ROMEO
Joystick

Sturdy and reliable joystick for harsh environments and situations.
Materials, technical solutions and sizing of critical components studied to guarantee mechanical resistance and long life, with special attention to design, ergonomics, operation accuracy and sensitivity.

FEATURES

- Structural components are made of die-cast nickel-plated zama to ensure maximum resistance, while parts subject to wear are made of techno-polymer.
- Positive opening NC contacts for safety functions.
- Mechanical life of switches: 5 million operations.
- IP protection degree: Romeo is classified IP00 or IP65, if housed in a specific enclosure.
- Extreme temperature resistance: -25°C to +70°C.

OPTIONS

- Available with up to 6 speeds for each direction.
- Stepped or linear operation with spring return or maintained position.
- Cross or 360° movement.
- 3 different versions: with free movement, with "dead man" safety device (with mechanical interlock with or without NO/NC contact), or with NO pushbutton to be used as electrical interlock.
- 3 different handles, also available with pushbuttons and selector switches.
- Available with potentiometers.
- Stepless proportional version available, with built-in analogue actuator and current, voltage or PWM outputs.
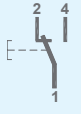
CERTIFICATIONS

- CE marking and EAC certification.

CERTIFICATIONS

Conformity to Community Directives	2014/35/UE Low Voltage Directive
	2006/42/CE Machinery Directive
Conformity to CE Standards	EN 60204-1 Safety of machinery - Electrical equipment of machines
	EN 60947-1 Low-voltage switchgear and controlgear
	EN 60947-5-1 Low-voltage switchgear and controlgear - Control circuit devices and switching elements - Electromechanical control circuit devices
	EN 61000-6-2 Electromagnetic compatibility (EMC) - Generic standards - Immunity for industrial environments
	EN 61000-6-3 Electromagnetic compatibility (EMC) - Generic standards - Emission standard for residential, commercial and light-industrial environments
Markings and homologations	CE EHC

GENERAL TECHNICAL SPECIFICATIONS

Ambient temperature	Storage -40°C/+70°C
	Operational -25°C/+70°C
IP protection degree	IP 00 (IP 65 max. when assembled in specific enclosure)
Insulation category	Class I
Operating positions	Any position

TECHNICAL SPECIFICATIONS OF THE MICROSWITCHES

Code	PRVV0804PE
Utilisation category	AC 15
Rated operational voltage	48 Vac
Rated operational current	2 A
Other operating electrical usages	Inductive load 125 Vac/1 A 250 Vac/0,5 A 30 Vdc/1 A
	Resistive load 125 Vac/3 A 250 Vac/2 A 30 Vdc/3 A
Rated thermal current	8 A
Rated insulation voltage	60 Vac/dc
Mechanical life	5×10^6 operations
Connections	Screw-type terminal
Wires	0.2 mm^2 - 2.5 mm^2
Tightening torque	0.5 Nm - 0.6 Nm
Microswitch type	Single break
Contacts	1NO+1NC change-over contacts (All NC contacts are of the positive opening operation type ⊖))
Scheme	
Markings and homologations	CE ⓈⓅ c🆄🅻us VDE

TECHNICAL SPECIFICATIONS OF THE BUTTONS

Code	PRVV5019PE	PRVV5020PE	PRVV5080PE
Color	Green	Black	Green
Contact current rating	Resistive load 32 Vac/400 mA Resistive load 50 Vdc/100 mA Resistive load 125 Vac/125 mA		Resistive load 28 Vdc/5 A
Contact resistance	50 mΩ		-
Mechanical life	1x10^6 operations		1x10^6 operations
Contacts	1NO		1NO
Markings and homologations	CE		CE

TECHNICAL SPECIFICATIONS OF THE POTENTIOMETERS

Code	PRVV9020PE	PRVV9025PE	PRVV9035PE
Ohmic value	4,7 kΩ	10 kΩ	2,2 kΩ
Indipendent linearity (over AEA -3°)	±0.25%		
Life time	3x10^6 movements		
Operational ambient temperature	-55°C/+125°C		
Mechanical angle	360° continuous		
Actual electrical angle	355°±5°		
Ohmic value tolerance	±5%		
Temperature drift	< 50 PPM/°C		
Dissipation	4 W		

