

According European Standard NF EN 574: 1996 + A1 : 2008

Instruction leaflet for two-hand control

**TRANSLATION
OF THE ORIGINAL VERSION**
Type PXP-A11-A / PXP-C111-A / PXP-D121-A /
PXP-S111-A / PXP-S121-A

Before any intervention on components on the machine
make sure of the effective shut off of the air supply and
pressure unloading of the installation



Before any installation and initial start up, read the
Instructions for Installation and utilization pages 25 of 42.

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NF EN 574 - 1 - General - 0 - Introduction

A two-hand control device is a safety device (safety component). It provides a measure of protection for the operator against reaching danger zone during hazardous situations by locating the control actuating devices in a specific position.

The selection of a two-hand control device as an appropriate safety device will depend upon the risk assessment made by designers standard makers and others in accordance with EN ISO 12100: 2010.

NF EN 574 - 1 - General - 1 - Scope

This standard specifies the safety requirements of a two-hand control device and its logic unit as delined in 3-1, (see page 6).

This standard applies to all two-hand control devices, independant of energy used, including :

- two-hand control devices which are or are not integral part of a machine,
- two-hand control devices which consist of one or more than one separate element.

NF EN 574 - 1 - General - 2- Definitions

For the purposes of this chapter 3 standard, the following definitions apply :

3-1- A device which requires at least simultaneous actuation by use of both hands in order to initiate and to maintain, whilst a hazardous condition exists, any operation of a machine thus affording a measure of protection only for the person who actuates.

(See figure 2.)

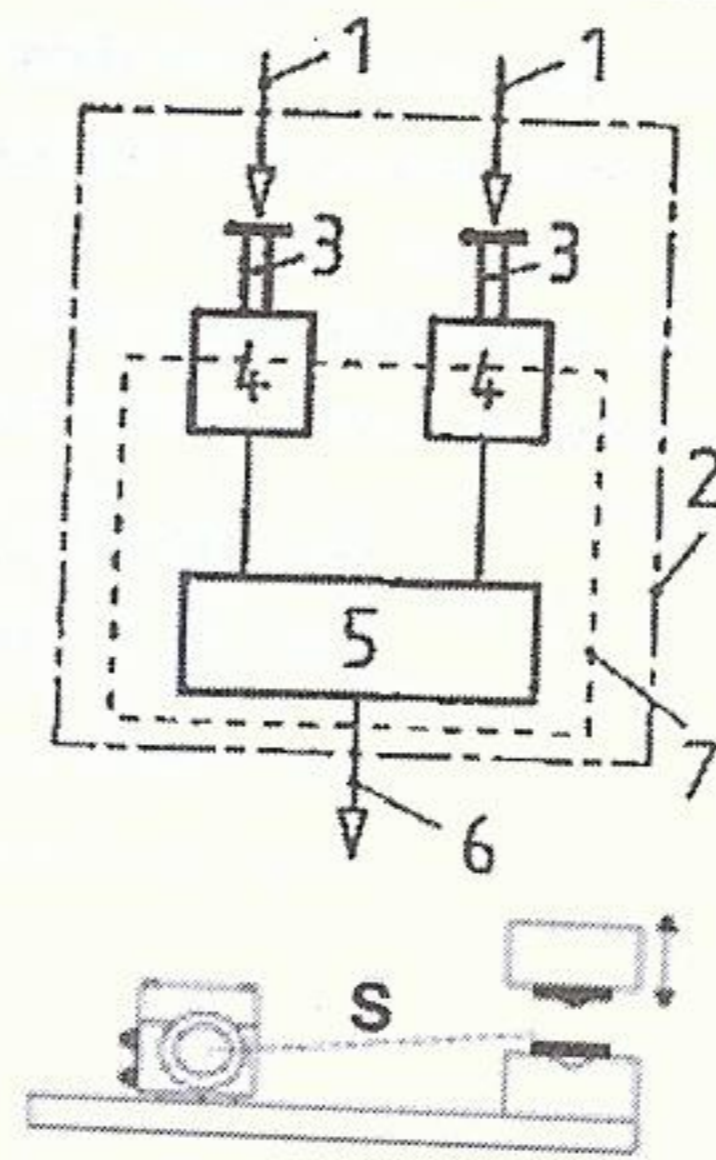


Figure 2

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NF EN 574 -1 - General -2- Définitions

3-2- Input signal:

The externally actuated signal applied by hand to a control actuating device (see figure 1).

3-3- Control actuating device:

A component of the two-hand control device which senses an input signal from one hand and transmits it to a signal converter (see figure 1).

3-4- Simultaneous actuation:

The continuing actuation of both control actuating devices during the same time period.

- 1) Input signal
- 2) Two-hand control device
- 3) Control actuating device
- 4) Signal converter(s)
- 5) Signal processor(s)
- 6) Output signal
- 7) Logic unit

Description of elements figure1

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NF EN 574 -1 - General - 3 - Definitions

Whatever the time lag is between the start of one input signal and the start of the other (see figure 2 page 6).

3-5- Synchronous actuation

A particular case of simultaneous actuation where the time lag between the start of one input signal and the start of the other is less or equal to 0,5 s (see figure 3 page 12).

3-6- Signal converter

A component of the two-hand control device which receives an input signal from a control actuating device and which transmits and/or converts this signal into a form acceptable to the signal processor (see figure 1 page 6).

3-7- Signal processor

A part of the two-hand control device which generates the output signal as a consequence of the two input signals (see figure 1 p. 6).

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NF EN 574 -1 - General - 3 - Definitions

3-8- Output signal

The signal generated by the two-hand control device to be fed into the machinery to be controlled and which is based on one pair of output signals (see figure 1 page 6).

3-9- Response time

The time between the release of a control actuating device and the cessation of the output signal.

3-10- Mobile two hand control device

A device which can be moved and used in more than one finable position relative to the danger zone of the machine which it controls.

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NF - 1 - General - 4 -Types of two-hand control devices

Three types of two hand control devices can be found.

All two-hand control devices shall comply with EN ISO 12100 : 2010 and chap: 9.2.6.2, two-hand control devices – of the standard NF EN 60204-1 :2006 /A1 (may 2009) for the choice of the type of two-hand control devices depending of the risk evaluation.

