

# 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 (CO<sub>2</sub>), R717 (NH<sub>3</sub>), R290, R600 natural HC refrigerants CO<sub>2</sub> 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 (NH<sub>3</sub>) 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.

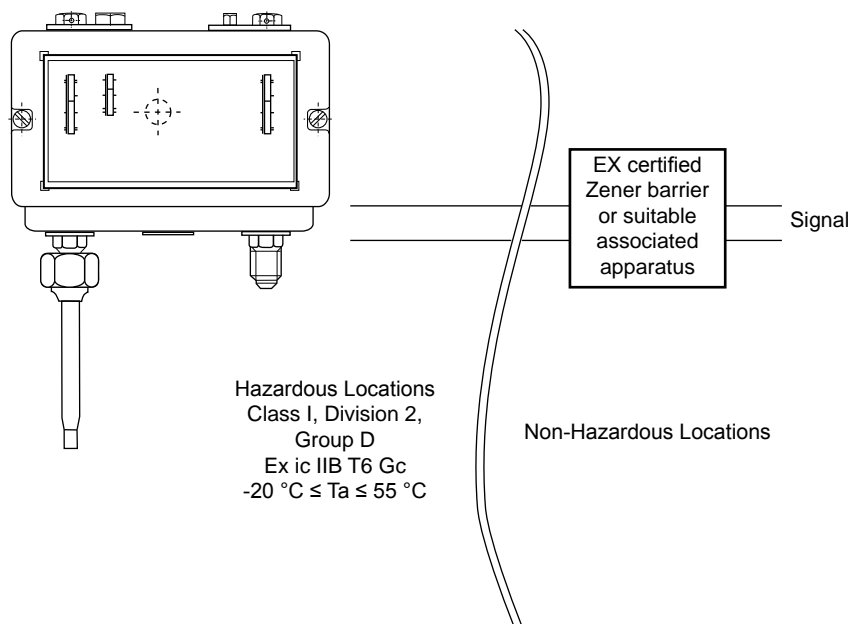
They are designed to operate in

- 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 CO<sub>2</sub> 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

<b>P78LCA</b>	Automatic reset both sides
<b>P78MCA</b>	Automatic reset low side manual reset high side
<b>P78PGA</b>	Manual reset both sides
<b>P78LCW</b>	Automatic reset both sides conform PED 2014/68/EU
<b>P78MCB</b>	Automatic reset low side manual reset high side conform PED 2014/68/EU
<b>P78MCS</b>	Automatic reset low side manual reset high side conform PED 2014/68/EU
<b>P78PGB</b>	Manual reset both sides conform PED 2014/68/EU
<b>P78PLM</b>	2 x manual rest HP conform PED 2014/68/EU
<b>P78ALA</b>	Dual fan cycling control (2 x SPST close high)
<b>P78XLCW</b>	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).

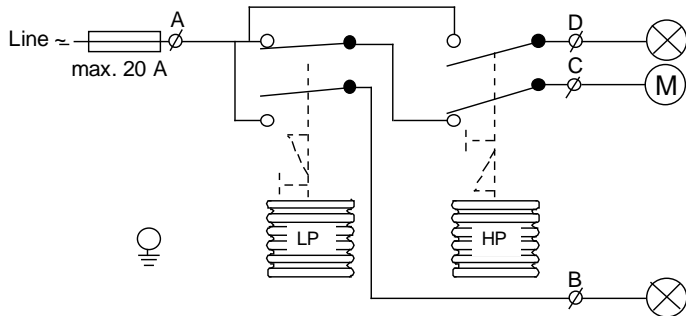
To obtain low switch point deduct differential value from the high switch point.