TECHNICAL SPECIFICATIONS OF STEPLESS ROMEO
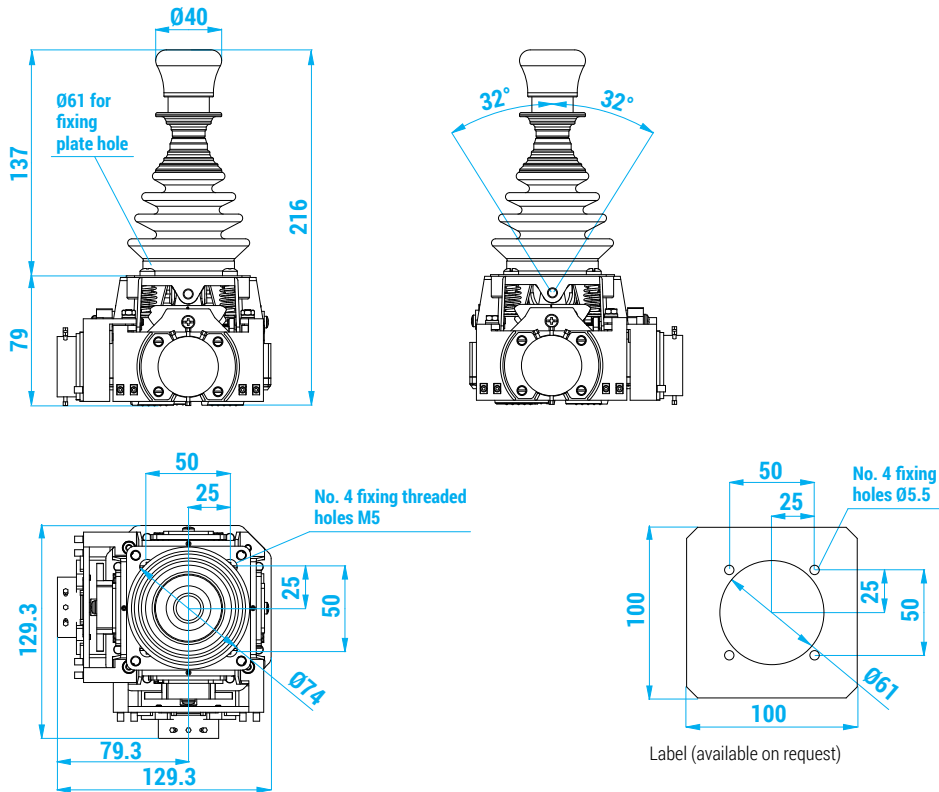
Supply voltage	12 ÷ 48 Vac/dc
Proportional outputs	2 voltage outputs: 0 ÷ +10 Vdc
	2 current outputs: 4 ÷ 20mA
	2 PWM outputs: 0 ÷100% D.C. (freq=1KHz)
Resolution	10 bit
4 directional microswitches	Inductive load 48 Vac/2 A 125 Vac/1 A 250 Vac/0,5 A 30 Vdc/1 A
	Resistive load 125 Vac/3 A 250 Vac/2 A 30 Vdc/3 A
Connections	Screw-type terminals
Wires	0.2 mm^2 - 2.5 mm^2
Tightening torque	0.5 Nm - 0.6 Nm

OVERALL DIMENSIONS (mm)

With knob

Ø40

Ø61 for fixing plate hole

137

222.5

216

79

100

50

25

No. 4 fixing threaded holes M5

100

25

50

Ø74

100

32°   32°

50

25

No. 4 fixing holes Ø5.5

100

25

50

Ø61

100

Label (available on request)

With potentiometer

Ø40

Ø61 for fixing plate hole

137

216

79

50

25

No. 4 fixing threaded holes M5

129.3

25

50

Ø74

79.3

129.3

32°   32°

50

25

No. 4 fixing holes Ø5.5

100

25

50

Ø61

100

Label (available on request)

With handle

55.5
15°
178
79

Ø61 for fixing plate hole

257

50
25
No. 4 fixing threaded holes M5
50
25
100
100
108

50
25
No. 4 fixing holes Ø5.5
100
25
50
100
Ø61

Label (available on request)

With ergonomic handle

52
281
202
79
100

15°
Ø61 for fixing plate hole

No. 4 fixing threaded holes M5
141
100
50
25
25
50
100

50
25
No. 4 fixing holes Ø5.5
100
25
50
100
Ø61

Label (available on request)

EXPLODED DRAWING

STANDARD JOYSTICKS

Romeo standard joysticks feature spring return stepped movement and are equipped with 1NO+1NC change-over microswitches PRVV0804PE and fixed terminal board.

Grip type	Positions	Direction of movement		Code	
		360°	Cross	Free movement	Mechanical interlock + NC/NO contact
	1-0		X	PF580C010001	PF580C010002
	1-1	X		PF580L011001	PF580L011002
	2-0		X	PF580C020001	PF580C020002
	2-2	X		PF580L022001	PF580L022002
	3-0		X	PF580C030001	PF580C030002
	3-1	X		PF580L031001	PF580L031002
	3-2	X		PF580L032001	PF580L032002
	3-3	X		PF580L033001	PF580L033002
	4-0		X	PF580C040001	PF580C040002
Knob	4-1	X		PF580L041001	PF580L041002
	4-2	X		PF580L042001	PF580L042002
	4-3	X		PF580L043001	PF580L043002
	4-4	X		PF580L044001	PF580L044002
	5-0		X	PF580C050001	PF580C050002
	5-1	X		PF580L051001	PF580L051002
	5-2	X		PF580L052001	PF580L052002
	5-3	X		PF580L053001	PF580L053002
	5-4	X		PF580L054001	PF580L054002
	5-5	X		PF580L055001	PF580L055002
	6-1	X		PF580L061001	PF580L061002
	6-2	X		PF580L062001	PF580L062002
	6-3	X		PF580L063001	PF580L063002
	6-4	X		PF580L064001	PF580L064002
	6-5	X		PF580L065001	PF580L065002
	6-6	X		PF580L066001	PF580L066002

