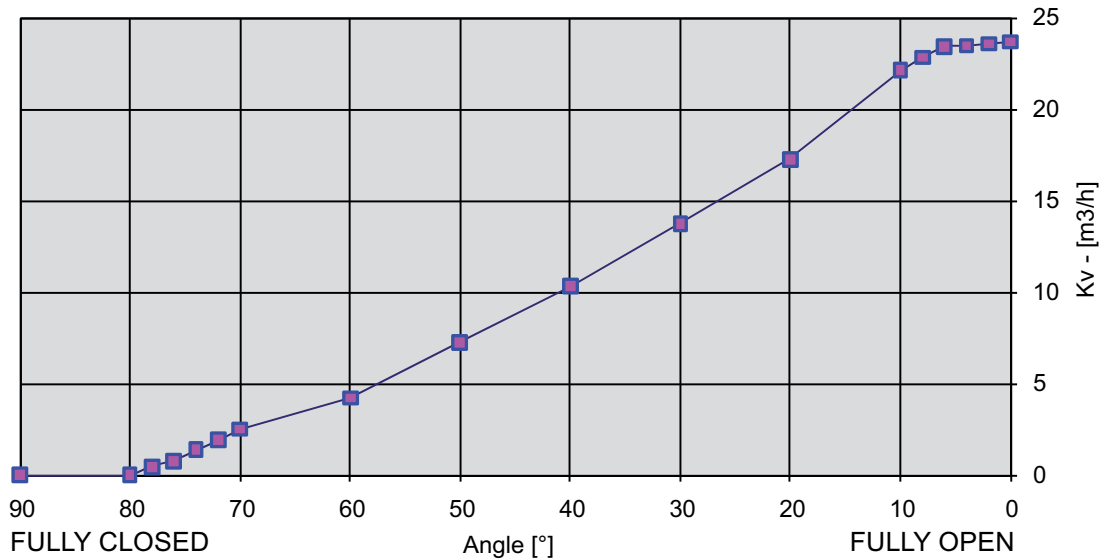
+15°C, 1013 mbar, dry

$$V_{\text{gas to be used}} = V_{\text{air}} \cdot K$$

$$K = \sqrt{\frac{\text{air density}}{\text{gas density}}}$$

VALVE LINEARITY GRAPH

DN50 - Kv



G1672I01

WARNINGS

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

■ The VL-2R-HP series valves are supplied without coupling flanges and gaskets. Flanges and gaskets that are to be predisposed by the client must be suitable for the type of application.

■ Check the correct installation of the valve before starting the flow inside the duct.

■ Check the correct electrical wiring. Before powering the actuator make sure that the voltage, frequency and command signal is correct. Check that the absorption of the users is not higher than the maximum flow of the the limit switch contacts.

■ The actuator is intended to be permanently connected. Inverting the phase/neutral connection may compro-

mise the system safety. Do not use different phases between the various voltage inlets and do not apply tension on the outlet clamps.

■ Operate on the actuator and on the conneted devices only with power off. Before disconnecting the device make sure the conductors have been numbered.

■ Do not rotate the actuator shaft manually by forcing the lever or by using any other means so as not to damage the internal adapter.

■ In case of valve or actuator malfunctioning, follow the indications in this manual at the "MAINTENANCE" chapter or contact ESA-PYRONICS assistance.

■ Any type of modification or repair done by third parties could compromise the application safety and cause the guarantee conditions to automatically expire.

INSTALLATION

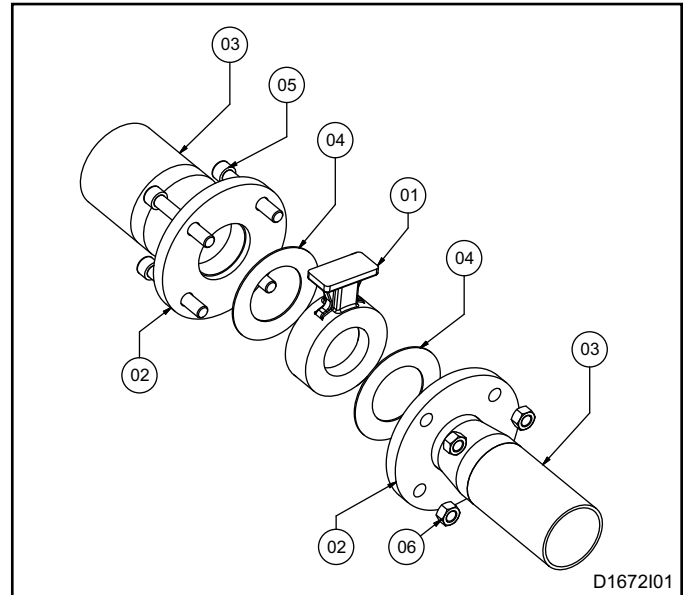
For installation carefully follow the instructions below:

MOUNTING

- 1 - Maintain, where possibile, a constant pressure on the valve inlet.
- 2 - Place the VL-2H-HT valves far from excessive heat sources and products like: liquids, solvents or corrosive gases.
- 3 - The valve (**pos. 01**) may be installed in any position. Keep a certain distance away from surrounding objects to allow for free air circulation.
- 4 - Check that the flanges (**pos. 02**), gaskets (**pos. 04**) and pipes (**pos. 03**) are compatible with the valve and the fluid.
- 5 - Check the correct alignment of the attachment pipes as well as the correct distance between the pipes and the assembly (flanges/gaskets/valve body), to avoid exerting tension on the pipes during the tightening phase.
- 6 - Weld the flanges (**pos.02**) at the end of the tubes, eliminating possible welding burrs.
- 7 - Before assembling, make sure that there are no foreign objects inside the valve or in the pipes. If necessary, remove all impurities.
- 8 - Place the valve between the two flanges, then assemble the gaskets (**pos. 04**), bolts (**pos.05**), washers and nuts (**pos. 06**).
- 9 - Using suitable tools, progressively screw on the bolts crossing them over makin sure not to tighten them excessively.

ELECTRICAL WIRING

- 1 - Check that the actuator is compatible with the control system, both for voltage supply as well as for the type of command.
- 2 - For the passage of electric cables use inlets that are predisposed on the actuator, without making further holes on the cover. Install glands or sheaths to guarantee a protection degree equal to or not lower that IP40. For systems used in open air the protection degree must be equal to IP54. The protection degree may also be guaranteed by the container that houses the device.
- 3 - The command signal cable in the case of proprotional actuators, must be screened and must be laid out separately from the power lines, motor control (inverter)



and network voltage; in particular multipolar cables must not be used. The same applies to position feedback signals, both the open/close type as well as the proportional type.

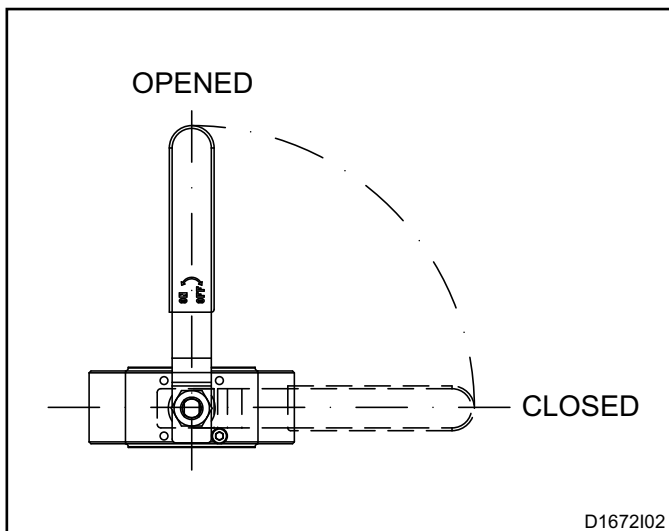
- 4 - If there is a phase-phase type power supply system, the installation of an insulation transformer is necessary with secondary earthing connection.
- 5 - During electrical wiring refer to the technical documentation, respecting the polarity between phase and neutral. The clamps for electrical connections are screw type and can accept section conductors from 0.5 to 2.5mm²; the choice of conductors and their location must be suited to the application. We advise you to number and to use appropriate terminals on conductors.
- 6 - Always make sure that the earthing is connected to the related clamps and to the actuator case by conductors with suitable sections.
- 7 - After wiring make sure that the conductors do not interfere internally with the servomotor gears. Close the cover, checking the correct positioning of the gasket and checking that the conductors do not get pressed between the cover and case.

REGULATION - SETTING

The operations indicated in the following chapter must be carried out by expert technicians or qualified personnel. During the regulation phase, monitor the duct flow using flowmeters (calibrated flanges, differential pressure gauges etc...)

