

Series P78

Dual pressure controls for Refrigeration, Air-conditioning and Heatpump Applications

Product Bulletin

These dual pressure controls are designed for use in a variety of applications involving refrigeration high or low pressure. Models supplied have a "whole range" design, enabling them to be used with refrigerants R22, R134A, R404A, R410A, R744 (CO₂), R717 (NH₃), R290, R600 natural HC refrigerants CO₂ and all other non-corrosive refrigerants which are within the operating range of the control. They may also be used for other high or low pressure applications such as air, water etc. Models which can be used with ammonia are included in the program. Also models tested and approved to PED 2014/68/EU Cat. IV (supersedes DIN and TUV approval) are included in the program.

The P78 series pressure controls may be used for control functions or limit functions, depending on model number. All models are provided with alarm contacts (except P78ALA). All standard models have phosphor bronze bellows and brass pressure connections. Models for use with ammonia (NH₃) are provided with stainless steel bellows and connectors. Devices conforming to PED 2014/68/EU Cat. IV (HP models) have the fail-safe function with double bellows. Their IP54 classification means that these pressure controls are suitable for almost all applications.

P78 Series Controls for Hazardous Location Applications use a low energy signal from inside an explosive zone on commercial refrigeration and air-conditioning applications. The controls have special dry circuit switches with gold-plated contacts for improved contact characteristics required in low voltage, low current circuits.

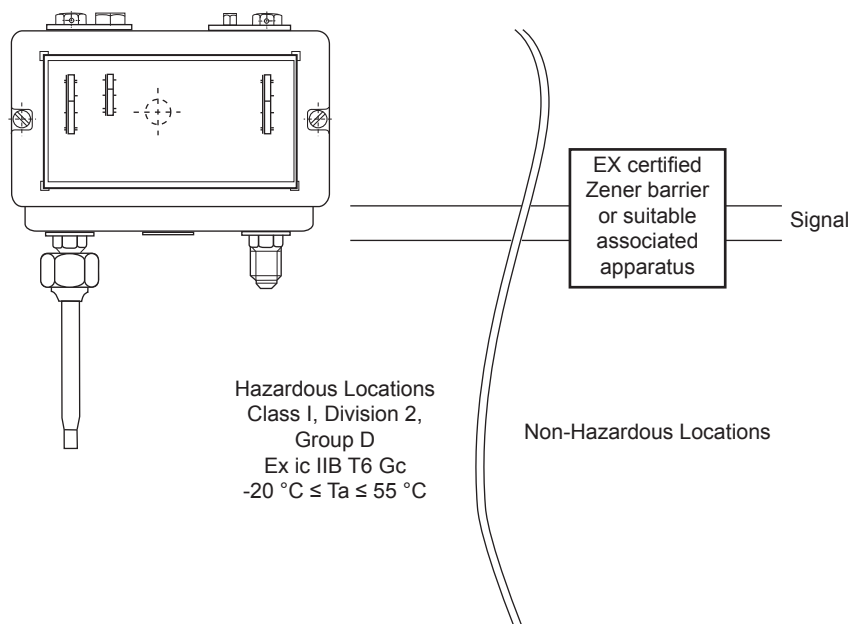
They are designed to operate in

- Group II, Zone 2 (per the ATEX Directive) environments.
- Class I, Division 2, Group D (per NFPA 70 and CSA C22.2) environments.
- **High refrigerant pressure**
Suitable for R410A and CO₂ subcritical applications
- **Gold plated contacts**
For low current applications custom models with gold plated contacts may be requested. Contact your salesman.
- **Generous wiring space**
Easy wiring and maintenance
- **Splash-proof enclosure (IP54)**
Can be used for indoor/outdoor applications
- **Trip-free manual reset**
Override is not possible in the control function
- **Patented separate alarm contacts for both low pressure and high pressure cut-out (except P78ALA)**
Easy monitoring of the fault location
- **ATEX approved**
For use with flammable refrigerants (R290, R600).
Meets 2014/34/EU ATEX directive.