Grip type	Positions	Direction of movement		Code
		360°	Cross	1NO button
Knob	4-4		X	PF580C044016

Grip type	Positions	Direction of movement		Code	
		360°	Cross	Free movement	1NO button (for use as electrical interlock)
Handle	1-0		X	PF580C010006	PF580C010003
	1-1	X		PF580L011006	PF580L011003
	2-0		X	PF580C020008	PF580C020003
	2-2	X		PF580L022008	PF580L022003
	3-0		X	PF580C030006	PF580C030003
	3-1	X		PF580L031007	PF580L031003
	3-2	X		PF580L032006	PF580L032003
	3-3	X		PF580L033006	PF580L033003
	4-0		X	PF580C040008	PF580C040003
	4-1	X		PF580L041007	PF580L041003
	4-2	X		PF580L042006	PF580L042003
	4-3	X		PF580L043006	PF580L043003
	4-4	X		PF580L044007	PF580L044003
	5-0		X	PF580C050006	PF580C050003
	5-1	X		PF580L051006	PF580L051003
	5-2	X		PF580L052006	PF580L052003
	5-3	X		PF580L053006	PF580L053003
	5-4	X		PF580L054006	PF580L054003
	5-5	X		PF580L055006	PF580L055003
	6-1	X		PF580L061006	PF580L061003
	6-2	X		PF580L062006	PF580L062003
	6-3	X		PF580L063006	PF580L063003
	6-4	X		PF580L064006	PF580L064003
	6-5	X		PF580L065006	PF580L065003
	6-6	X		PF580L066006	PF580L066003
Ergonomic handle	1-0		X	PF580C010004	PF580C010005
	1-1	X		PF580L011004	PF580L011005
	2-0		X	PF580C020004	PF580C020005
	2-2	X		PF580L022004	PF580L022005
	3-0		X	PF580C030004	PF580C030005
	3-1	X		PF580L031004	PF580L031005
	3-2	X		PF580L032004	PF580L032005
	3-3	X		PF580L033004	PF580L033005
	4-0		X	PF580C040004	PF580C040005
	4-1	X		PF580L041004	PF580L041005
	4-2	X		PF580L042004	PF580L042005
	4-3	X		PF580L043004	PF580L043005
	4-4	X		PF580L044004	PF580L044005
	5-0		X	PF580C050004	PF580C050005
	5-1	X		PF580L051004	PF580L051005
	5-2	X		PF580L052004	PF580L052005
	5-3	X		PF580L053004	PF580L053005
	5-4	X		PF580L054004	PF580L054005
	5-5	X		PF580L055004	PF580L055005
	6-1	X		PF580L061004	PF580L061005
	6-2	X		PF580L062004	PF580L062005
	6-3	X		PF580L063004	PF580L063005
	6-4	X		PF580L064004	PF580L064005
	6-5	X		PF580L065004	PF580L065005
	6-6	X		PF580L066004	PF580L066005

STEPLESS PROPORTIONAL JOYSTICKS

Grip type	Direction of movement		Code	
	360°	Cross	Free movement	1NO button (for use as electrical interlock)
Knob		X	PF584C066001	-
	X		PF584L066001	-
Handle		X	PF584C066002	PF584C066003
	X		PF584L066002	PF584L066004
Ergonimic handle		X	PF584C066004	PF584C066005
	X		PF584L066005	PF584L066006

Grip type	Direction of movement		Code	
	360°	Cross	Free movement	1NO button (for use as electrical interlock)