VL-2R-HP-M VALVE

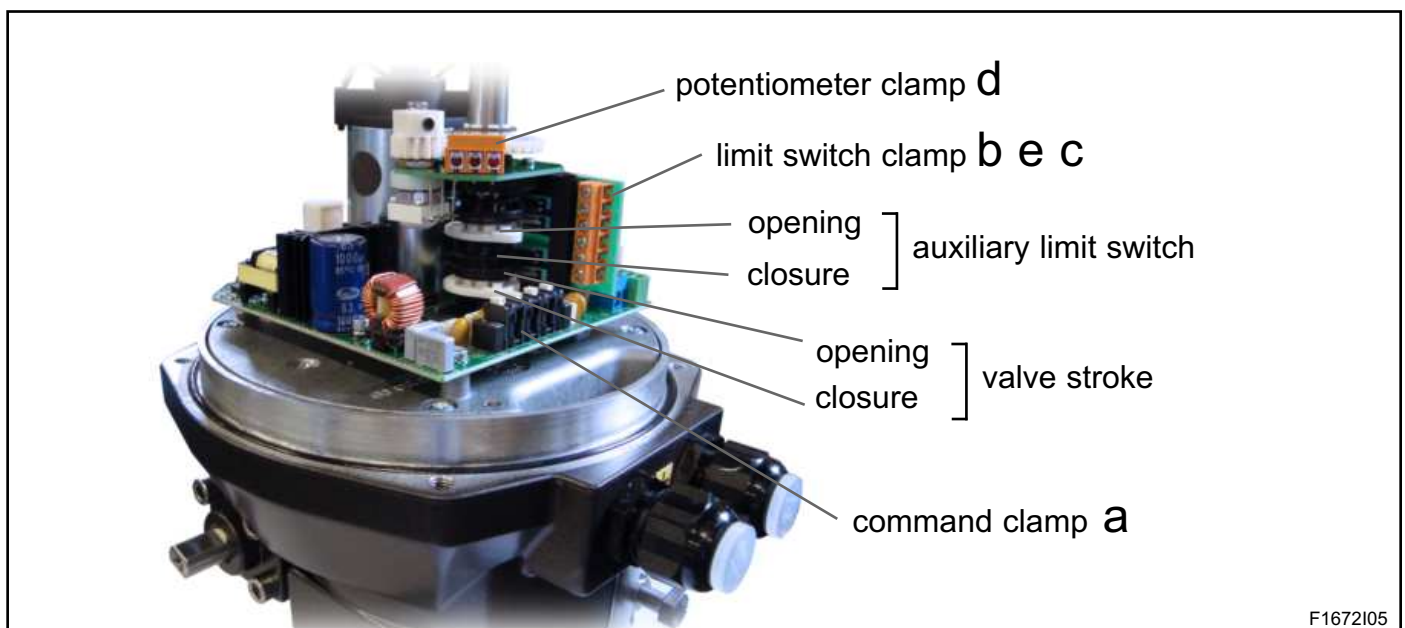
- 1 - Rotate the lever until the new desired regulated position is reached. The valve rotation angle is 90° and when the lever is in the cross position compared to the piping, the valve is CLOSED, on the other hand, when the lever is in the longitudinal position compared to the piping, the valve is OPEN.
- 2 - If more valves are regulated on shunts of the same pipe, check that the previous settings have not undergone any variations, otherwise regulate again.



VALVOLA VL-2R-HP-CMAP

The regulation and setting of the VL-2R-HP-CMAP valves establishes the minimum and maximum opening of the valve that is controlled by the electric actuator. The two limit positions of the valve movement must correspond to the minimum and maximum flow desired. Regulation is actuated by reducing the actuator stroke acting on the electric limit switches.

- 1 - Check that the actuator is not powered, furthermore you are reminded that the valve is supplied by ESA-PYRONICS regulated so that the valve stroke runs from completely closed to completely open (OPEN/CLOSE).
- 2 - Open the actuator cover to gain access to the limit switches.
- 3 - Using the handle on the side of the actuator open the valve ball until reaching half of the opening.
- 4 - Anticipate the intervention of the minimum opening limit switch of the valve.
- 5 - Send the closing command to the servomotor that will then close the ball until reaching the minimum opening limit switch.
- 6 - Check the regulated flow value, assessing whether the minimum opening position should be modified. To obtain a greater or lower minimum flow, act again on the valve's minimum opening limit switch.
- 7 - Command the valve to open fully once the minimum opening has been regulated.
- 8 - Once maximum opening has been reached, assess the maximum flow.
- 9 - If it is too high, anticipate the intervention of the valve's maximum opening limit switch to obtain the maximum flow desired.



GENERAL MAINTENANCE PLAN

Operation	Type (*)	Suggested Schedule	Notes
Gasket integrity	O	annual	Check that there is no air leaking towards the outside
Bolt tightening	E	annual	Reduce to half yearly inspection in applications where there are vibrations
Actuator connection cable integrity	O	every six months	Check external insulation integrity and the absence of abrasions or overheating of the conductors
Valve movement	O/E	every six months	Make sure there is nothing obstructing the valve movement
Valve regulation	O/E	annual	Check the flow regulation carried out by the valve
Electric actuator	O/E	annual	Make sure that the commands are respected and that the limit switches and feedback signals are correct
Valve maintenance	E	annual	Check the conditions of the elements inside the valve

NOTES:

Key: O = ordinary / E = extraordinary

(*) It is suggested that the gasket be replaced every time the valve is dismantled.