PXP-A11-A, PXP-C111-A, PXP-S111-A :
- type III A according NF EN 574 : 1996 + A 1 : 2008
- category 1 according NF EN ISO 13849-1 : 2016

PXP-S121-A, PXP-D121-A
- type III B according NF EN 574 : 1996 + A1 : 2008
- category 3 according NF EN ISO 13849-1 : 2016

NF EN 574 - 1 - General - 5 - Synchronous actuation

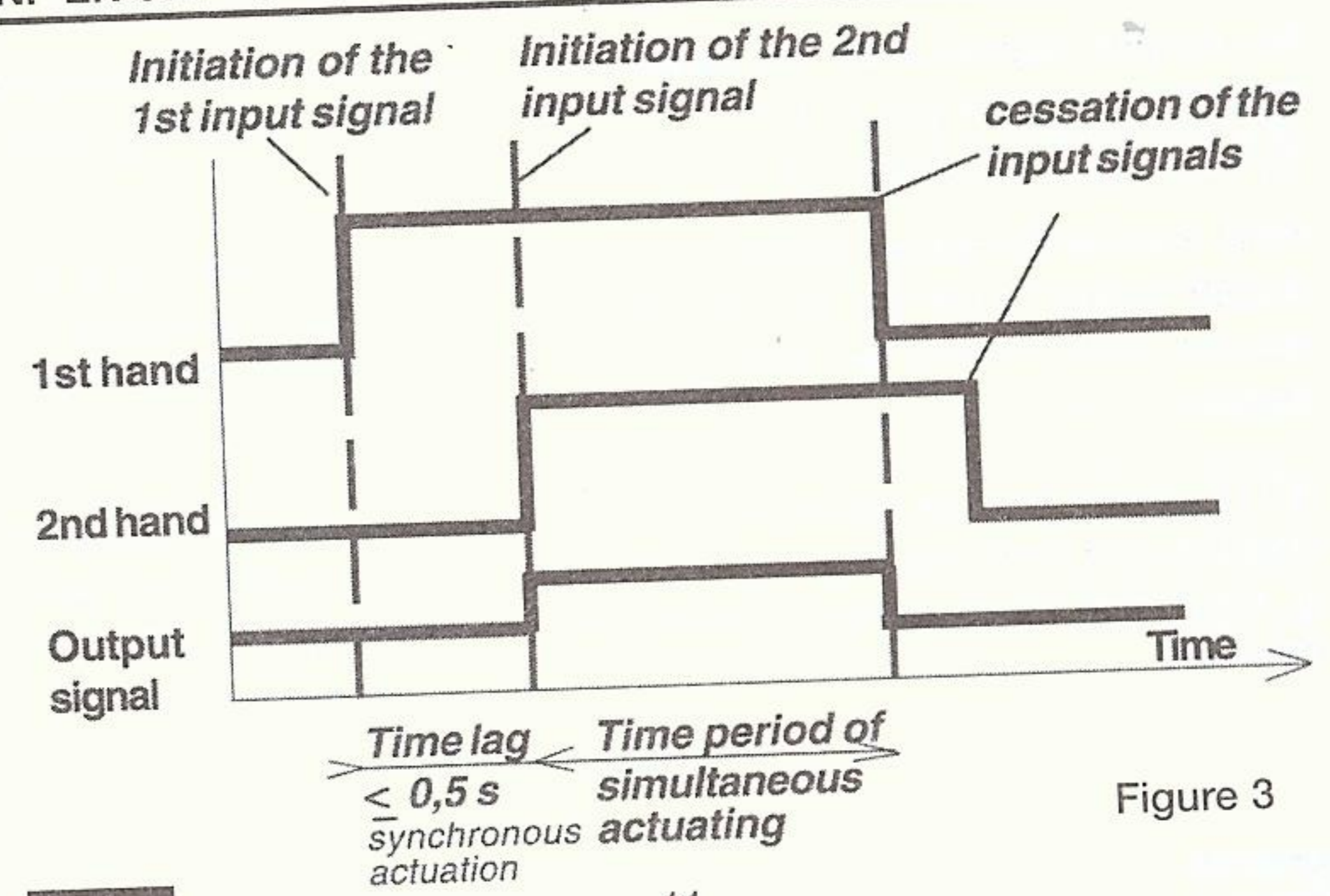


Figure 3

NF EN 574 - 1 - General - 5 - Synchronous actuation

An output signal shall be generated only when both control actuating devices are actuated in a time lag which is less or equal to 0,5s (see fig. 3 page 12).

If the control actuating devices are not actuated synchronously, the output signal shall be prevented and it shall be necessary to release both control actuating devices and re-apply both Input signals.

NOTE: when two or more two-hand control devices are used to operate one machine, synchronous actuation is required only with in each two-hand control device and is not required between devices.

NF EN 574 (extraits) - 1 - General - 8 - Prevention

Prevention of accidental actuation and of defeat

The control actuating devices of a two-hand control device shall be designed and arranged in such a way that the protective effect of the two-hand control device cannot be easily defeated, and that the probability of accidental actuation is minimized, in accordance with the risk assessment for the particular application.

The use of one hand alone, possible combinations of one hand and/or other parts of the body and/or the use of simple aids, which allow defeat shall be considered, so that it shall not be possible to reach into the danger zone during a hazardous situation. Accidental actuation (e.g. by the clothes of the operator) shall be considered in the same way.

NOTE: Total protection from "defeat" is not possible.

NF EN 574 (extraits) - 1 - General - 8- Prevention

Prevention of defeat using one hand

Measures to prevent defeat by using one hand shall be provided.

Examples of suitable measures are:

- Separation of the control actuating devices (inside dimension) by at least 260mm.
- Prevention of defeat using hand and elbow of the same arm
Measures to prevent defeat by using the hand and elbow of the same arm shall be provided:
 - covers designed in such a way that the control actuating devices cannot be operated by the elbow.
- Prevention of defeat using one hand and any other part of the body (e.g. knee, hip).
Measures to prevent defeat by using other part of the body in conjunction with one hand shall be provided: examples of suitable measures are:

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NF EN 574 (extraits) - 1 - General - 8- Prevention

- Arrangement of the control actuating devices on a horizontal or nearly horizontal surface which is at least 1100 mm above the floor or level of access. This is intended to prevent actuation by the hip.
- In the case of attachment to a vertical or near vertical surface by the provision of a protective collar around the control actuating devices.
- Covers and/or shields which are designed in such a way that the control actuating devices cannot be operated by one hand and any other part of the body.

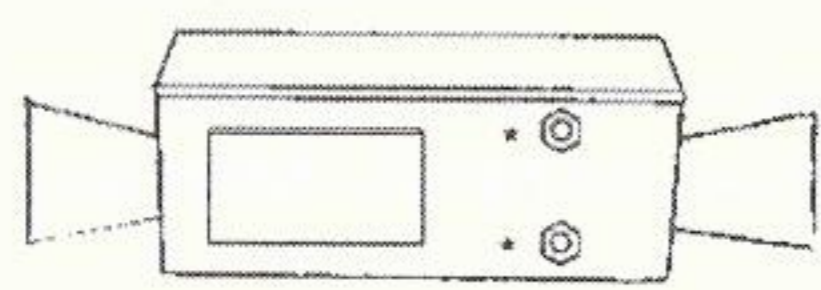
Remark: two-hand control PXP-C111-A, PXP-D121-A, PXP-S111-A, PXP-S121-A meet these requirements for protection against accidental operation and tampering.