ASSEMBLY DRAWING
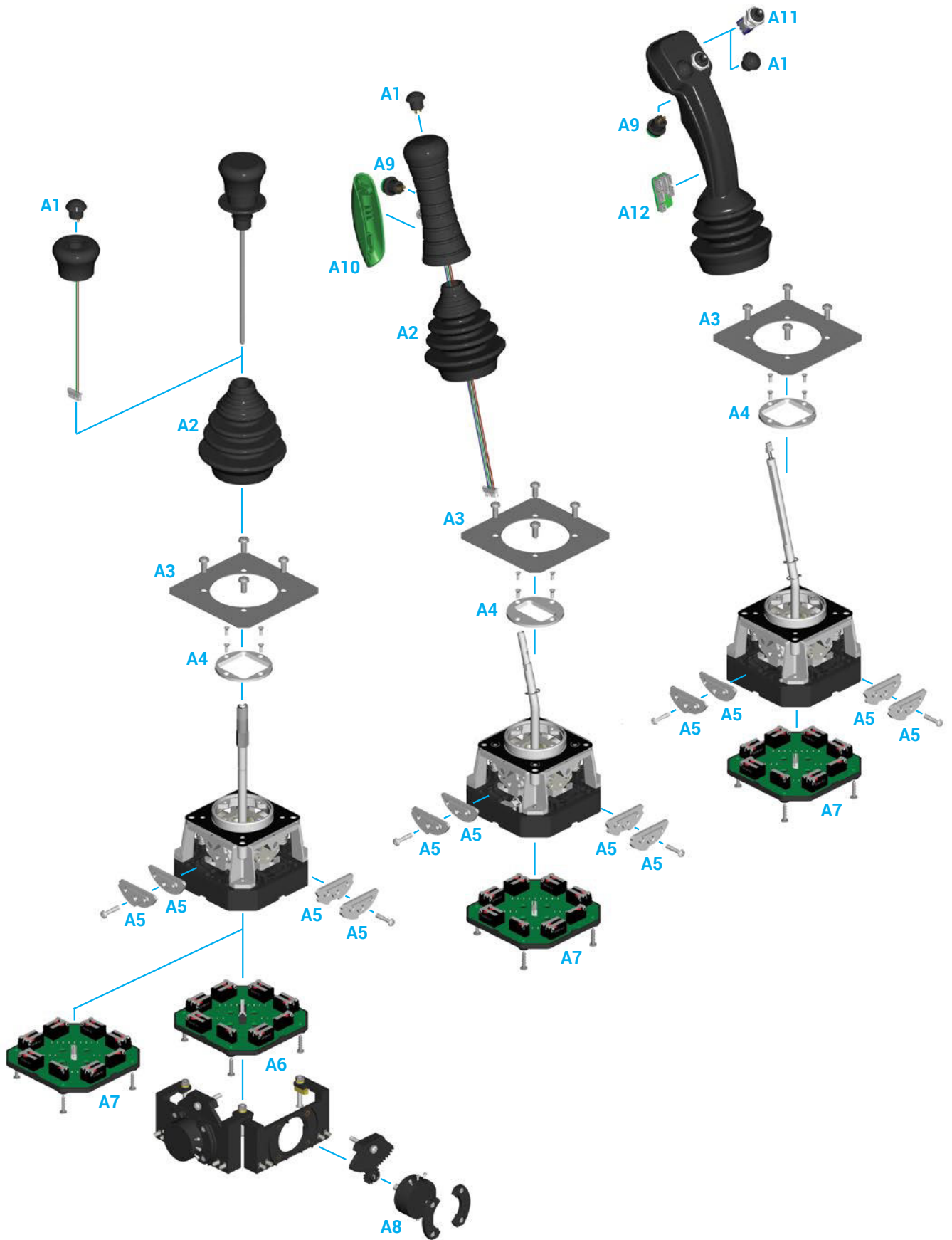
COMPONENTS

Buttons

Ref.	Drawing	Description	Code
A1		Green 1NO button	PRVV5019PE
		Black 1NO button	PRVV5020PE
A9		Green 1NO button	PRVV5080PE
A10		Trigger button	PRSL7595PI

Switch boards

Ref.	Drawing	Description	Code
A6		6 speed board, 14 microswitches + electrical interlock	93620
		3 speed board, 8 microswitches + electrical interlock	93621
A7		6 speed board, 14 microswitches	93623
A12		Board for ergonomic handle	93624

Potentiometers

Ref.	Drawing	Description	Code
A8		Potentiometer Megatron 2.2 kΩ	PRVV9035PE
		Potentiometer Megatron 4.7 kΩ	PRVV9020PE
		Potentiometer Megatron 10 kΩ	PRVV9025PE

Selector switches

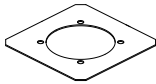| Ref.	Drawing	Description	Code
A11		2 maintained position selector switch ON-ON wired	PRVV0830PE
		3 maintained positions selector switch ON-OFF-ON wired	PRVV0831PE
		2 positions spring return selector switch ON-MOM wire	PRVV0832PE
		3 positions selector switch MOM-OFF-MOM wired	PRVV0833PE
		3 positions selector switchON-OFF-MOM wired	PRVV0834PE
		2 maintained positions selector switch ON-OFF wired	PRVV0840PE
		2 positions selector switch MOM-OFF wired	PRVV0842PE

Lever guides

Ref.	Drawing	Description	Code
		Cross lever guide 6/2-3/1	PRGC6622PE
		Cross lever guide 6/3	PRGC6633PE
		Cross lever guide 6/4-3/2	PRGC6644PE
		Cross lever guide 6/5	PRGC6655PE
		Cross lever guide 3/3-6/6	PRGC6666PE
		Lever guide 1/0	PRGL1100PE
		Lever guide 1/1	PRGL1111PE
		Lever guide 2/0-4/0	PRGL4400PE
		Lever guide 4/1	PRGL4411PE
		Lever guide 4/2-2/1	PRGL4422PE
		Lever guide 4/3	PRGL4433PE
		Lever guide 4/4-2/2	PRGL4444PE
A4		Lever guide 5/0	PRGL5500PE
		Lever guide 5/1	PRGL5511PE
		Lever guide 5/2	PRGL5522PE
		Lever guide 5/3	PRGL5533PE
		Lever guide 5/4	PRGL5544PE
		Lever guide 5/5	PRGL5555PE
		Lever guide 6/0-3/0	PRGL6600PE
		Lever guide 6/1	PRGL6611PE
		Lever guide 6/2-3/1	PRGL6622PE
		Lever guide 6/3	PRGL6633PE
		Lever guide 6/4-3/2	PRGL6644PE
		Lever guide 6/5	PRGL6655PE
		Lever guide 3/3-6/6	PRGL6666PE