ORDINARY MAINTENANCE

For correct maintenance of the VL-2HR-HP valves, scrupulously follow the instructions below. Before making any manouvres with the plant on, make sure that the process safety as well as the operator's safety is not compromised, if necessary inspect with plant turned off.

INTEGRITY INSPECTION'

- The integrity of the gaskets can be checked visually. If leak detection fluid is necessary, inspection can only be performed if the flow inside the pipe 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 for inspection purposes, if they are not totally visible, disconnect the device power before carrying out any type of operation. Before replacing the actuator, make sure that it is indeed the cause of the malfunctioning.

VALVE MOVEMENT

- Inspection to check that there is nothing obstructing the valve movement takes place by completely visually checking that there is no stroke friction nor restrictions.

VALVE REGULATION - ELECTRIC ACTUATOR

- Check that the valve regulates the flow correctly, if necessary repeat all the steps indicated in the "REGULATION -SETTINGS" section.

- Inspection of the electric actuator is done checking that the commands sent by the control system are carried out by the actuator and that the position feedback signals and auxiliary limit switches send the correct indications to the control system. If necessary repeat all the steps indicated in the "REGULATION -SETTINGS" section.

EXTRAORDINARY MAINTENANCE

For correct maintenance of the VL-2R-HP valves, scrupulously follow the instructions given below with the plant off.

BOLT TIGHTENING

- Bolt tightening check must take place with plant off and cold.

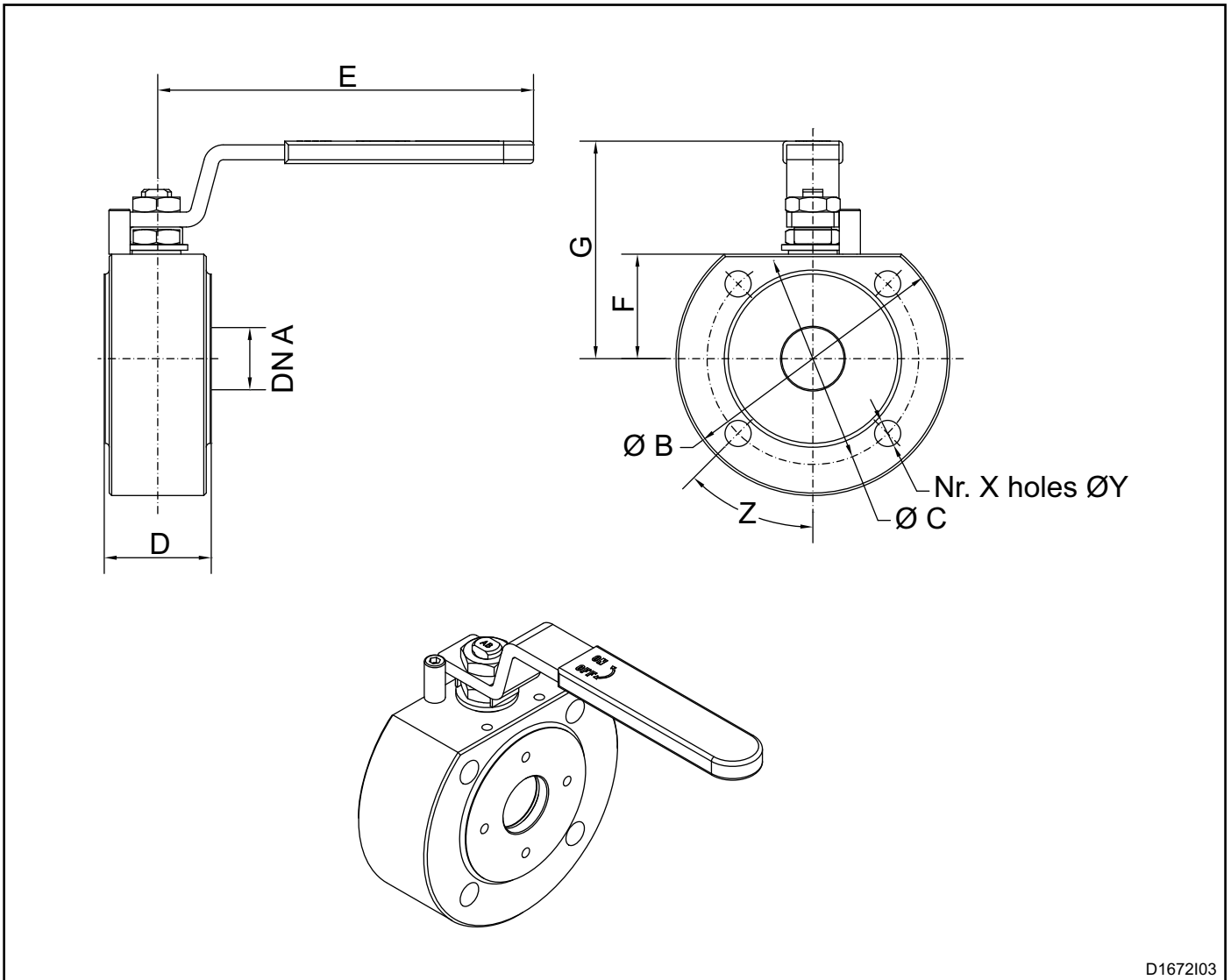
BALL VALVE MAINTENANCE - GASKET REPLACEMENT

