Series P28
Oil Protection Controls

Introduction

These oil protection controls are designed to give protection against low net lube oil pressure on pressure lubricated refrigeration compressors. The controls measure the pressure differential between the pressure generated by the oil pump and the refrigerant pressure at the crankcase. A built-in time delay switch allows for pressure-pick up on start and avoids nuisance shutdowns on pressure drops of short duration during the running cycle.

Description

When the compressor is started, the time delay switch is energised. If the net oil pressure does not build up within the required time limit, the time delay switch trips to stop the compressor. If the net oil pressure rises within the required time after the compressor starts, the time delay switch is automatically de-energised and the compressor continues to operate normally. If the net oil pressure should drop below setting (scale pointer) during the running cycle, the time delay switch is energised and, unless the net oil pressure returns to cut-in point within the time delay period, the compressor will be shut down, and have to be manual reset. The compressor can never run longer than the predetermined time on low oil pressure.
Controls are available only for manual reset after cut-out.

P28DP Oil Protection Control
(P) Setpoint adjusting cam

Feature and Benefits	
❑ **Heavy duty pressure elements**	Withstand high overrun pressure
❑ **Safety lock-out with trip-free manual reset**	Override is not possible in the control function
❑ **Ambient compensated timing**	Stable delay time during all ambient conditions
❑ **Dust-tight Penn switch**	Prevents pollution of the contacts by electrostatic influences

Order No. PD-P28-E

Note

These controls are designed for use only as operating controls. Where an operating control failure would result in personal injury or loss of property it is the responsibility of the installer to add devices or systems that protect against, or warn of, control failure.

Time delay switch

Timings of 30, 50, 90 or 120 seconds are available for all models. The 230 VAC time delay circuit requires 30 VA for timing of 120 seconds and 50 VA for timing of 30 seconds. The time delay unit is compensated to assure uniform timing for 0 to +55°C ambient temperature. Timing is affected only by voltage variations. After a lock-out has occurred the control can be manual reset after the time delay switch has cooled down for minimum 15 minutes.

Time delay heater circuits

Standard controls are equipped with time delay circuit for 230 VAC. Special models can be supplied at extra cost for 12 V AC/DC, 24 V AC/DC or 115/230 V AC. Quantity orders only.

Fig. 1
P28DA Control, Cover removed

Repair and replacement

The timer and terminal board assembly may be replaced as a complete unit. Other repairs are not recommended. When contacting the supplier for a replacement you should state the type/modelnumber of the control. This number can be found on the data plate or cover label.