Cams

Ref.	Drawing	Description	Code
		Cam 1st position - 6/3 speeds	CKR60006
A5		Cam 2nd-3rd position - 6 speeds	CKR60008
		Cam 6th position - 6 speeds	CKR60009
		Cam 4th-5th position - 6 speeds	CKR60007

Accessories

Ref.	Drawing	Description	Code
A2		Bellows	PRGU6050PE
		Blank label	PRTA0150PE
A3		Lifting-Traverse label	PRTA0151PE
		Trolley-Rotation label	PRTA0152PE

ROMEO - REQUEST FORM FOR NON STANDARD JOYSTICK
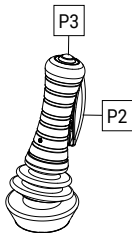
Grip type

☐ Knob (IP 65 assembled in specific enclosure)

P1

Function

☐ Free movement

☐ Mechanical interlock + NC/NO contact (not available for proportional Romeo)
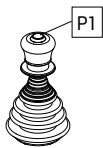
☐ P1 1NO button

Colour of button

☐ black   ☐ green

☐ Handle (IP 44 assembled in specific enclosure)

P3

P2

Function

☐ Free movement

☐ P2 1NO button (for use as electrical interlock)

☐ P2 1NO button (for use as electrical interlock) + P3 1NO button

Colour of button

☐ black   ☐ green
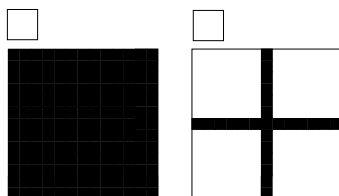
☐ Ergonomic handle (IP43 assembled in specific enclosure)

Movement

☐ Stepped - spring return

☐ Stepped - maintained positions
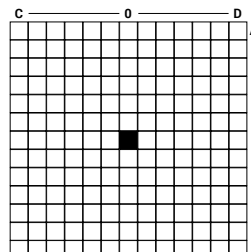
☐ Linear - spring return

Lever guide

Standard lever guide

☐

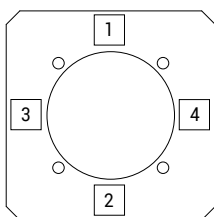6 steps directions A-B
6 steps directions C-D
360° movement

☐

6 steps directions A-B
6 steps directions C-D
Cross movement

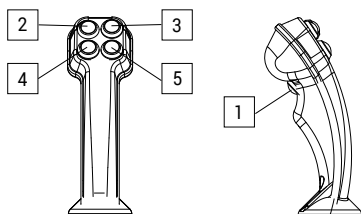☐ Customized lever guide (not available for proportional Romeo)

C ——— 0 ——— D
A
0
B

Joystick label

☐ Blank label

☐ Lifting-Traverse symbols

☐ Trolley-Rotation symbols

☐ Customized label

Pos.	Letterings
1	_____
2	_____
3	_____
4	_____

Actuators for ergonomic handle

2   3
4   5
1

Actuator type* and label letterings

Pos.

1 ☐ Yes ☐ No PRVV5080PE Green button 1NO contact + 1 common**

	Type	Lettering
2	☐	_____
3	☐	_____
4	☐	_____
5	☐	_____

Actuators for positions 2-3-4-5

A PRVV9019PE Green button 1NO contact + 1 common

B PRVV9020PE Black button 1NO contact + 1 common

C PRVV0840PE 2 position selector ON-OFF 1 contact + 1 common

D PRVV0842PE 2 position selector MOM-OFF 1 contact + 1 common

E PRVV0830PE 2 maintained position selector ON-ON 2 contacts + 1 common

F PRVV0831PE 3 maintained position selector ON-OFF-ON 2 contacts + 1 common

G PRVV0832PE 2 position spring return selector ON-MOM 2 contacts + 1 common

H PRVV0833PE 3 position selector MOM-OFF-MOM 2 contacts + 1 common

I PRVV0834PE 3 position selector ON-OFF-MOM 2 contacts + 1 common

∗ Maximum 5 contacts + 1 common available.
Ex.: 1NO contact in position 1 + 4 buttons A type.
1NO contact in position 1 + 4 selectors C type.
1NO contact in position 1 + 2 selectors G type.

∗∗ In case of use of the electrical interlock function, connect it to actuator 1.