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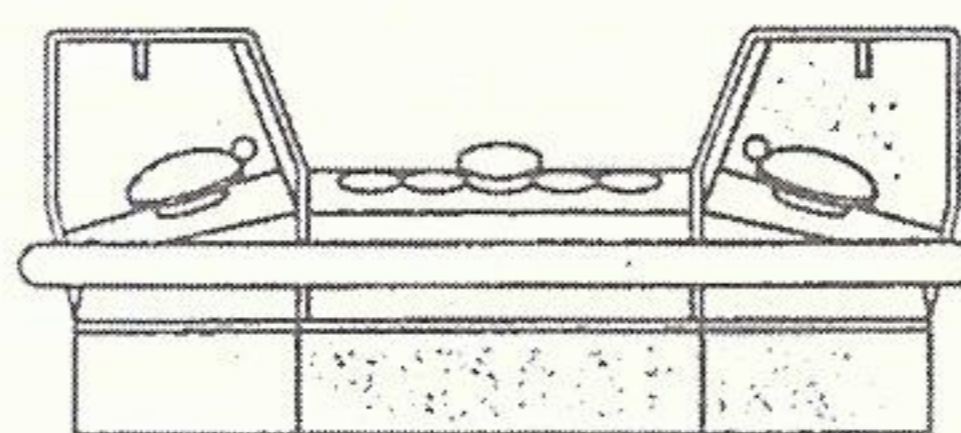
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Annex B (informative)

Correspondance between two-hand control devices and the categories (see pages 10 to 11).



PXP-C...-A and PXP-D...-A series



PXP-S...-A serie

Means and measures to achieve safety need to reflect the balance between:

- the need to follow good ergonomie principles, and
- the need to provide measure to prevent tampering and an accidental actuation. The balance shall provide adequate safety for the particular risk.

Enclosures of two-hand control devices PXP-C111-A and PXP-D121-A meet these requirements and provide an excellent ergonomoy.

Enclosures of two-hand control devices PXP-S111-A and PXP-S121-A features a wrist-rest bar which allows to alternate various hands positions to operate the control actuating device, thus preventing contracting professional illness* due to execution of repetitive action.called "R.S.I. Repetitive Strain In jury".

*called "R.S.I. Repetitive Strain Injury".

NF EN 574 -1 - General - 9 - Safety distance

Type of machines involved

- The two-hand control device can be used for numerous machines, especially for those operating in inching mode.

- Exemples :
- guillotine-shears,
 - hydraulic presses
 - all kind of mechanical press, excluding wedge presses,
 - retouch presses,
 - welding machine,
 - crimping machine

NF EN 574 - 1 - General -9 - Safety distance

Statuory provisions EN ISO 13855 : 2010.

Recommended position and normal signal distances for the bimanual conrai system

Extracts:

The present document defines the elements to be taken into consideration to evaluate the stop time and the access time of the movable elements of a machine depending on the installed protective devices conforming to the valid statuory provisions related to the prevention of industrial accidents.

General formula

The minimum distance to the dangerous zone must be calculated using the general formula:

$$S = (K \times T) + C$$

NF EN 574 - 1 - General - Safety distance

where:

S is the minimum distance, in mm, calculated between the safeguard and the hazard zone necessary to prevent a person or part of a person reaching the hazard zone before the termination of the hazardous machine function,

K is the constant in mm per second, based on the approach speed of the body or a body limb,

T is the total response time in seconds,

C is the intrusion distance, in mm, distance that a part of the body (usually a hand) can move past the safeguard towards the hazard zone prior to actuation of the safeguard.

NF EN 574 -1 - General - Safety distance

Control actuating devices (push-buttons) of the two-hand control unit.

The minimum safety distance between the dangerous zone and the closest push-button must be calculated using the formula:

$$S = (K \times n + C \text{ (see general formula)})$$

where: $K = 1600 \text{ mm/s}$, $C = 250 \text{ mm}$.

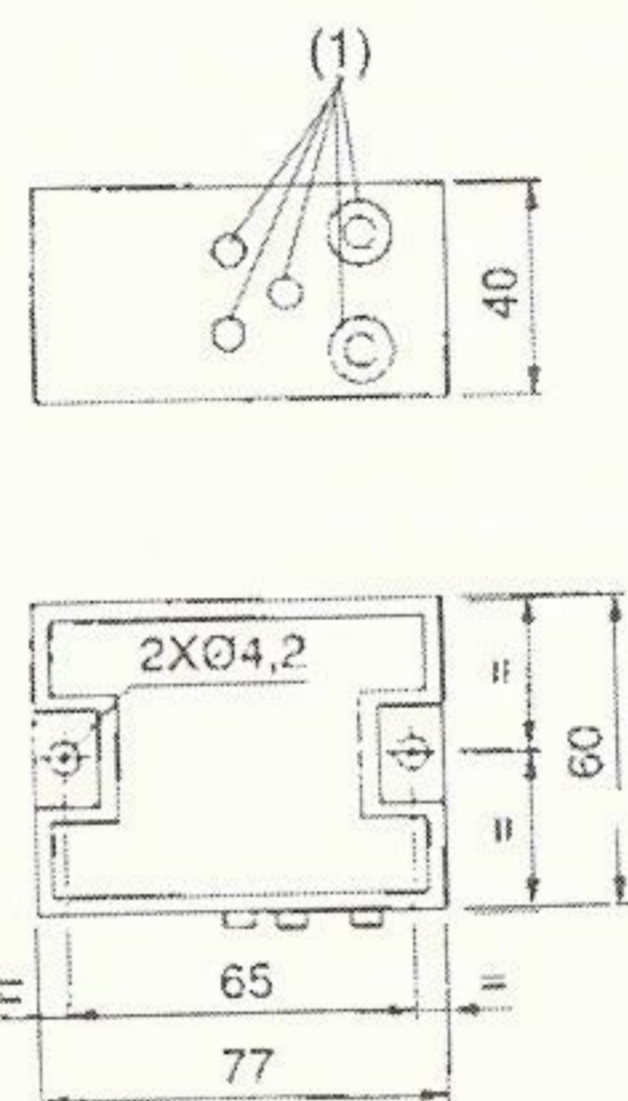
That's mean : $S = 1600 \times T + 250$

If the risk of encroachment of the hands or part of the hands towards the hazard zone is eliminated while the actuator is being operated, for example by adequate shrouding, then **C** may be zero with a minimum allowable distance for **S** of 100 mm.