- 1 - Close the shut off valve upstream the piping and make sure that there is no flow in the ducts.
- 2 - Place the valve in the complete closing position.
- 3 - Progressively unscrew the screws that fix the valve in a crossover way. Extract the valve and check the condition of the internal components.
- 4 - With a clean cloth and compressed air, clean the inside of the valve body and the ball with its components. Do not use any tools that could damage the internal parts.
- 5 - Check that the valve moves without any friction.
- 6 - Replace the gaskets and remount the valve onto its seat, according to the steps indicated in the "INSTALLATION" section.
- 7 - Finally check that the valve moves freely without any obstructions.
- 8 - Check that the flow regulation is carried out correctly by the valve, if necessary repeat all the steps indicated in the "REGULATION AND SETTINGS" section.

ACTUATOR REPLACEMENT

- 1 - Make sure that the actuator is indeed the cause for malfunctioning and that you dispose of a spare actuator which is the same as the one that needs replacing.
- 2 - Deactivate power supply. Remove the cover of the actuator and then disconnect the electric wires from the clamps. Extract the conductors from the case being careful not to damage them.
- 3 - Remove the fixing screws from the support plate, checking that the valve shaft is correctly inserted inside the actuator pin.
- 4 - Fix the new actuator to the support plate, checking that the valve shaft is correctly inserted in the actuator pin.
- 5 - Reinsert the conductors into the actuator and connect them to the clamps referring to the wiring diagram.
- 6 - Check that the actuator does in fact carry out the commands sent to it by the control system and that the position feedback signals as well as the auxiliary switches send the correct indications to the control system. If necessary repeat all the steps in the "REGULATION SETTING" section.