## 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.

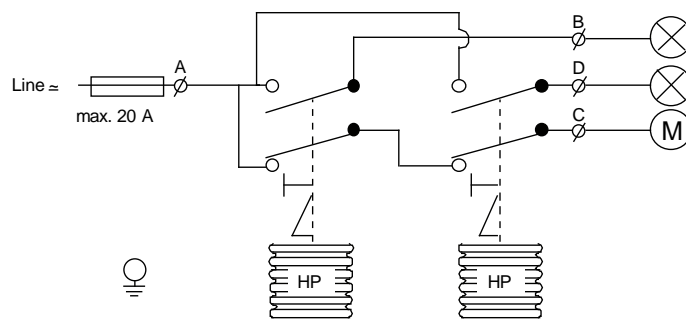
# Contact functions

(see also "Type number selection" tables)



<b>LP</b>	A - C opens on pressure decrease
	A - B closes simultaneously
<b>HP</b>	A - C opens on pressure increase
	A - D closes simultaneously

Figure 1



<b>Left side HP</b>	A - C opens on pressure increase
	A - B closes simultaneously
<b>Right side HP</b>	A - C opens on pressure increase
	A - D closes simultaneously

Figure 2

## Switching action P78ALA

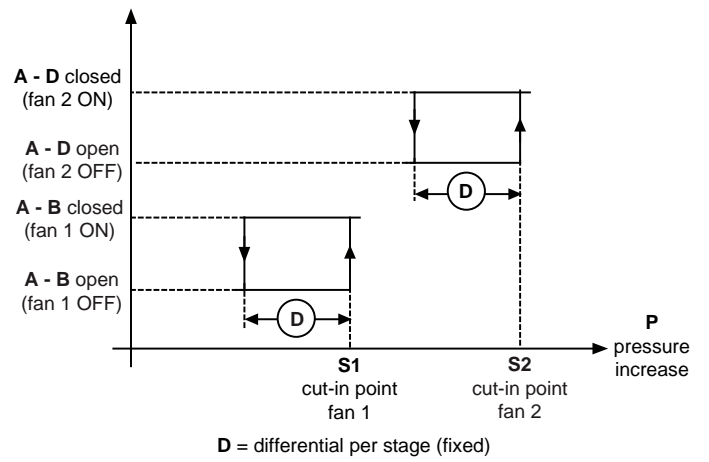


Figure 3a

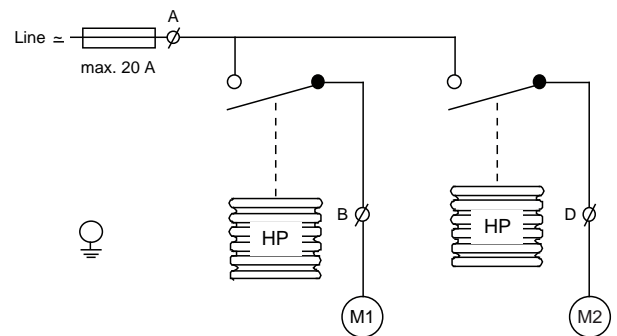


Figure 3b

## 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		Style 30	Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)		
	Ind. pack.	Bulkpack	Ind. pack.						
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)	Construction
	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	LP/HP
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	

\*\*\*\* 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 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		Style 30	Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)		
	Ind. pack.	Bulkpack	Ind. Pack.						
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		Style 28	Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)		
	Ind. pack.	Bulkpack	Ind. pack.						
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	●

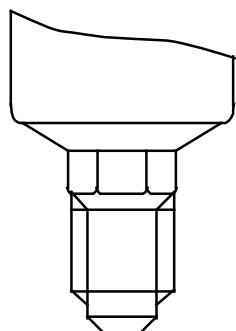
\* Resetable at 5 bar below cut-out

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

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

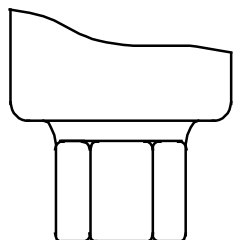
Family code	Pressure connection		Left side		Right side		Contact function (Figure)	Approved according to PED 2014/68/EU Cat. IV
	Style 28		Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)		
	Ind. pack.	Bulkpack						
P78XLCW	-18000C	-18000D	-0.5 to 7	0.6 to 3	3 to 30	3 (fixed)	1	●