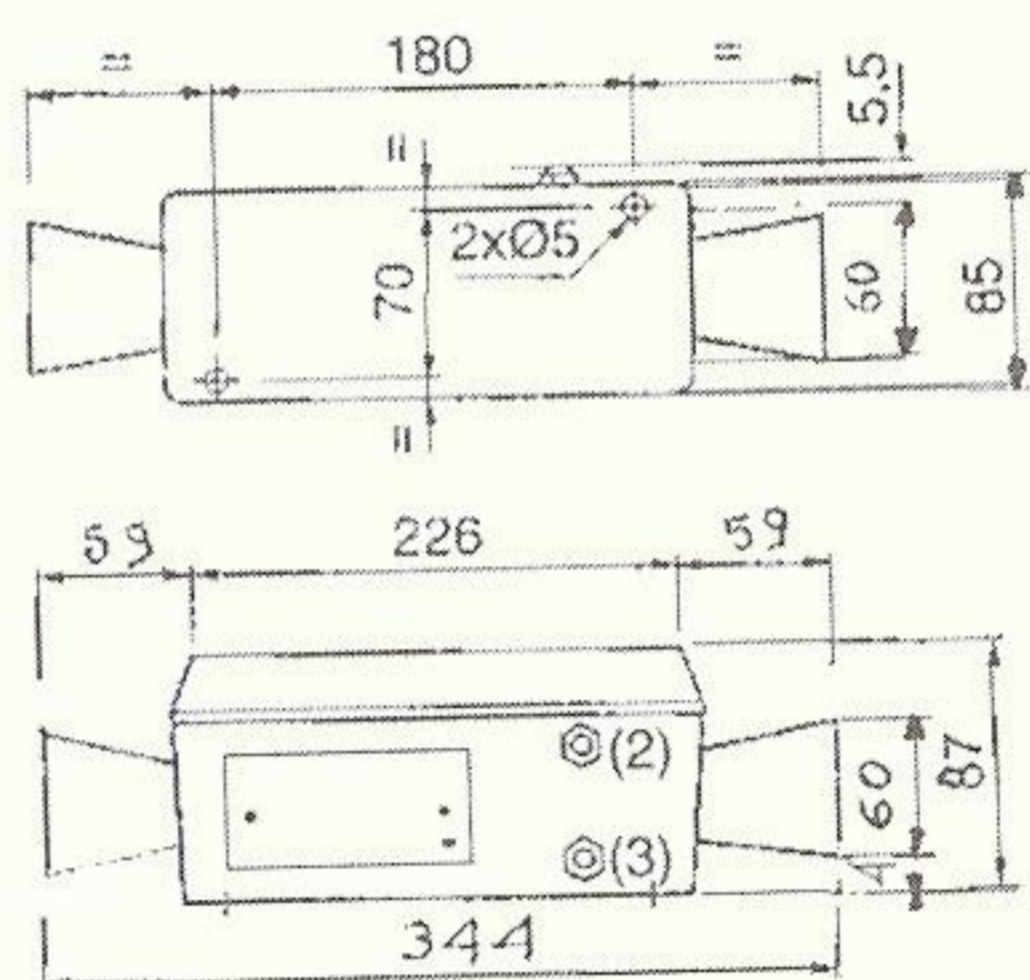
Two-hand control devices enclosures shall be monted and positioned so that the operator, after releasing an actuator, cannot reach the danger zone during the hazardous situation.

2 - Installation instructions - Dimensions - Fixing - Connecting

PXP-A11-A



PXP-C111-A et PXP-D121-A

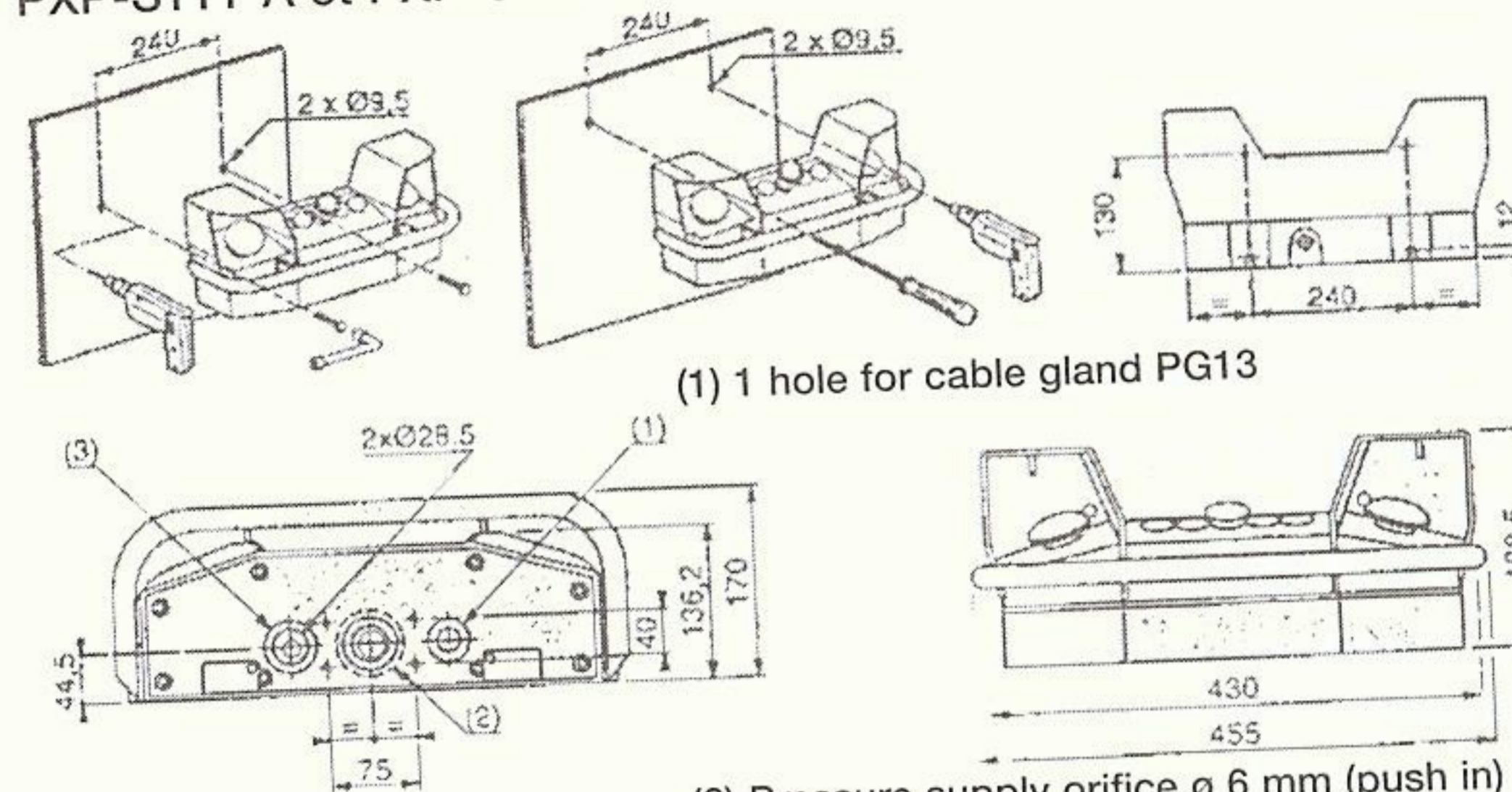


- (2) Pressure supply orifice \varnothing 4 mm (push in)
- (3) Output signal orifice \varnothing 4 mm (push in)

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2 - Installation instructions - Dimensions - Fixing - Connecting

PXP-S111-A et PXP-S121-A



- (1) 1 hole for cable gland PG13

- (2) Pressure supply orifice \varnothing 6 mm (push in)
- (3) Output signal orifice \varnothing 4 mm (push in)



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2 - Installation : Recommendations

2- Installation

Location of the control actuating devices type PXB-B4131B + ZB4-BC2S15 shall meet requirements for prevention of defeat and accidental actuation.