Electrical connection P78 hazardous location applications

Use only cables and cable entries approved for propane applications. Do not allow cables to come into contact with sharp edges. Install cables with adequate stress relief to avoid pulling at the terminal.



Intrinsic safety protection method

Entity parameters (P78 pressure control parameters)

Maximum switch loads	
Pi max (P max)	1 W
Ui Max (V max)	30 V
Ii Max (I max)	0.1 A
Ci max	0.5 nF
Li max	0.2 μH

Selected associated apparatus providing output entity parameters must be third party listed for the application and have intrinsically safe entity parameters conforming with table below.

Intrinsically safe entity parameters for the associated apparatus

P78 pressure control		Zener barrier or suitable associated apparatus
Ui Max (V max)	≥	Voc or Vt (or Uo)
Ii Max (I max)	≥	Isc or It (or Io)
Pi max (P max)	≥	Po
Ci + Ccable	≤	Ca (or Co)
Li + Lcable	≤	La (or Lo)

IMPORTANT: The controls are intended to control equipment under normal operating conditions. Where failure or malfunctioning of the controls could lead to an abnormal operating condition that could cause personal injury or damage to the equipment or other property, other devices (limit or safety controls) or systems (alarm or supervisory systems) intended to warn of or protect against failure or malfunctioning of the controls must be incorporated into and maintained as part of the control system.

Type number matrix

P78LCA	Automatic reset both sides
P78MCA	Automatic reset low side manual reset high side
P78PGA	Manual reset both sides
P78LCW	Automatic reset both sides conform PED 2014/68/EU
P78MCB	Automatic reset low side manual reset high side conform PED 2014/68/EU
P78MCS	Automatic reset low side manual reset high side conform PED 2014/68/EU
P78PGB	Manual reset both sides conform PED 2014/68/EU
P78PLM	2 x manual rest HP conform PED 2014/68/EU
P78ALA	Dual fan cycling control (2 x SPST close high)
P78XLCW	HP or LP limit (autoreset) HP conforming to PED 2014/68/EU HP or LP conforming to ATEX 2014/34/EU

Adjustment

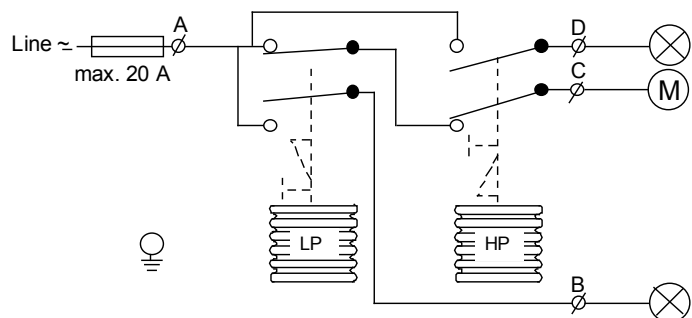
On most models the range scale indicates the high switch point (exception: LP side of P78PGA,P78PGB, here the range scale indicates the low switching point).

To obtain low switch point deduct differential value from the high switch point.

Repair and replacement

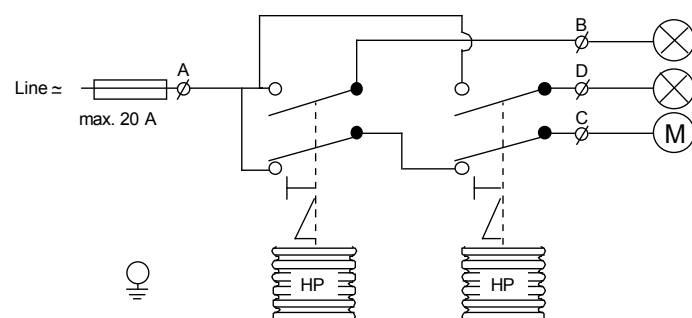
Repair is not possible. In case of an improperly functioning control, please check with your nearest supplier. When contacting the supplier for a replacement you should state the type/model number of the control. This number can be found on the data plate or cover label.