## Pressure connections



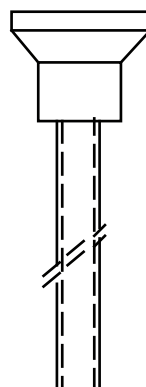
**Figure 4**  
**Style 5**

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



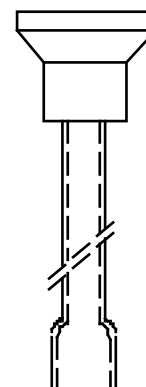
**Figure 5**  
**Style 15**

Female connector  
1/4"-18 NPT



**Figure 6**  
**Style 28**

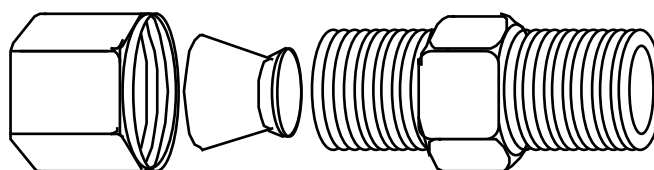
Braze connection  
6 mm ODM



**Figure 7**  
**Style 30**

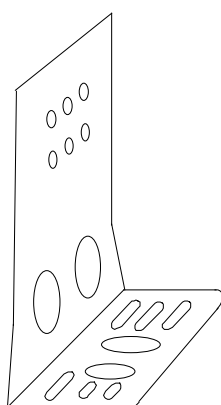