Connection shall be made with polyamid or polyurethan tubes, cut with a suitable tool, such as tube cutter P6T-C, to obtain a perpendicular cut, guaranteeing optimum air tightness.

Tubes length will be such they will not be submitted to bending or pulling. They will bound in such a manner they will not be exposed to risk of squeeze, rub, cut, pulling out.

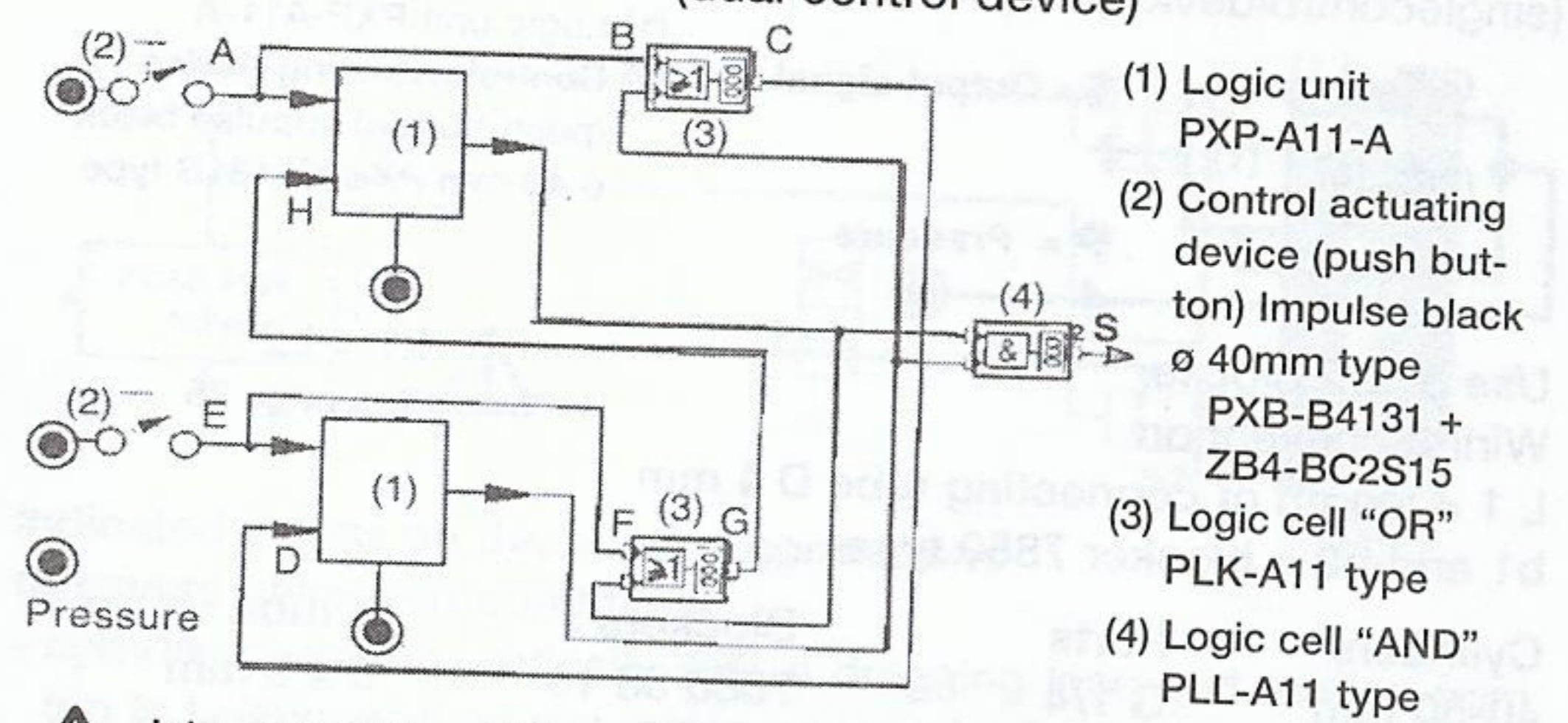
Air pressure supply an output signal tubes will be protected (sheath, cover, spout) to avoid cutting, pinching and notching risks.



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2 - Installation - Connection circuit diagram

Connection circuit diagram: with two logic units PXP-A11-A (dual control device)



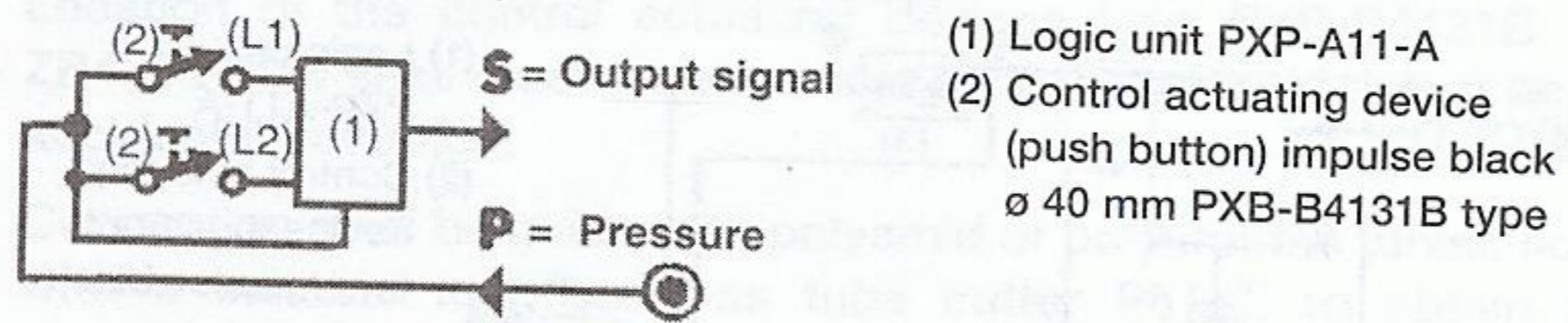
⚠ L1 = AB+CD = 250mm / L2 = EF + GH = 250mm (length of tube L1 et L2 must be equal, recommended 250mm)



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2- Installation - Connection circuit diagrams

Connection circuit diagram: with one logic unit PXP-A11-A (single control device)