Typical wiring diagrams

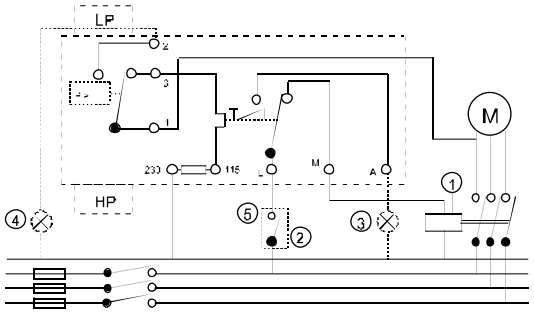


Fig. 2
P28DA

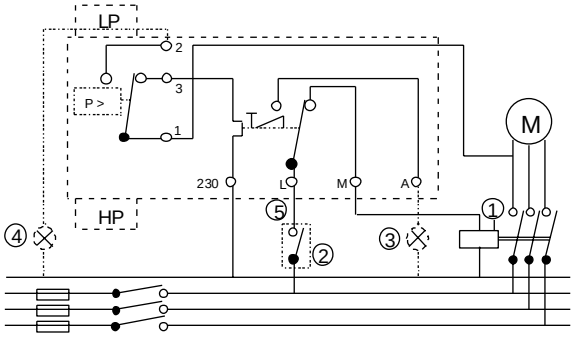


Fig. 3
P28DP/DJ

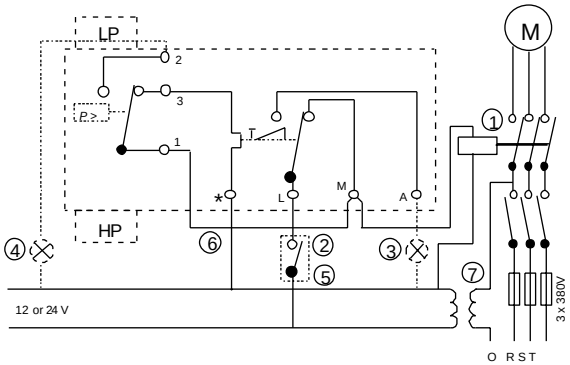


Fig. 4
12 or 24 VAC. or VDC

- . Electro-magnetic switch
- . Operating control
- . Alarm light
- . Safe light
- . Additional controls only in this line
- . Jumper
- . Transformer (12 or 24 V)

"Lp" = LP bellows
"Hp" = HP bellows

Type number selection table

Order number	Pressure connection	Timing (s)	Voltage	Refrigerant	Remarks
P28DA-9341	5	50	115/230	non-corrosive	incl.PG 13.5 nipple
P28DA-9660	13	90	115/230	non-corrosive	
P28DJ-9360	5	90	230	non-corrosive	
P28DJ-9861	15	90	230	NH3	
P28DP-9300	5	-	230	non-corrosive	without time delay
P28DP-9340	5	50	230	non-corrosive	
P28DP-9360	5	90	230	non-corrosive	
P28DP-9380	5	120	230	non-corrosive	
P28DP-9640	13	50	230	non-corrosive	
P28DP-9660	13	90	230	non-corrosive	
P28DP-9680	13	120	230	non-corrosive	
P28DP-9840	15	50	230	NH3	
P28DP-9860	15	90	230	NH3	

Pressure connections

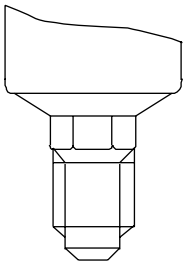


Fig. 5
Style 5
Male connection
$^{7}/_{16}$"-20 UNF for
$^{1}/_{4}$" /6 mm flare nut

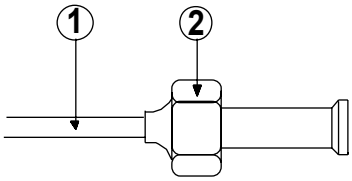


Fig. 6
Style 13
1. 90 cm capillary
2. $^{7}/_{16}$"-20 UNF nut for
$^{1}/_{4}$" SAE flare tube

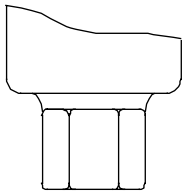


Fig. 7
Style 15
$^{1}/_{4}$"-18 NPT (female)