Contact functions (see also "Type number selection" tables)



LP	A - C opens on pressure decrease A - B closes simultaneously
HP	A - C opens on pressure increase A - D closes simultaneously

Figure 1



Left side HP	A - C opens on pressure increase A - B closes simultaneously
Right side HP	A - C opens on pressure increase A - D closes simultaneously

Figure 2

Switching action P78ALA

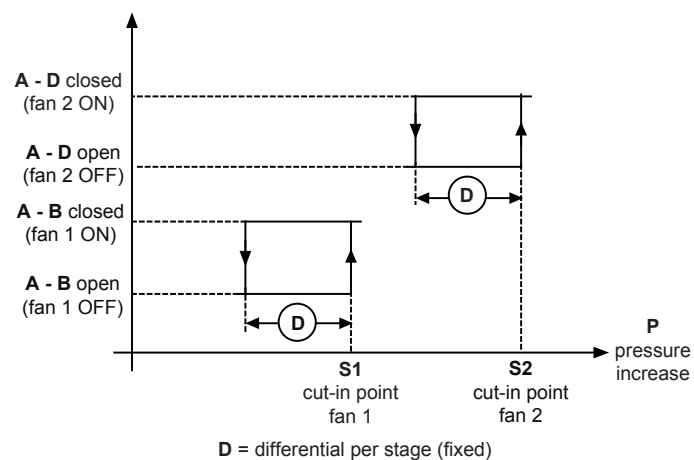


Figure 3a

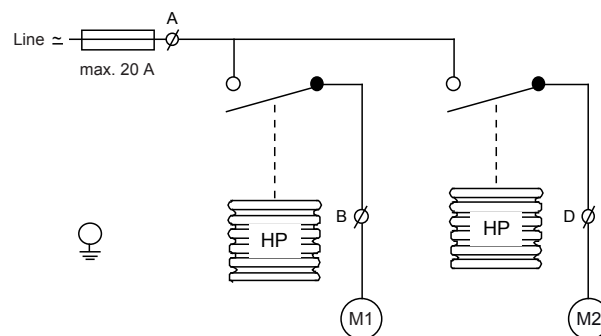


Figure 3b

Type number selection

Dual pressure controls for non-corrosive refrigerants. LP Pmax.: 22 bar HP Pmax.: 33 bar

Family code	Pressure connection		Left side		Right side		Contact function (Figure)	Construction	
	Style 5		Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)			
	Ind. pack.	Bulkpack							Style 30
P78LCA	-9300	-9320	-9400	-0.5 to 7	0.6 to 3	3 to 30	3 (fixed)	1	LP/HP
P78MCA	-9300	-9320	-9400	-0.5 to 7	0.6 to 3	3 to 30	Man. res.**	1	
P78PGA	-9300	****	-9400	-0.5 to 7	Man. res *	3 to 30	Man. res.**	1	

**** Can be set-up for quantity orders

** Resettable at 3 bar below cut-out point

* Resettable at 0.5 bar above cut-out point

Dual pressure controls for ammonia and non-corrosive refrigerants. LP Pmax.: 14 bar HP Pmax.: 33 bar

Family code	Pressure connection		Left side		Right side		Contact function (Figure)	Approved according to PED 2014/68/ EU Cat. IV
	Style 15		Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)		
	Ind. pack.	Bulkpack						
P78LCA	-9700	****	-0.5 to 7	0.6 to 3	3 to 30	3 (fixed)	1	---
P78MCA	-9700	****	-0.5 to 7	0.6 to 3	3 to 30	Man. res.**	1	
P78PGA	-9700	****	-0.5 to 7	Man. res *	3 to 30	Man. res.**	1	
P78PLM	-9750	****	3 to 30	Man. res ***	3 to 30	Man. res.***	2	●

**** Can be set-up for quantity orders

** Resettable at 3 bar below cut-out point

* Resettable at 0.5 bar above cut-out point

*** Resettable at 3.5 bar below cut-out point

Dual pressure fan cycling controls for air-cooled condensers (non-corrosive refrigerants). HP Pmax.: 30 bar