Use of 2/2 blocker

Wiring convention

L 1 = length of connecting tube D 4 mm

b1 and b2 = blocker 7880 type

L1 = L2
 See page 25

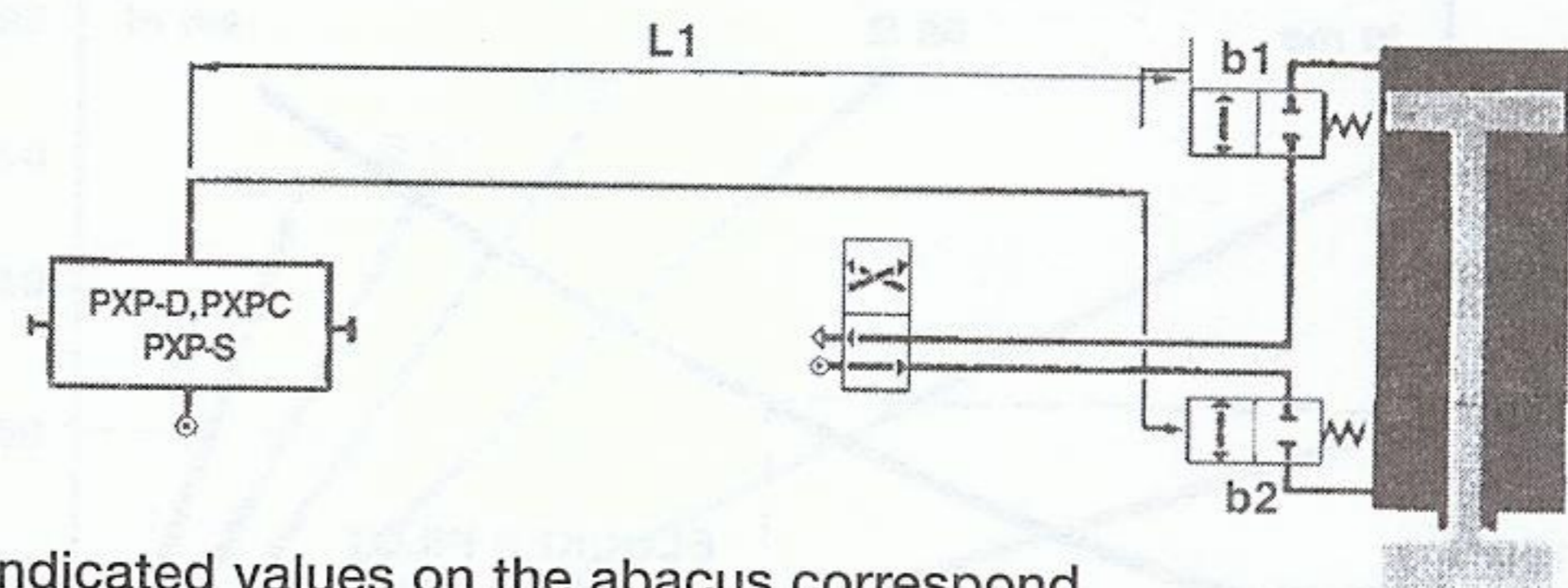
Cylinders	Ports	Blockers	ø tube
40-50 mm	G 1/4	7880 08 13	6 x 8 mm
63-50 mm	G 3/8	7880 10 17	8 x 10 mm
100 mm	G 1/2	7880 12 21	10 x 12 mm

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2 - Installation - Connection circuit diagrams

Connection circuit diagram: with one logic units PXP-D, ... C, ... S Utilization of 2/2 blocker (b1 and b2 7880 type)



Indicated values on the abacus correspond to severe utilisation conditions:

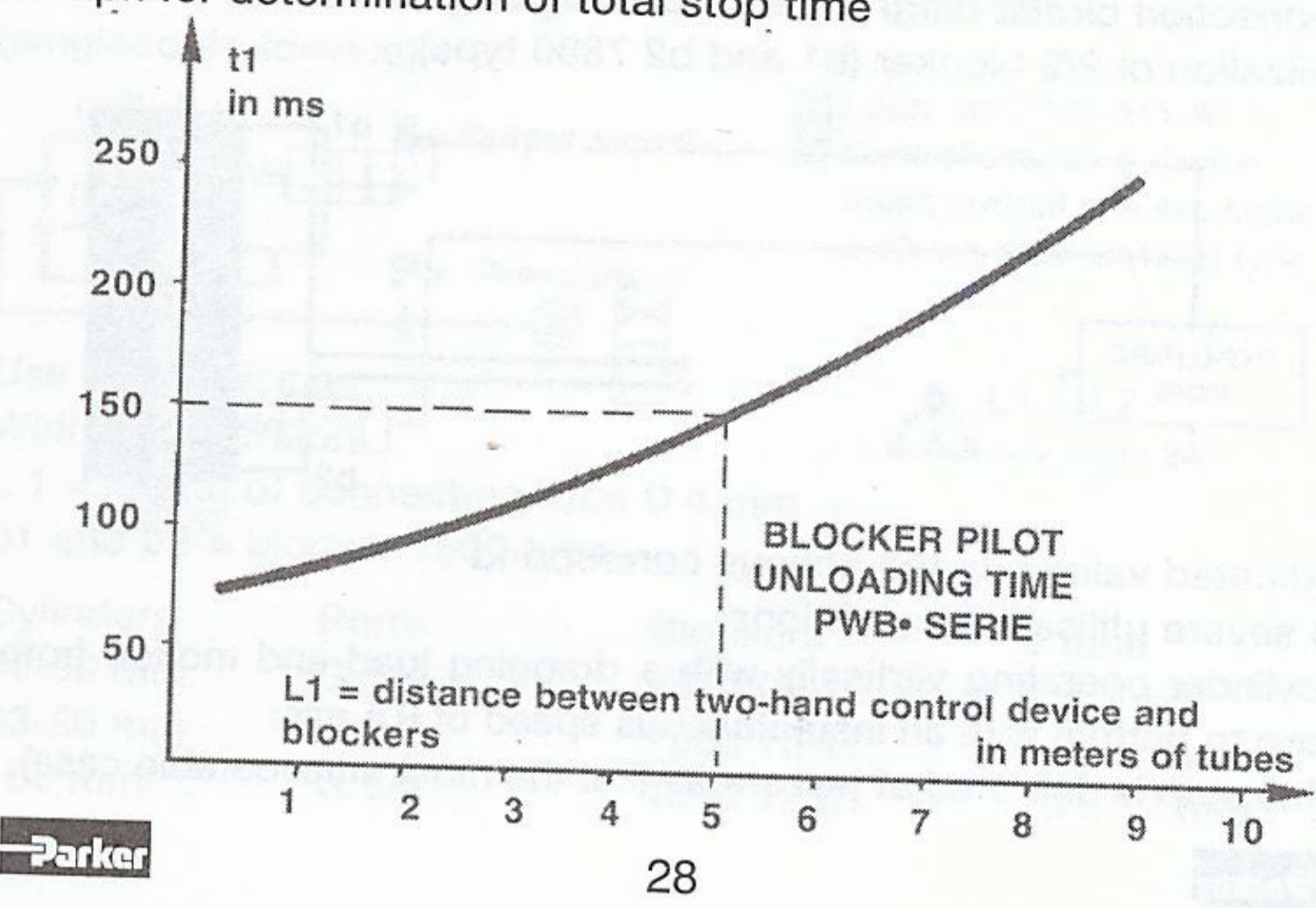
- cylinder operating vertically with a dragging load and motion from top to bottom with an instantaneous speed of 0,5 mis;
- the stop is delivered at half stroke (i.e. the most unfavourable case).