☐ Joystick with switches

Potentiometer

☐1 PRVV9035PE 2.2 kΩ

☐2 PRVV9020PE 4.7 kΩ

☐3 PRVV9025PE 10 kΩ

☐4 Preset only

Instructions
When necessary, write the number corresponding to the potentiometer or to the preset required. Fill in the contact scheme blackening the boxes corresponding to the positions where the cams close the contacts (each bar of 13 boxes correspond to a switch; the central box corresponds to the zero position of the joystick). In the example, the contact is closed in positions 1-2-3 to the left and 3-4 to the right.

6	5	4	3	2	1	0	1	2	3	4	5	6
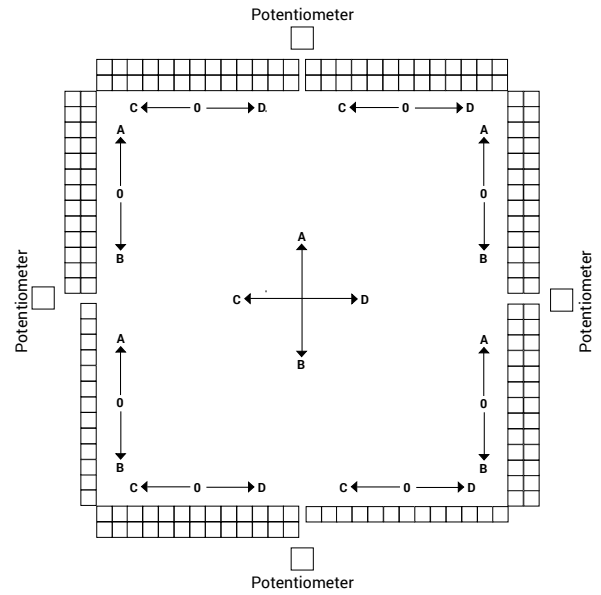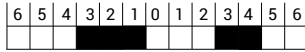
☐ Stepless proportional joystick

A-B LEVER DIRECTION

Select the increase / decrease direction of the signal

A max   A min

B min   B max

☐   ☐
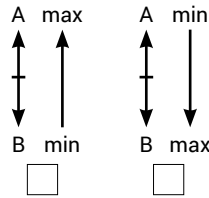
☐ **Standard outputs***

Standard outputs (A-B direction)			Select a version
Voltage	Current	PWM	
0-10V	4-20mA	0-100%	☐
0-5V	4-12mA	0-50%	☐
0.5-9.5V	4.5-19.5mA	5-95%	☐
0.5-4.5V	4.5-11.5mA	5-45%	☐

☐ **Customized outputs**

Customized outputs (A-B direction)								
Voltage (from 0 to 10 V)			Current (from 4 to 20 mA)			PWM (from 0 to 100%)		
min	Lever in central position	max	min	Lever in central position	max	min	Lever in central position	max
_____V	_____V	_____V	____mA	____mA	____mA	_____%	_____%	_____%

C-D LEVER DIRECTION

Select the increase / decrease direction of the signal

C ←→ D   C ←→ D
max ← min   min → max

☐   ☐
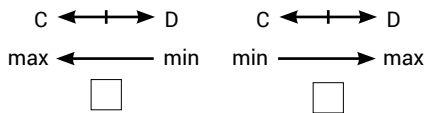
☐ **Standard outputs***

Standard outputs (C-D direction)			Select a version
Voltage	Current	PWM	
0-10V	4-20mA	0-100%	☐
0-5V	4-12mA	0-50%	☐
0.5-9.5V	4.5-19.5mA	5-95%	☐
0.5-4.5V	4.5-11.5mA	5-45%	☐

☐ **Customized outputs**

Customized outputs (C-D direction)								
Voltage (from 0 to 10 V)			Current (from 4 to 20 mA)			PWM (from 0 to 100%)		
min	Lever in central position	max	min	Lever in central position	max	min	Lever in central position	max
_____V	_____V	_____V	____mA	____mA	____mA	_____%	_____%	_____%

* Select the standard output required. In case of customized outputs, fill in the 'customized outputs' table paying attention at the value ranges.
The value of 'Lever in central position' must be in between the minimum and maximum values chosen.

USE AND MAINTENANCE INSTRUCTIONS

The Romeo joystick is an electromechanical device for low voltage control circuits (EN 60947-1, EN 60947-5-1) to be used as electric equipment on machines (EN 60204-1) in compliance with the essential requisites of the Low Voltage Directive 2014/35/UE and the Machine Directive 2006/42/CE.

The Romeo joystick is designed for use in industrial environments even under severe climatic conditions (working temperatures from -25°C to +70°C and suitable for use in tropical environments). The equipment is not suitable for use in environments with potentially explosive atmosphere, corrosive agents or a high percentage of sodium chloride (saline fog). Oils, acids or solvents may damage the equipment; avoid using them for cleaning. Do not connect more than one phase to each switch. Do not oil or grease the switches and the control elements.

If the joysticks are equipped with mechanical interlock, do not move the control lever before removing this block by lifting the lower part of the knob (01), this operations also activates the dedicated central switch.

If the joysticks are equipped with the "Dead Man" button, push the button (P1) to enable movement and while operating eventual push buttons / selectors (P2, P3, P4, P5) the foreseen functions are activated.