Braze connection  
1/4" ODF

## Accessories (optional)



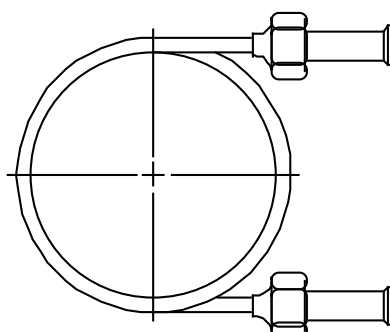
**Figure 8**

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



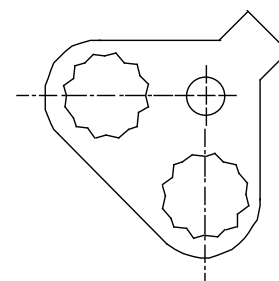
**Figure 9**

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



**Figure 10**

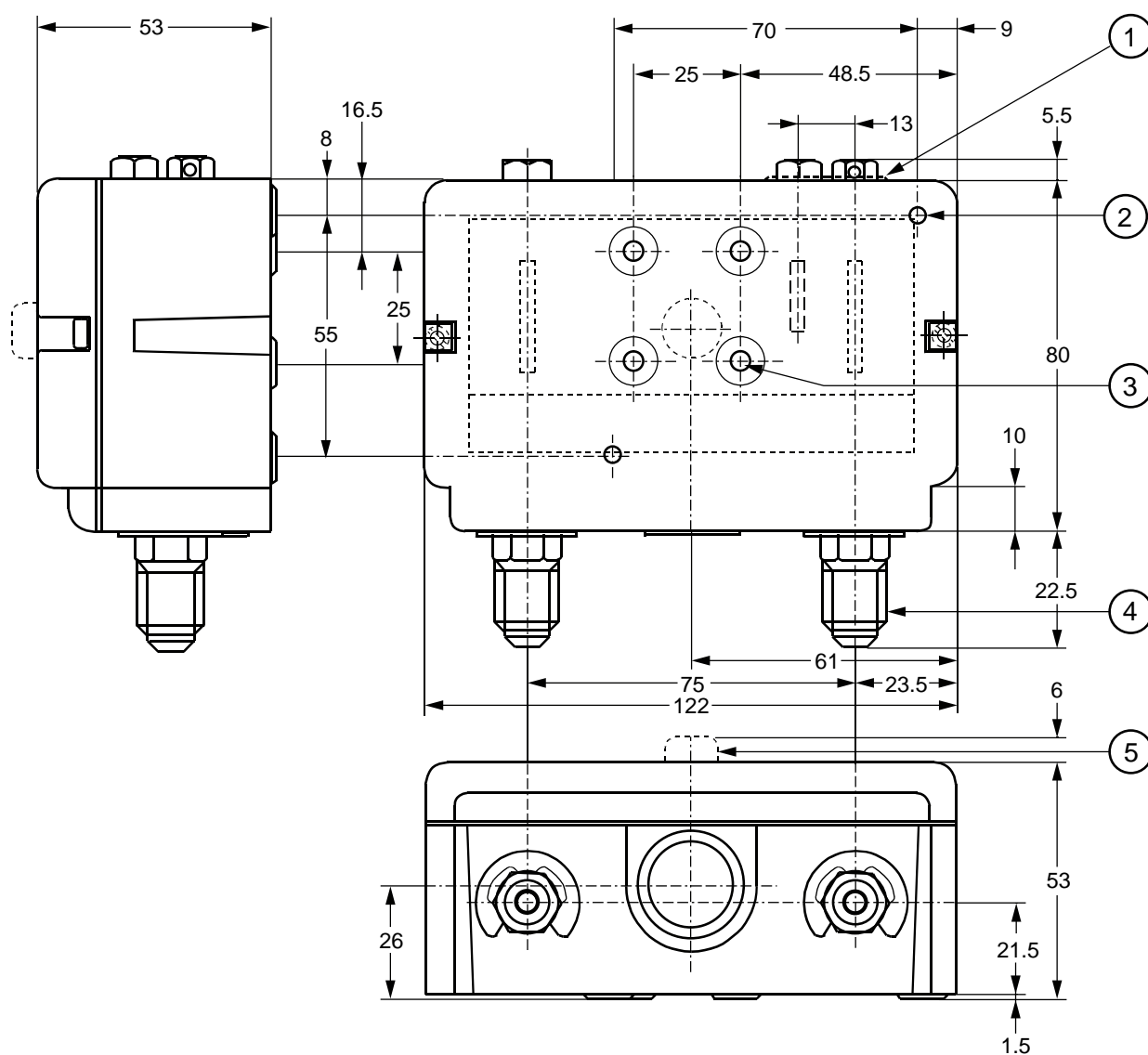
90 cm capillary  
with (2) flare nuts (1/4" SAE)  
Ordering code **SEC002N600**