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2 - Installation - Total stop time determination - Graph

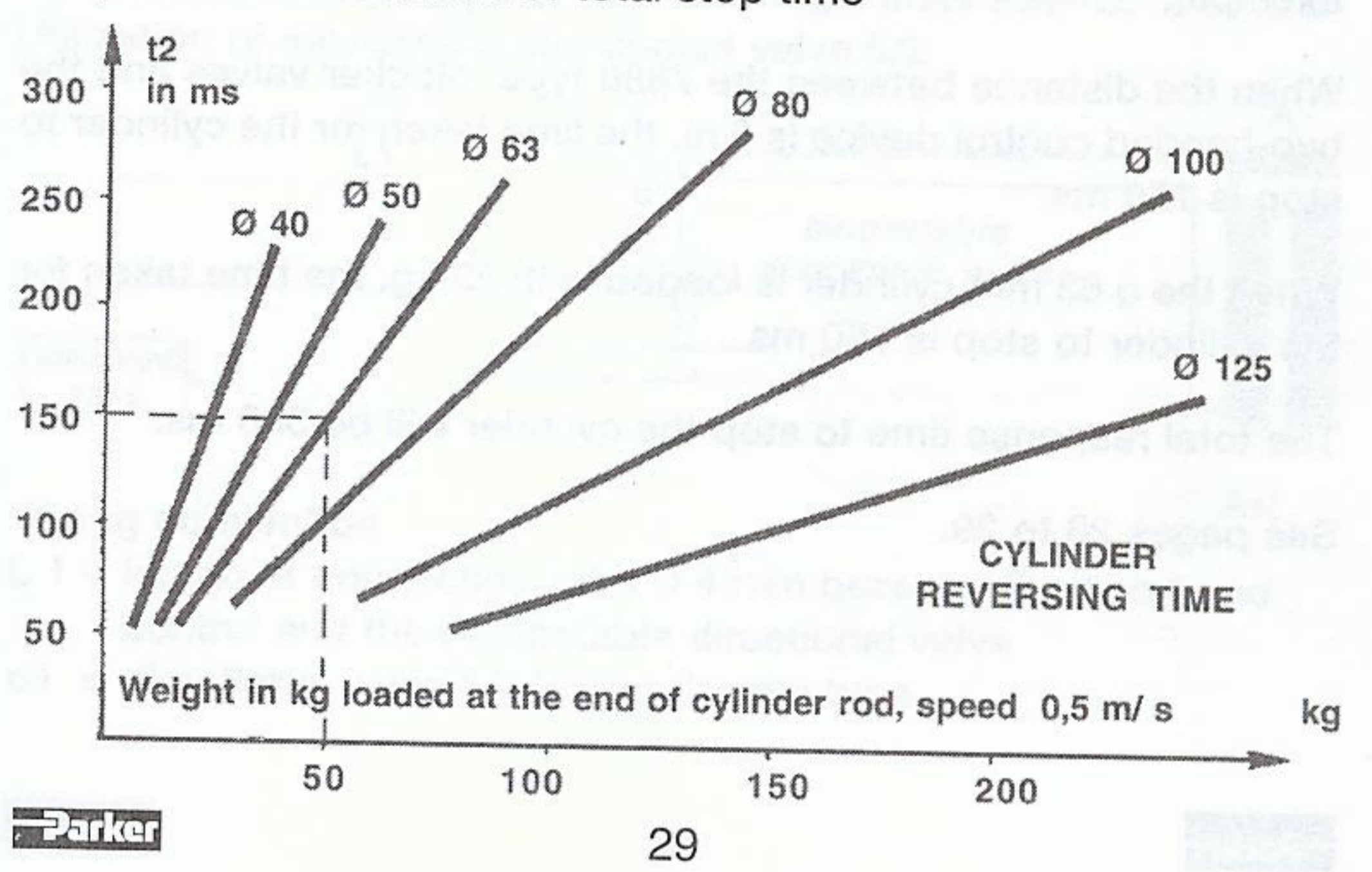
Graph for determination of total stop time



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2 - Installation - Total stop time determination - Graph

Graph for determination of total stop time



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2 - Installation - Total stop time determination - Graph

Example:

When the distance between the 7880 type blocker valves and the two-handed control device is 5 m, the time taken for the cylinder to stop is 150 ms.

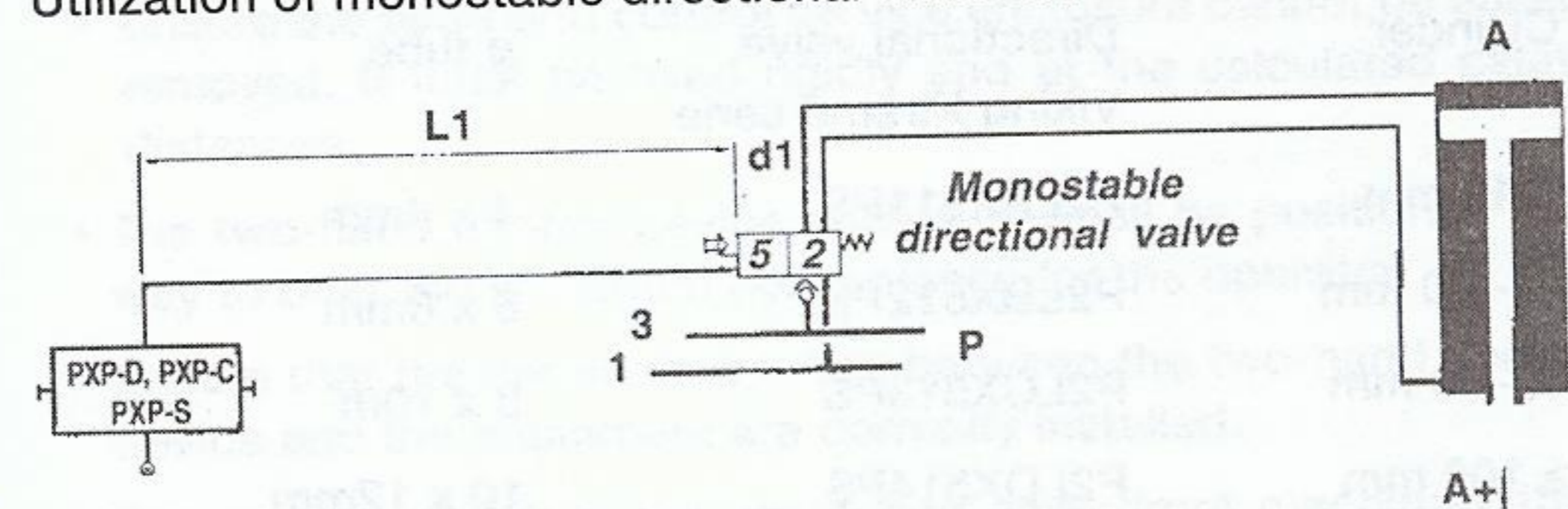
When the \varnothing 63 mm cylinder is loaded with 50 kg, the time taken for the cylinder to stop is 150 ms

The total response time to stop the cylinder will be 300 ms.