Family code	Pressure connection		Left side		Right side		Contact function (Figure)	Construction	
	Style 5		Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)			
	Ind. pack.	Bulkpack							Style 30
P78ALA	-9351	****	-9451	3.5 to 21	1.8 (fixed)	3.5 to 21	1.8 (fixed)	3a / 3b	HP/HP

**** Can be set-up for quantity orders

Note: 100 kPa = 1 bar ≈ 14.5 psi

Dual pressure controls for non-corrosive refrigerants

(Pressure limiter, pressure cut-out, safety pressure cut-out, including lockplate assy) - (Except P78PGB-*)

LP Pmax.: 22 bar HP Pmax.: 33 bar

Family code	Pressure connection		Left side		Right side		Contact function (Figure)	Approved according to PED 2014/68/EU Cat. IV	
	Style 5		Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)			
	Ind. pack.	Bulkpack							Style 28
P78LCW	-9300	-9320	-9800	-0.5 to 7	0.6 to 3	3 to 30	3 (fixed)	1	●
P78MCB	-9300	-9320	-9800	-0.5 to 7	0.6 to 3	3 to 30	Man. res.**	1	●
P78MCS	-9300	-9320	-9800	-0.5 to 7	0.6 to 3	3 to 30	Man. res.**	1	●
P78PGB	-9300	****	-9800	-0.5 to 7	Man. res.*	3 to 30	Man. res.**	1	●
P78PLM	-9350	****	-9850	3 to 30	Man. res.**	3 to 30	Man. res.**	2	●

**** Can be set up for quantity orders

** Resettable at 3.5 bar below cut-out point

* Resettable at 0.5 bar above cut-out point

Type number selection

Dual pressure controls for non-corrosive refrigerants

(Pressure limiter, pressure cut-out, safety pressure cut-out, including lockplate assy)

LP Pmax.: 15 bar HP Pmax.: 47.6 bar

Family code	Pressure Connection		Left side		Right side		Contact function (Figure)	Approved according to PED 2014/68/EU Cat. IV
	Style 5		Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)		
	Ind. pack.							
P78LCW	-9355		-0.2 to 10	1 to 4.5	3 to 42	4 (fixed)	1	●
P78MCB	-9355		-0.2 to 10	1 to 4.5	3 to 42	Man. res.*	1	●
P78PLM	-9355		3 to 42	Man. res.*	3 to 42	Man. res.*	2	●

* Resetable at 5 bar below cut-out

Dual pressure control for Hazardous Location Application and non-corrosive refrigerants

(Pressure limiter LP Pmax.: 22 bar HP Pmax.: 33 bar)

Family code	Pressure connection		Left side		Right side		Contact function (Figure)	Approved according to PED 2014/68/EU Cat. IV
	Style 28		Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)		
	Ind. pack.	Bulkpack						
P78XLCW	-18000C	-18000D	-0.5 to 7	0.6 to 3	3 to 30	3 (fixed)	1	●

Pressure connections

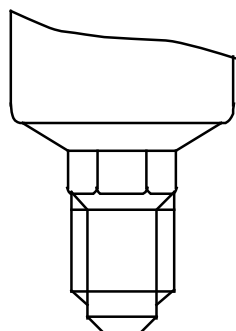


Figure 4
Style 5

Male connector
7/16"-20 UNF for 1/4"
6 mm flare nut

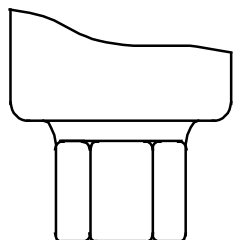


Figure 5
Style 15

Female connector
1/4"-18 NPT

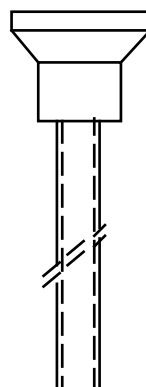


Figure 6
Style 28

Braze connection
6 mm ODM

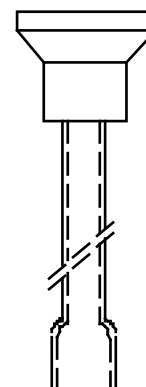


Figure 7
Style 30

Braze connection
1/4" ODF

Accessories (optional)