**Figure 11**

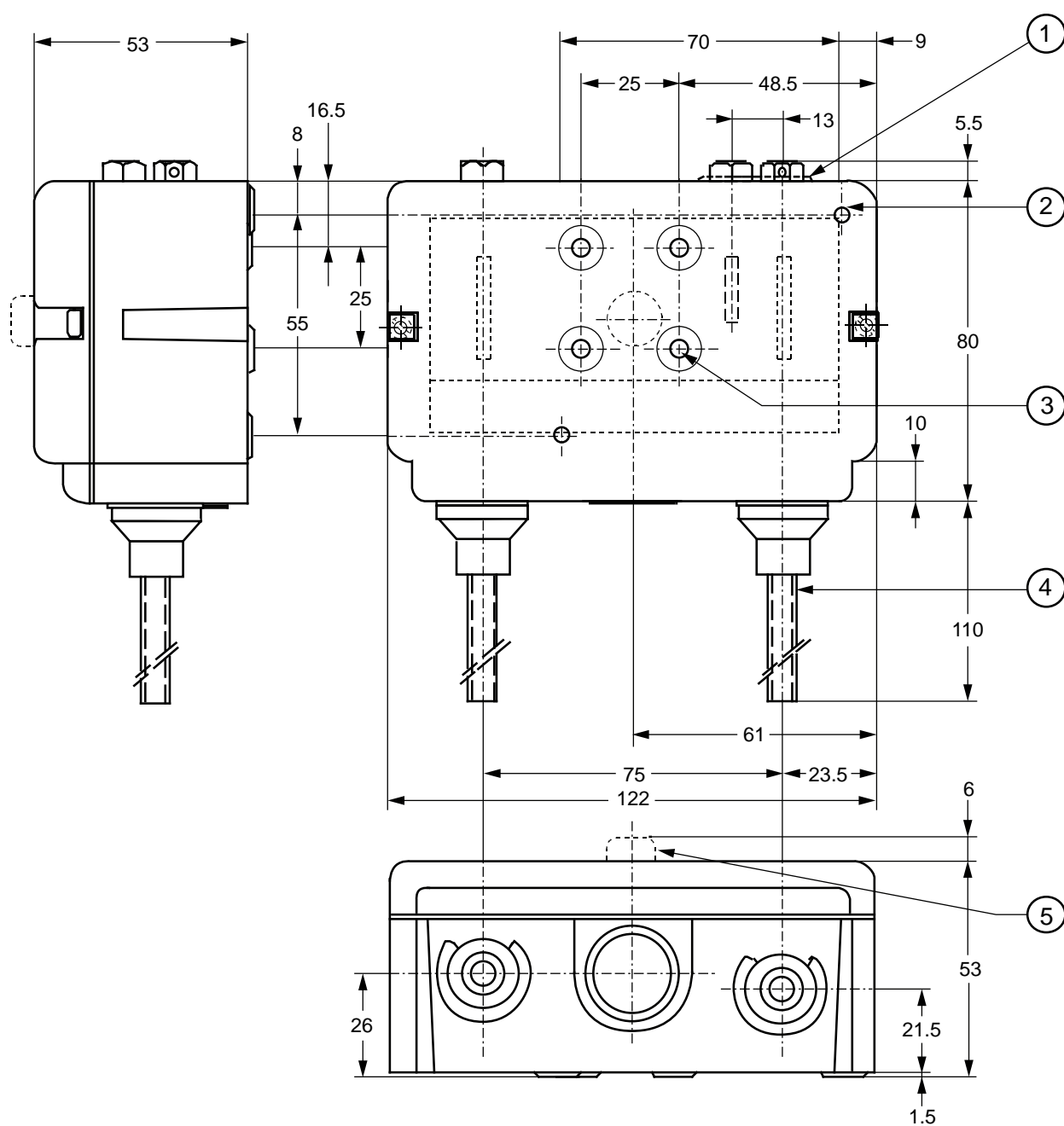
Locking kit  
Ordering code **KIT023N600**

## 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

<b>Pressure connections</b>	Style 5, 15, 28, 30 (see drawings)		
<b>Operating ranges and diff.</b>	See "Type number selection" tables		
<b>Adjustments</b>	See "Type number selection" tables		
<b>Ambient temperature limit</b>	-50 to +55 °C (+70 °C max. duration two hours) -20 to +55 °C for PED approved models		
<b>Electrical ratings</b>	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		
<b>Pulsation plug</b>	Fitted into all HP bellows		
<b>Locking plate and screw</b>	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)		
<b>Protection class</b>	IP54		
<b>Material</b>			
	<b>Case and cover</b>	Weatherproof aluminium (die-cast)	
	<b>Contact unit</b>	Large silver nickel contact surface	
<b>Accessories (see pag. 6)</b>	Mounting bracket Compression coupling 90 cm capillary with two flare nuts		
<b>Shipping weight</b>			
	<b>ind. pack</b>	0.8 kg.	
	<b>-93xx</b>	Ind. overpack	30 pcs. (24.5 kg)
	<b>-97xx</b>	Bulk pack	24 pcs. (19.5 kg)
	<b>-94xx</b>		
	<b>-98xx</b>	Ind. overpack	13 pcs. (11 kg)
	<b>-18xx</b>		
<b>Compliance</b>			
 	<b>Europe</b>	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	
	<b>Australia and New Zealand</b>	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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