See pages 28 to 29.

2 - Installation - Connection circuit diagrams

Connection circuit diagram: with one logic units PXP-D, ... C, ... S
Utilization of monostable directional valve 5/2



Wiring convention

L 1 = length of connecting tube D 4 mm between the two-hand control and the monostable directional valve
d1 = directional valve 5/2 Viking Xtreme type

2 - Installation - Guidance for selecting well-tried components

Recommendation of choice of tested components

Cylinder	Directional valve Viking Xtreme serie	ø tube
< 40 mm	P2LAX511PS	4 x 6mm
40- 50 mm	P2LBX512PS	6 x 8mm
63-80 mm	P2LCX513PS	8 x 10mm
≥ 100 mm	P2LDX514PS	10 x 12mm

3 - Utilisation - Initial start up

3.1. Adjustment instructions and operation check

- Ensure the two-hand control device enclosure cannot be easily removed. It must be fixed rigidly and at the calculated safety distances.
- The two-hand control device enclosure shall be positioned in a way to offer the maximum convenience for the operator.
- Ensure that the connecting tubes between the two-hand control device and the equipment are correctly installed.
- Ensure that all tubes are positioned away from machinery that could cause damage due to crushing, cutting or vibration. Tubes should not be positioned in areas which are subject to high temperatures.

3 - Instructions for use

3.2. Characteristics and limitation

Utilization	Characteristics and limitation
Quality of air :	Filtered $\leq 5 \mu\text{m}$, non lubricated ISO 8573-1 : 2010 [3:4:3]
T° of operation :	0°C to 60°C
T° of air :	15°C to 60°C
Operating pressure:	3 to 8 bar
Reset time at 6 bar:	< 150 ms
The minimum time to operate the signals is	0,12 sec. Simultaneity : > 0.12 s < 0.5 s

• Malfunction simulation

Action	Consequence
- actuating device (push button ($t > 0,5$ s) are not simultaneously actuated	- No output signal is delivered, start command inhibited
- One of the two actuating devices (push button) is not maintained actuated during the dangerous motion	- Output signal is no longer delivered, immediate stop of the dangerous movement

3 - Instructions for use

3.3. Safety parameters

B10d = mean number of cycles till 10% of the components fail dangerous

Type	B10d (cycles)	Level of Compliance	
		NF EN 574	NF EN ISO 13849-1
PXP-A11-A	10 000 000	Type III A	Category 1 PLc
PXP-C111-A	3 000 000	Type III A	Category 1 PLc
PXP-S111-A	3 000 000	Type III A	Category 1 PLc
PXP-D121-A	3 000 000	Type III B	Category 3 PLd
PXP-S121-A	3 000 000	Type III B	Category 3 PLd

3 - Instructions for use

3.4. Predictable misuse

The use of the two hand control unit must be in conformity to the rules described in this instruction manual.

Level of Contamination	Frequency of Use	Duration of Use	Number of Operations
Low	Low	Low	Low
Medium	Medium	Medium	Medium
High	High	High	High

3 - Instructions for use

3.5. Adjustment instructions, operation check

- Check min pressure and max pressure
- Check the air quality. Recommended ISO8573-1:2010 [3:4:3]
- Ensure the correct condition of the tubes and fittings of the connection body.
- Ensure for mobile two-hand control devices, there is stability during normal use. Stability can be achieved by adding weight or other suitable means.
- The minimum time to operate the signals is 0,12 sec.

4 - Maintenance instructions

4.1. Quaterly inspection

- We recommend a quaterly check of the control circuit of the two-hand control unit device
 - Check the various connections, tubes between the two-hand control device and the equipment are tight and in good condition,
 - Check the efficiency of synchronous operation on the actuating devices (push buttons) of the two-hand control device in generating an output signal,
 - Check it is not possible to deliver the output signal by operating only one control actuating device (push button).
 - Check the condition of the tubes between the two-hand unit device and the equipment.
 - Check the air quality and the condition of air filters to ensure that they are free of impurities and condensate.
 - Check the condition of exhaust to en sure they are not blocked.

4 - Maintenance instructions

4.2. Yearly inspection

- Twice per year (every 6 months), we recommend in addition to the inspection the following points to be examined :
 - Check the effective stop time of the machine, especially if it is a press,
 - Check the tight-fixing of the two-hand control device enclosure,
 - Check the actuating devices (push buttons) operate freely,
 - Check the number of cycles of the two-hand control device and change the product if the number of maximum cycles has been reached.

5 - Homologation - Certification

Manufacturer: PARKER HANNIFIN
MANUFACTURING FRANCE S.A.S.
Rue H. Becquerel - BP 3124
27031 EVREUX Cedex - FRANCE

Notified body:

The INERIS, organization authorized by Employment Ministry, notified to the Commission of the European Community under the number 0080 for the EC type examination of "Logic Units to ensure safetyfunctions" listed in annex IV point 21 of Directive 2006/42/EC as amended.

INERIS
Parc Technologique Alata
BP 2
60550 VERNEUIL EN HALATTE
FRANCE



5 - EC Type examination Certificate*

The two-hand control devices, here after, conform to models that have obtained the EC type examination Certificate by the INERIS.

Partnumber	Description	Function
PXP-A11-A	Two-hand control device logic unit	Single control
PXP-C111-A	Two-hand control device polyester enclosure	Single control
PXP-D121-A	Two-hand control device polyester enclosure	Dual control
PXP-S111-A	Two-hand control device polyester enclosure	Single control
PXP-S121-A	Two-hand control device polyester enclosure	Dual control



5 - EC Type examination Certificate*

* Copy of Certificate on demand

** Directive reference: 2006/42/EC

Category	N° Type examination Certificate EC	Part n°
IIIA	0080.5130.520.12.17.0066	PXP-A11-A
IIIA	0080.5130.520.12.17.0067	PXP-C111-A
IIIB	0080.5130.520.12.17.0069	PXP-D121-A
IIIA	0080.5130.520.12.17.0068	PXP-S111-A
IIIB	0080.5130.520.12.17.0070	PXP-S121-A

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Date of yearly inspection

Date Visa Date Visa

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Date of yearly inspection

Date	Visa	Date	Visa
Category	N. type	Category	N. type
HA	00000000000000000000	HA	00000000000000000000
HB	00000000000000000000	HB	00000000000000000000
HC	00000000000000000000	HC	00000000000000000000
HD	00000000000000000000	HD	00000000000000000000

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Date of yearly inspection

Date Visa Date Visa

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