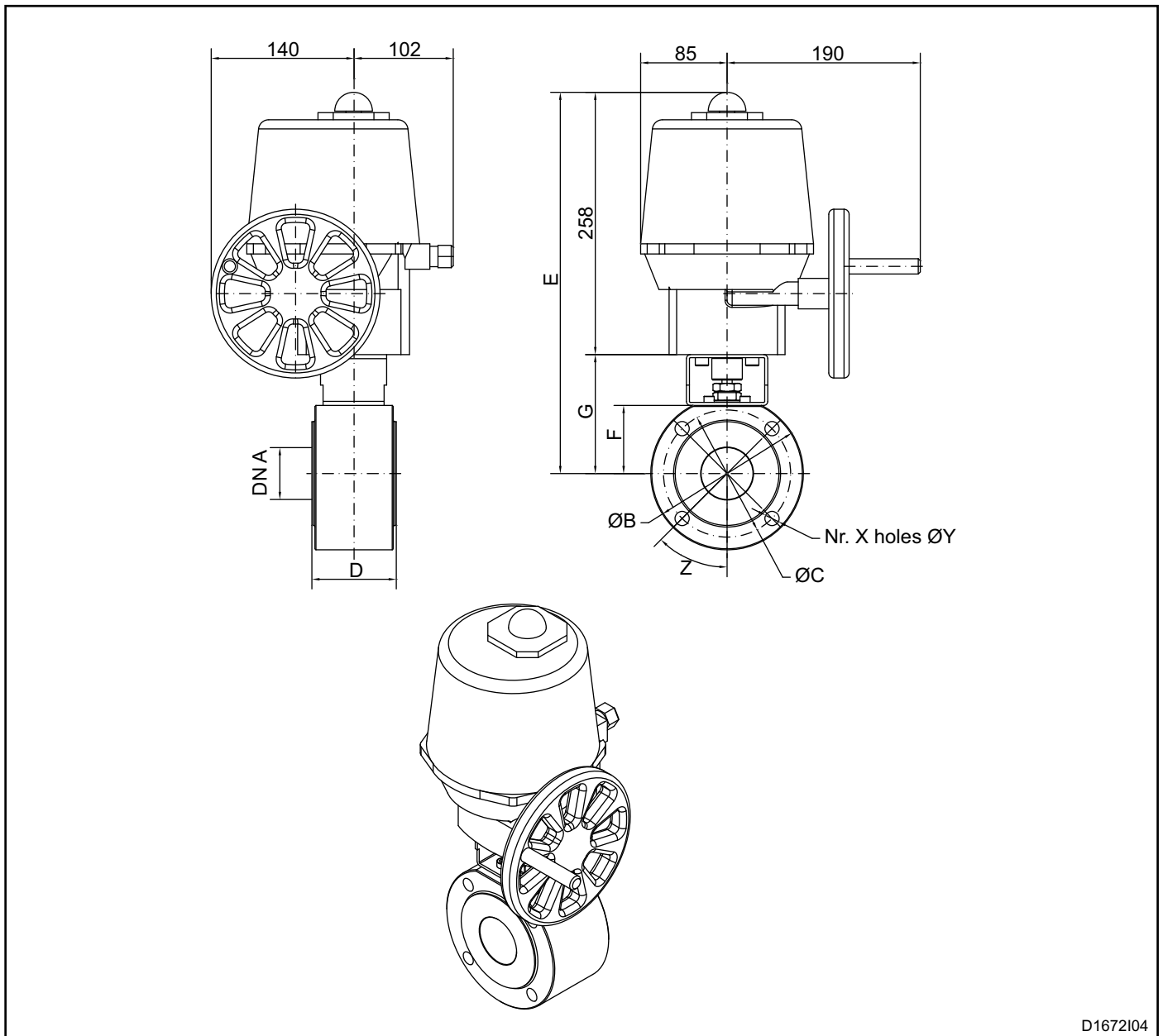
OVERALL DIMENSIONS - VL-2R-HP-M



D1672103

Model	DN	Ø B [mm]	Ø C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	X [mm]	Ø Y [mm]	Z	Mass Kg
4 VL-2R-HP-M	15	90	65	36	140	32	70	4	M12	45°	1,7
6 VL-2R-HP-M	20	100	75	39	140	35	73	4	M12	45°	2,1
8 VL-2R-HP-M	25	100	85	43	150	42	86	4	M12	45°	3,2
12 VL-2R-HP-M	40	140	110	63	275	58	108	4	M16	45°	6,9
16 VL-2R-HP-M	50	150	125	83	275	67	117	4	M16	45°	9,9
20 VL-2R-HP-M	65	178	145	107	350	83	142	4	M16	45°	17,7
24 VL-2R-HP-M	80	190	160	120	350	90	149	8	M16	22,50°	21,5
32 VL-2R-HP-M	100	220	180	152	450	101	191	8	M16	22,50°	36,0
40 VL-2R-HP-M	125	250	210	180	450	117	208	8	M16	22,50°	50,2