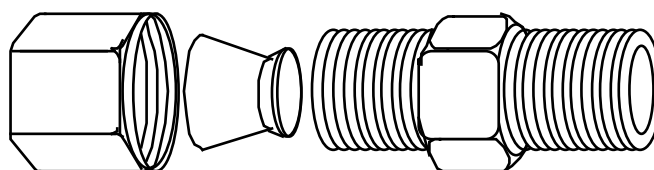


Figure 8

Ordering codes	Application	Description
CNR003N001R	For 6 mm copper or steel tubing	Fits into style 15 pressure connectors
CNR003N002R	For 8 mm copper or steel tubing	

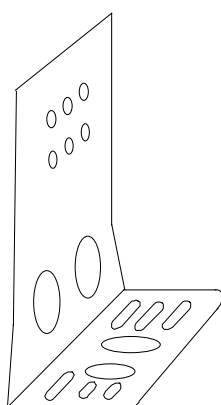


Figure 9

Mounting bracket
Ordering code **271-51L**

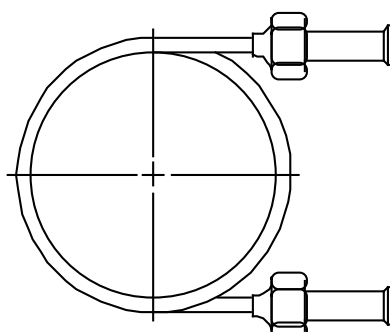


Figure 10

90 cm capillary
with (2) flare nuts (1/4" SAE)
Ordering code **SEC002N600**

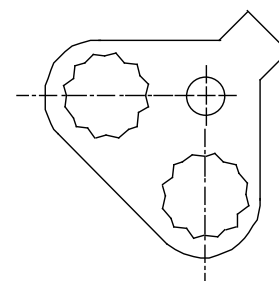
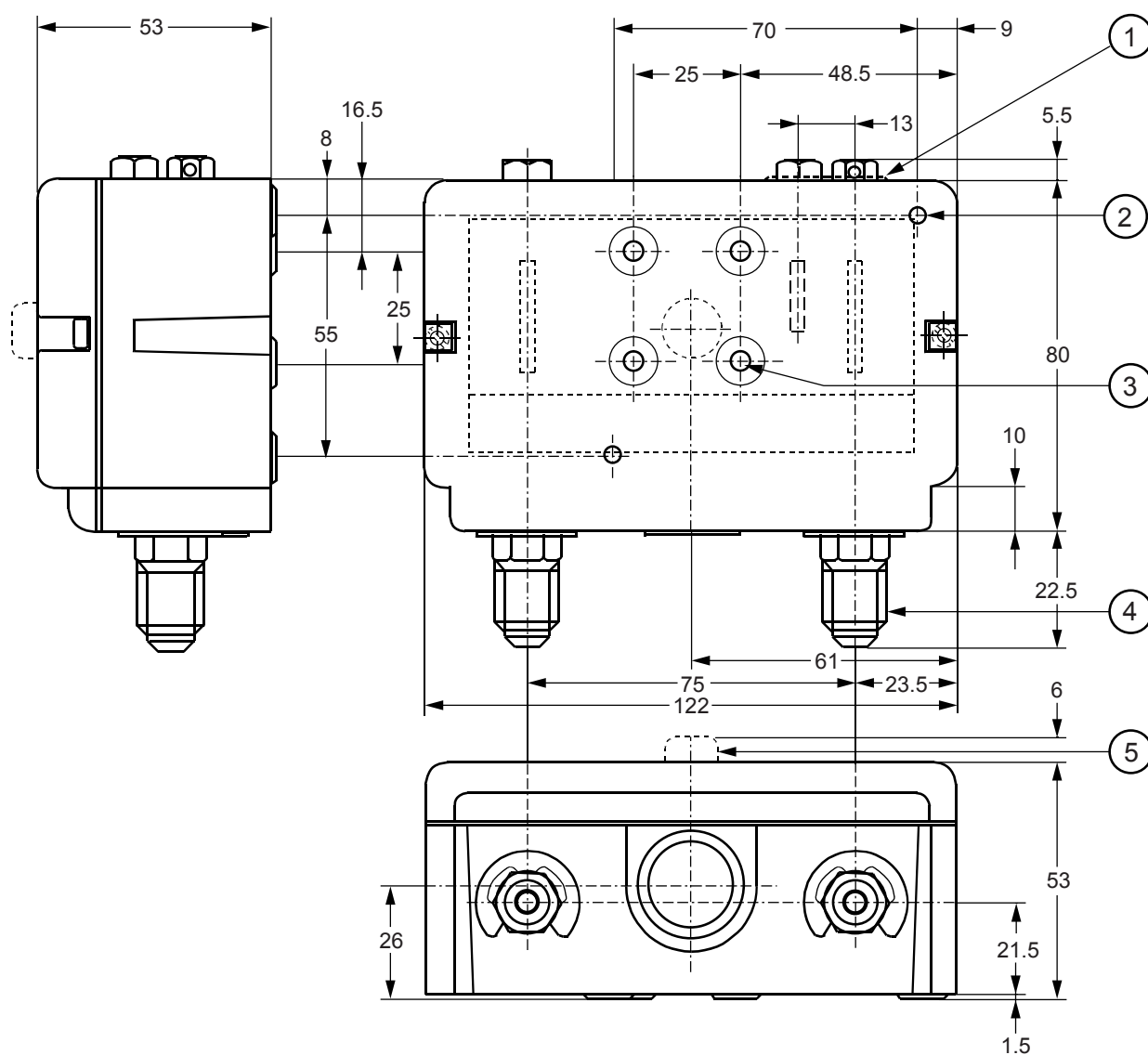