With regard to the conditions for installation, use and evaluation of the essential requisite for safety and the protection of health, the joystick must be installed so as to ensure adequate protection of the equipment in general and of the active parts in particular (protection against electric shock and against the penetration of solid bodies and liquids).

The installation of the Romeo joystick shall be carried out by expert and trained personnel. Wiring shall be properly done according to the current instructions.

Prior to the installation and the maintenance of the joystick, the main power of the machinery shall be turned off.

The joystick is supplied with a bag of accessories including: 4 metric screws (3).

Steps for the proper installation of the joystick

- Drill holes Ø 60 on the chosen support (support with a thickness of 4 mm) (for correct drilling use the special template supplied on request).
- Place the joystick in the hole on the support (press the bellows on the joystick (2) slightly for correct insertion).
- Position the plate (4) with its gasket on the joystick.
- Fasten the screws (3) matching the holes on the plate (4) with those on the support and the threaded holes on the joystick (take care to position the gasket correctly between the joystick and the support).
- Strip the multi-pole cable for a length sufficient for electrical connection with the terminals.
- Fasten the multi-pole cable so as to prevent the possibility of external traction on the connections.
- Connect the wires to the terminals in accordance with the wiring diagram shown on the instructions; we suggest the use of pin terminals.

Steps for routine maintenance

- Check the correct tightening of the screws (3) fastening the joystick to the support.
- If there is a mechanical interlock (1), make sure it functions correctly.
- If there is a "Dead Man" button (P1), make sure it mechanically functions correctly.
- If there are a push buttons / selectors (P2, P3, P4, P5), make sure they mechanically functions correctly.
- Check the conditions of the wiring (in particular where wires clamp into the terminals).
- Check the conditions of the bellows (2) on the joystick.

Any change to parts of the joystick will invalidate the rating plate and identification data of the device, and render the warranty null and void. In case of replacement of any part, use original spare parts only.

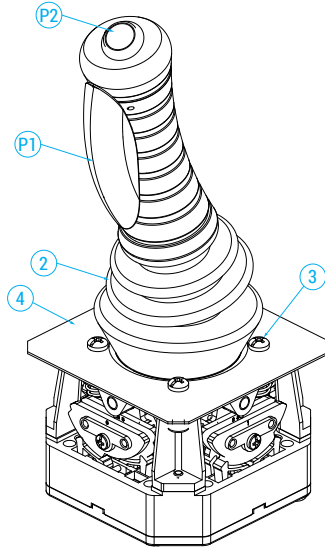TER declines all responsibility for damages caused by the improper use or installation of the equipment.

JOYSTICK WITH SWITCHES

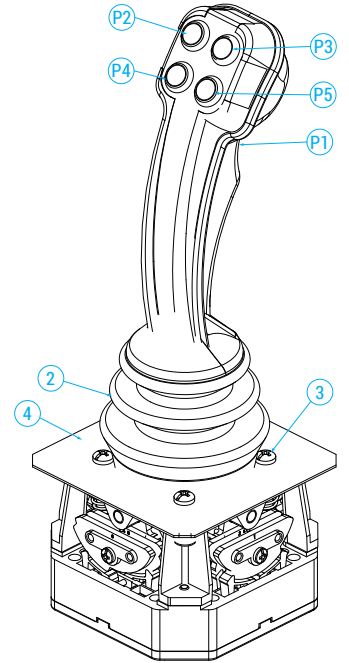### Device 1
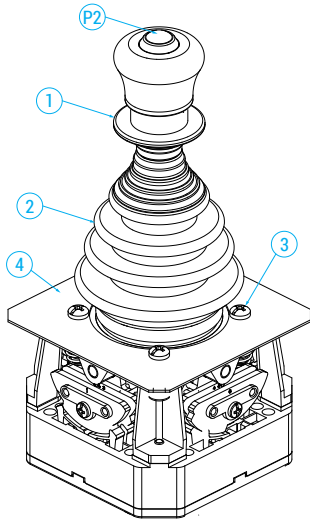
Wiring Layout A
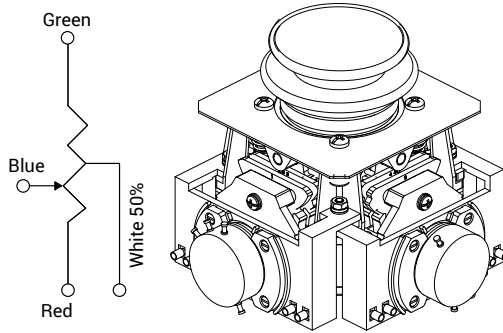
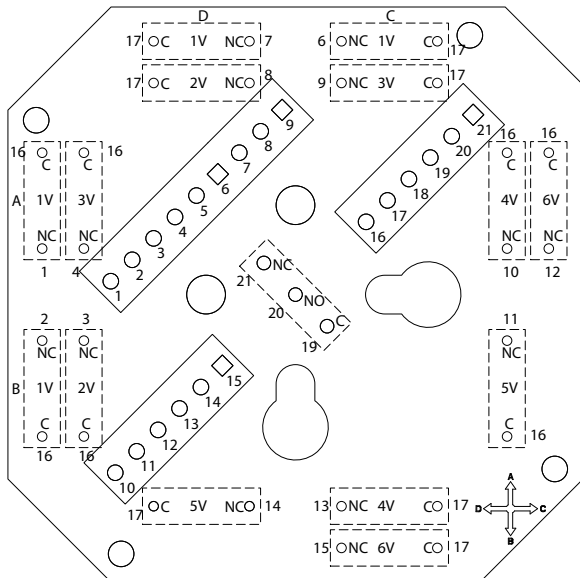### Device 2
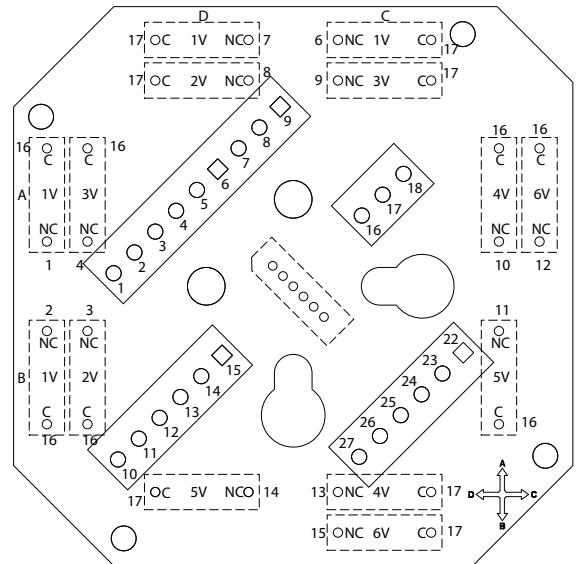