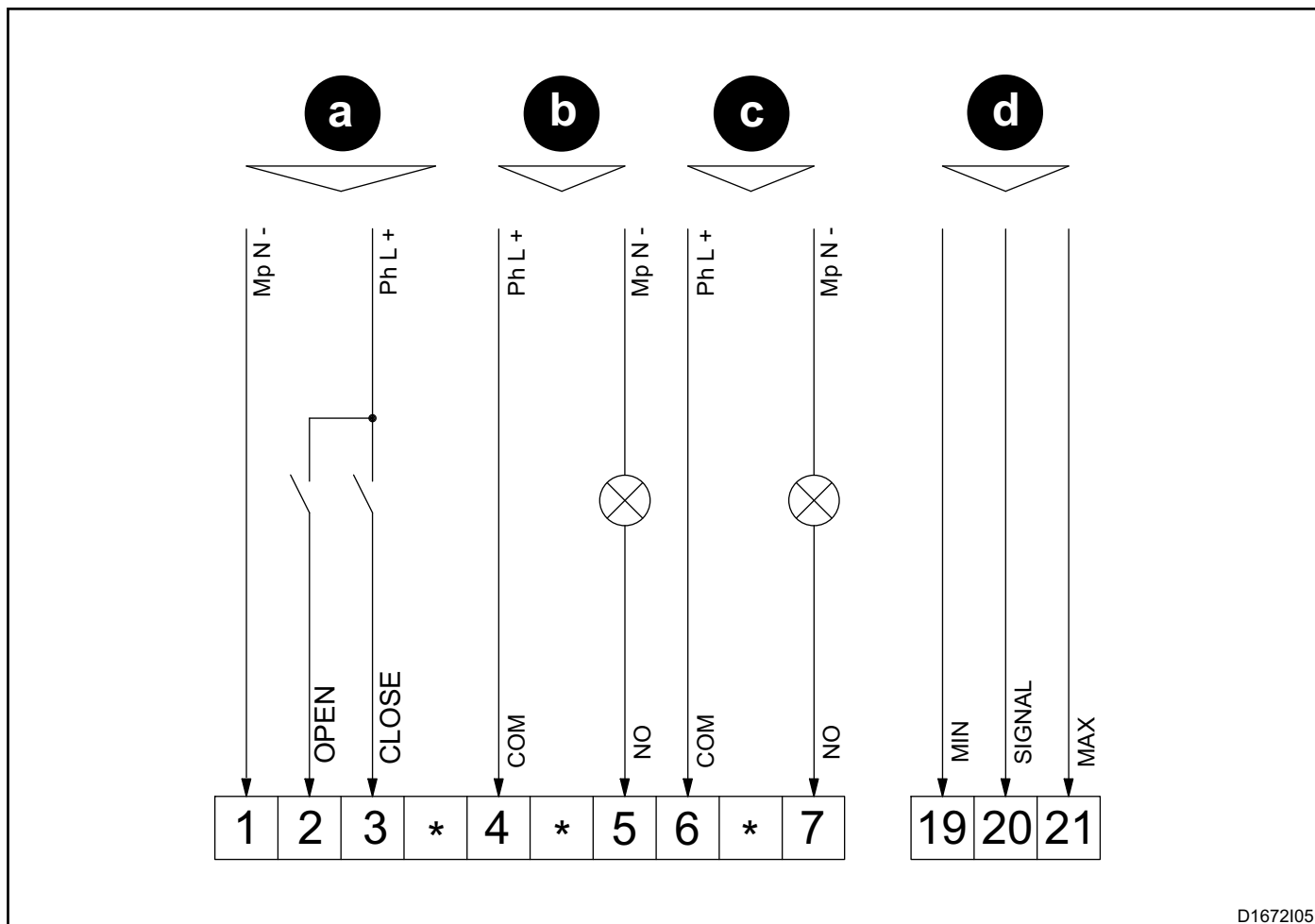
OVERALL DIMENSIONS - VL-2R-HP-CMAP



D1672104

Model	DN A	ø B [mm]	ø C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	X [mm]	ø Y [mm]	Z [mm]	Mass Kg
4 VL-2R-HP-CMAP	15	90	65	36	330	32	72	4	M12	45°	7,5
6 VL-2R-HP-CMAP	20	100	75	39	333	35	75	4	M12	45°	7,8
8 VL-2R-HP-CMAP	25	110	85	43	340	42	82	4	M12	45°	8,6
12 VL-2R-HP-CMAP	40	140	110	63	366	58	108	4	M16	45°	12
16 VL-2R-HP-CMAP	50	150	125	83	375	67	117	4	M16	45°	15,4
20 VL-2R-HP-CMAP	65	178	145	107	401	83	143	4	M16	45°	23,2
24 VL-2R-HP-CMAP	80	190	160	120	408	90	150	8	M16	22,30°	27,0
32 VL-2R-HP-CMAP	100	220	180	152	439	101	181	8	M16	22,30°	41,5
40 VL-2R-HP-CMAP	125	250	210	325	455	117	197	8	M16	22,30°	77,5
48 VL-2R-HP-CMAP	150	285	240	350	512	154	254	8	M20	22,30°	142