Figure 11

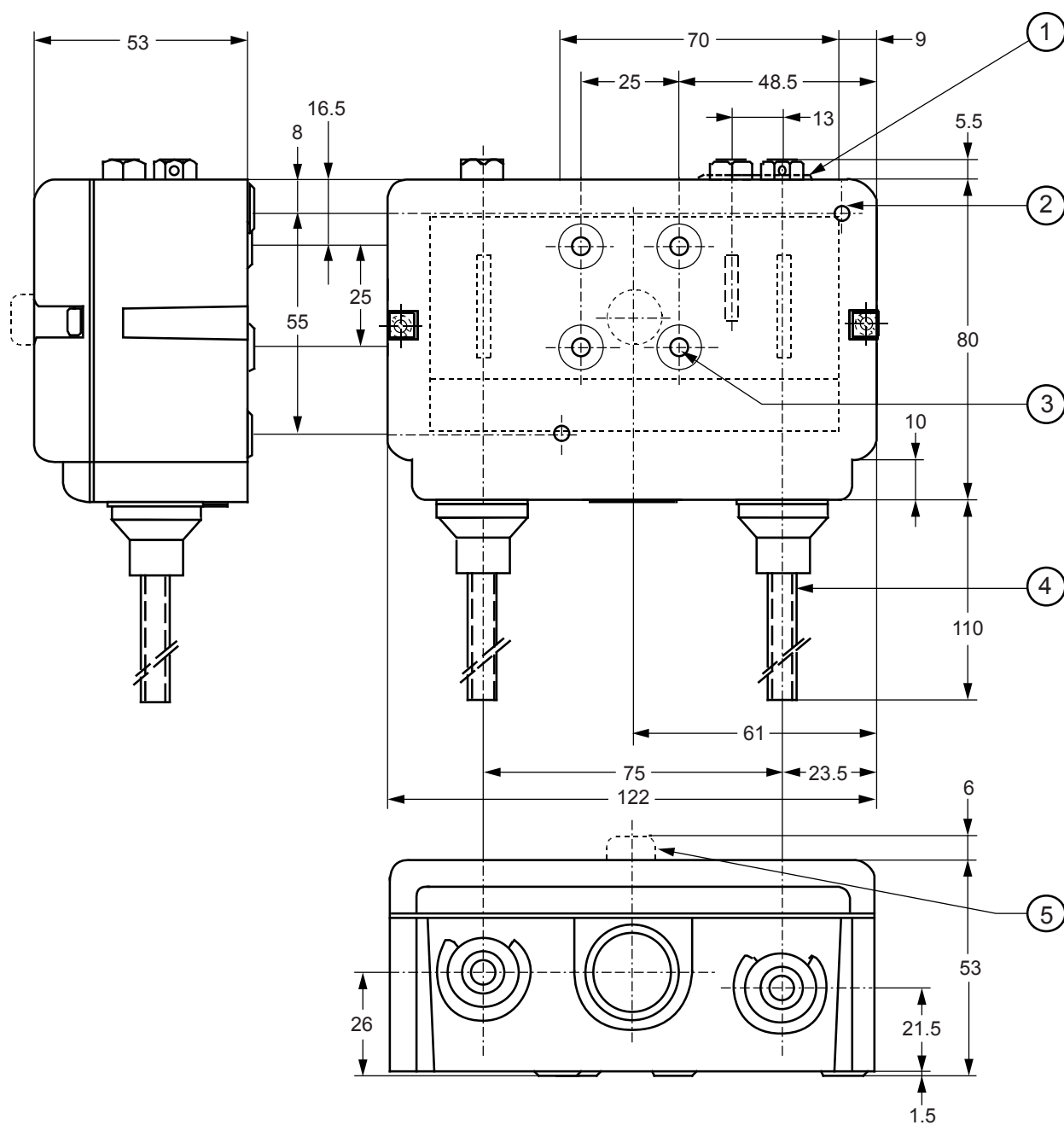
Locking kit
Ordering code **KIT023N600**