Wiring Layout B

Device 3

Wiring Layout B

Green

Blue

Red

White 50%

Avaiable for all models

	1	2	3
Device			
Position	**Function**	**Pin number**	
		23	
		27	
		26	
		25	
		24	
		22	

Wiring Layout A

Wiring Layout B

STEPLESS PROPORTIONAL JOYSTICK

Device 1
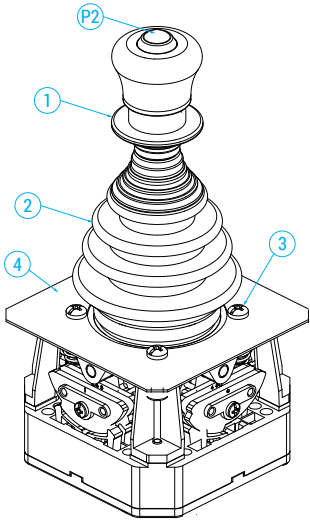
Device 2
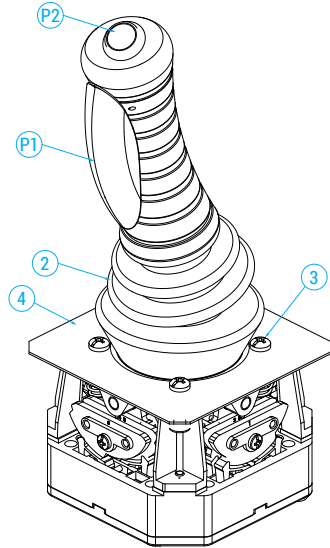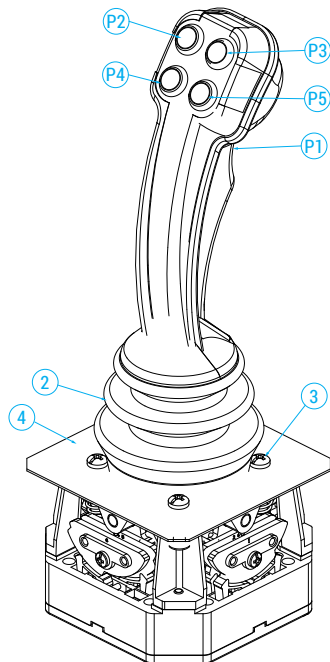
PIN No.	Function	
1	Switch output direction A	A
2	Switch output direction B	B
3	Switch output direction C	C
4	Switch output direction D	D
5	Common direction A/B	COM_AB
6	Common direction C/D	COM_CD
7	Ground reference for analog outputs	GND
8	Supply voltage VAC/VDC-	VAC/VDC-
9	Supply voltage VAC/VDC+	VAC/VDC+
10		
11		
12		
13		
14		
15		
16	Not connected	
17	Not connected	
18	PWM output direction A/B	PWM_AB
19	PWM output direction C/D	PWM_CD
20	Not connected	
21	Not connected	
22	Not connected	
23	Not connected	
24	Voltage analog output direction C/D	V_CD
25	Voltage analog output direction A/B	V_AB
26	Current analog output direction C/D	I_CD
27	Current analog output direction A/B	I_AB

Device 3

REMARKS