ELECTRIC WIRING DIAGRAMS - AW300 OPEN/CLOSE ACTUATOR



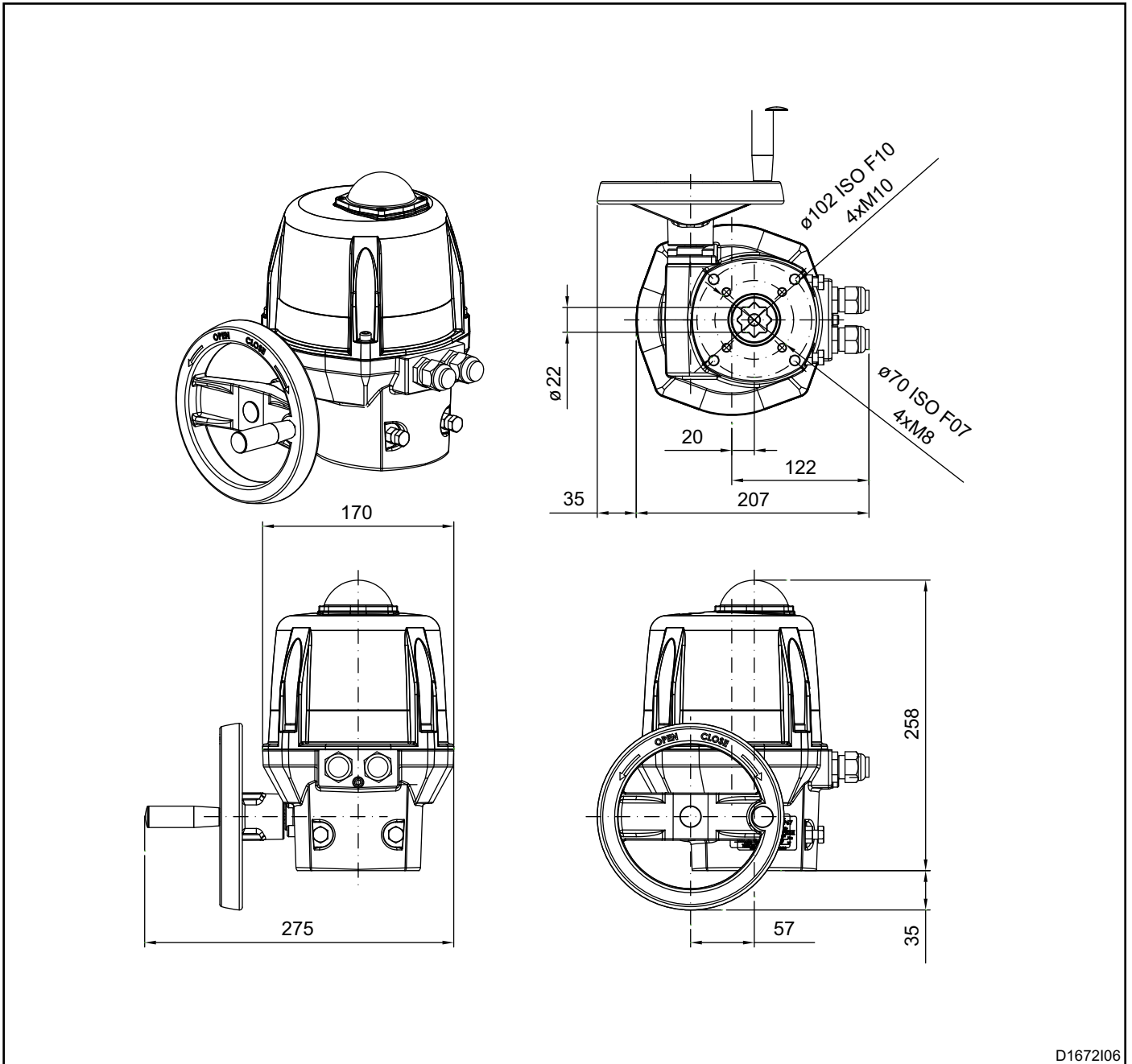
D1672105

Pos.	Description	Pos.	Description
a	Power supply and rotation commands	c	Closed valve auxiliary limit switch outputs
b	Open valve auxiliary limit switch outputs	d	Position feedback potentiometer

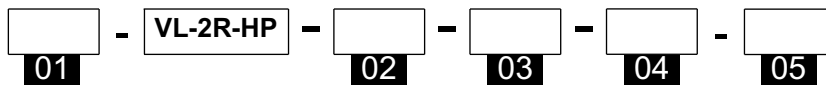
CONNECTION CLAMPS

Pos.	Description	Pos.	Description
1	Power supply neutral	6	Valve closed auxiliary limit switch output (COM)
2	Opening command inlet (phase)	*	Not connected
3	Closing command inlet (phase)	7	Valve closed auxiliary limit switch output (NO)
4	Valve open auxiliary limit switch output (COM)	19	Feedback potentiometer output (Minimum)
*	Not connected	20	Feedback potentiometer output (Cursor)
5	Valve open auxiliary limit switch output (NO)	21	Feedback potentiometer output (Maximum)

OVERALL DIMENSIONS - W300 ACTUATOR



ORDERING CODE - VL-2R-HP



Model		01
DN15	4	
DN20	6	
DN25	8	
DN40	12	
DN50	16	
DN65	20	
DN80	24	
DN100	32	
DN125	40	
DN150 *	48	

03 Valve body material	
Carbon steel	ASTM A 105 AISI OT
Stainless steel	
Brass	

04 Actuator supply voltage	
24Vac 50÷60Hz	24V
100-240Vac 50÷60Hz	100-240

Type		02
Manual	M	
Automatic with actuator	CMAP	

05 Proportional command type	
In current	4-20mA
In volt	0-10V

Notes:

* Size available only for the motorized model with actuator.