Dimensions in mm (Style 5 - style 15)






1. Lock plate (if applied)
2. Two mounting holes \varnothing 4.5 mm (knock out)
3. Four mounting holes \varnothing M4 (back side)
4. Power element: Style 5: 7/16" -20 UNF male (shown)
Style 15: 1/4" -18 NPT female
5. Reset button

Dimensions in mm (Style 28 - style 30)



1. Lock plate (if applied)
2. Two mounting holes \varnothing 4.5 mm (knock out)
3. Four mounting holes \varnothing M4 (back side)
4. Power element: Style 28: Braze connection 6 mm ODM (shown)
Style 30: Braze connection 1/4" ODF
5. Reset button

Technical specifications

Pressure connections	Style 5, 15, 28, 30 (see drawings)		
Operating ranges and diff.	See "Type number selection" tables		
Adjustments	See "Type number selection" tables		
Ambient temperature limit	-50 to +55 °C (+70 °C max. duration two hours) -20 to +55 °C for PED approved models		
Electrical ratings	400 Vac	contact A-C contact A-B contact A-D	16(10) A 8(5) A 8(5) A
	220 Vdc 12 W (pilot duty only) P78X model: 30 V / 1W		
Pulsation plug	Fitted into all HP bellows		
Locking plate and screw	To lock and seal range and/or differential screw. Standard on types P78LCW, MCB, MCS, PGB and PLM. Optional on all other types (quantity orders only)		
Protection class	IP54		
Material			
	Case and cover	Weatherproof aluminium (die-cast)	
	Contact unit	Large silver nickel contact surface	
Accessories (see pag. 6)	Mounting bracket Compression coupling 90 cm capillary with two flare nuts		
Shipping weight			
	ind. pack	0.8 kg.	
	-93xx	Ind. overpack	30 pcs. (24.5 kg)
	-97xx	Bulk pack	24 pcs. (19.5 kg)
	-94xx		
	-98xx	Ind. overpack	13 pcs. (11 kg)
	-18xx		
Compliance			
 	Europe	Johnson Controls declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive 2014/30/EU and Low Voltage Directive 2014/35/EU. Pressure Equipment Directive 2014/68/EU. ATEX: DEMKO 16 ATEX 1734 Directive: EN 60079-0 EN 60079-11	
	Australia and New Zealand	RCM Mark, Australia/NZ Emissions Compliant	

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls shall not be liable for damages resulting from misapplication or misuse of its products.



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