Accessories

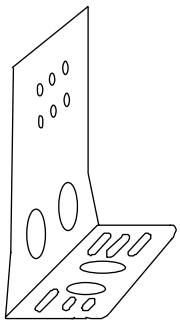


Fig. 8
Mounting Bracket
order number **271-51L**

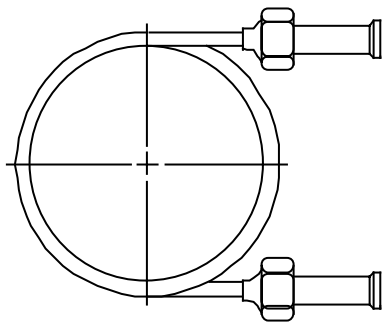


Fig. 9
90 cm Capillary with (2) flare nuts
order number **SEC002N600**

Accessories

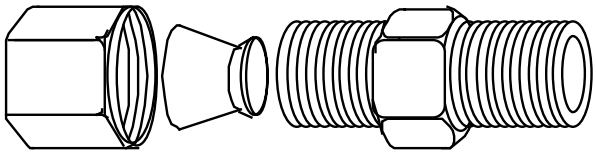
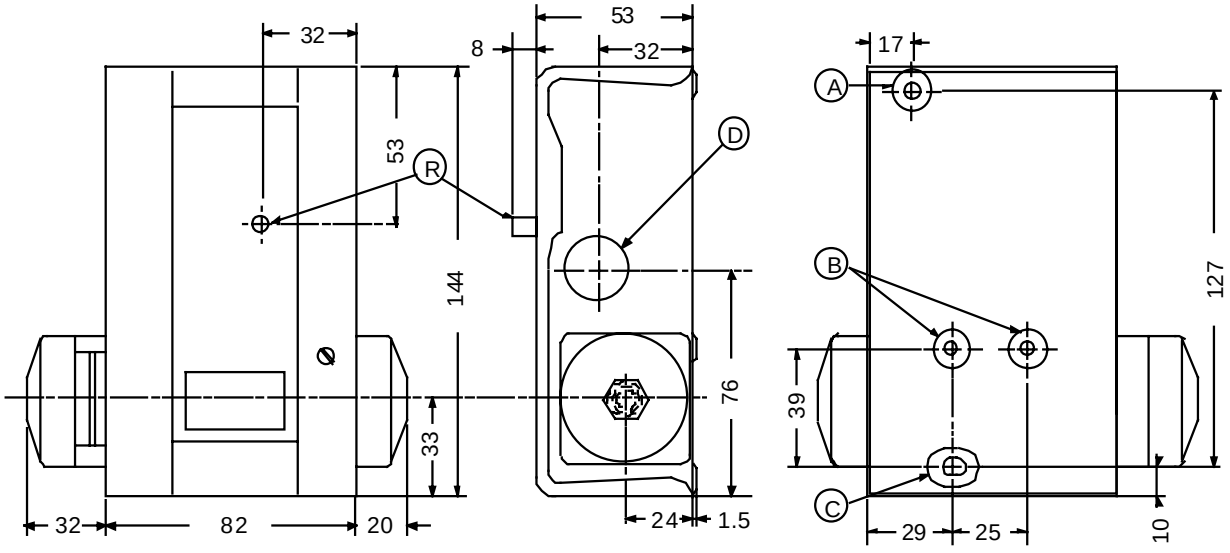


Fig. 10
Compression Coupling

Description	Application	Code number
Fits into style 15	For 6 mm copper or steel tubing	**CNR003N001R**
pressure connectors	For 8 mm copper or steel tubing	**CNR003N002R**

Dimensions (mm)

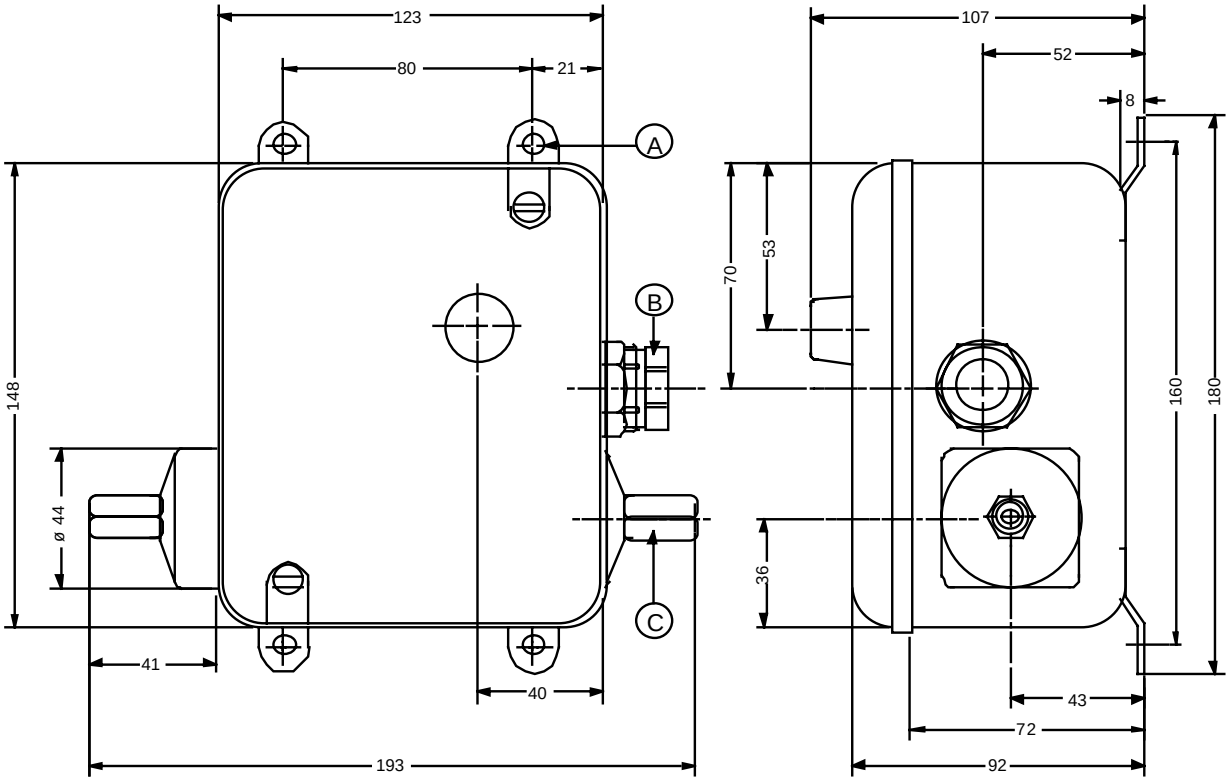


Type P28DA/DP

A. Mounting hole, 5 mm dia.
B. (2) mounting bracket holes, 10-32 UNF
C. Mounting slot
D. Cable inlet hole, 22.3 mm dia.
R. Reset button

Fig. 11

*D*imensions (mm)



Type P28DJ

A. (4) MTG holes, 7 mm dia.
B. Connector, PG-16
C. 1/4"-18 NPT (2x)

Fig. 12

Notes

Notes

Specifications

Product series	**P28DJ/DP**	single voltage	230 V	
	P28DA	dual voltage	115/230 V	
Application	Oil protection control on refrigeration compressors			
Pressure connectors	Style 5, 15, 13 (see drawings)			
Operating range*	0.6 to 4.8 bar Operating at pressures greater than 17 bar may lead to bellows failure and catastrophic refrigerant loss			
Maximum allowable overrun pressure	23 bar			
Range adjustment	Turn range cam to reach set point desired			
Material	Case 1.5 mm cold-rolled steel, zinc plated Cover 0.8 mm cold-rolled steel, blue enamel finish			
Enclosure	**Type P28DA/DP**	IP30		
	Type P28DJ	IP66		
Electrical ratings	15(8) A, 230 Vac			
Shipping weight	**P28DA/DP**	Individual pack	1.5 kg	
		Overpack (10 pcs)	15 kg	
	P28DJ	Individual pack	3 kg	
		Overpack (4 pcs)	12 kg	
Accessories (order separately)	**Mounting bracket**		order number	**271-51L**
	Compression coupling	(6mm)	order number	**CNR003N001R**
		(8mm)		**CNR003N002R**
	90 cm capillary with two flare nuts		order number	**SEC002N600**

* Time delay de-energised at 0.21 to 0.34 bar pressure difference above setting
100 kPa = 0.1 MPa = 1 bar ≈ 1.02 kp/cm2 = 1.02 at ≈ 14.5 psi

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

JOHNSON CONTROLS

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Printed in Europe