Danfoss Light Commercial Instructions

Contents

Danfoss Light Commercial

Installation and servicing of the condensing units by qualified personnel only. Follow these instructions and sound refrigeration engineering practice relating to installation, commissioning, maintenance and service.
The condensing unit must only be used for its designed purpose(s) and within its scope of application and according to instruction.
Under all circumstances, the EN378 (or other applicable local safety regulation) requirements must be fulfilled.
The condensing unit must be handled with caution in the vertical position (maximum offset from the vertical : 15°)
Condensing units can be used with refrigerant letter N = R290, necessary care to be taken during installation and servicing.
In case of R290 refrigerants, all components on the refrigeration circuit must be R290 certified. Example: Evaporator.

Relevant Standards and Directive (CE and non CE)
EN 378 -2: Refrigerating Systems And Heat Pumps-Safety And Environmental Requirements.
EN 60335-1: Household And Similar Electrical Appliances – Safety –Part 1: General Requirements
Low Voltage Directive n° 2014 / 35 / UE
Machinary Directive n° 2006 / 42 / CE
EC Pressure directive (PED) no. 2014/68/EU
RoHS Directive 2011-65-EU
WEEE Directive 2012-19-EU
(Other local applicable standards)

Introduction

These instructions pertain to Optyma™
Light Commercial range and R290 OP-LCHC,LCQC,MCGC,MCHC,MCHB,LCNC,MCNC,OPSC,SC,PL,BD,TL,FR,NL,FF,NF,DL used for refrigeration systems

Handling and Storage

- It is recommended not to open the packaging before the unit is at the final place for installation.
- Store and transport the unit in an upright position.
- Store the unit between -35°C and 50°C.
- Don’t expose the packaging to rain or corrosive atmosphere.
- Unit store and transport must be in comply with indication on their carton box.

Installation

	Do not braze as long as the
	condensing unit is under pressure.
	It’s not allowed to operate the unit in
	flammable atmosphere.
	Use a drier with molecular sieves
	suitable for R290 (for versions N0,
	A09, A11).
	Use only dry and clean components
	and avoid moisture entering the
	system.
	Do not lift or move the condensing
	unit by using copper tubes. Use Rail
	or base provided

Ensure there is sufficient distance between the condenser coil and surrounding to ensure good air circulation.
Condensing unit must be installed away from moving components, potential source of ignition and high temperature.
The unit ambient temperature shall not exceed 50°C during off cycle.
Ensure that the power supply corresponds to the unit characteristics (See nameplate in unit).
Use clean and dehydrated refrigeration-grade copper tubes and silver alloy brazing material.

The suction piping connected to the compressor must be flexible in 3 dimensions to dampen vibrations.
Furthermore, piping has to be done in such a way that oil return for the compressor is ensured and the risk of liquid slug over in compressor is eliminated.
Installer must carry out risk assessment for flammable refrigerant (R290) applications by referring EN 378 and equivalent European standards.
Installation, maintenance and commissioning must be carried out by qualified specialists only!
All connections, for example solderings and flare joints, are to be made professionally.
Protect the surroundings against the admittance of unauthorized persons. Pay attention to sufficient ventilation.

Remove transport safety devices, if any.
Mount the condensing unit horizontally. Use the correct tube diameters.
Prevent any vibrations. Avoid smoking and open fire.
Refrigerant is to be removed and disposed of professionally.
Assembly of the condensing units
Prepare the tube connections from the evaporator.
It is recommended to use a drier with 3Å molecular sieves, e.g. Danfoss type DML.
Use only dry components and avoid moisture entering the system.
The system components must not contain any chlorine, mineral oil, or other oily substances.
Maximum test pressure must not exceed 32 bar.

Refrigerant charging

Refrigerant charging (N0, N1, N2, T0, T1, T2,A00, A01 and A04)
Annex C Fig.2 The process descriptions below are based on the equipment shown.

1. Suction stop valve
2. Discharge stop valve
3. Connection to suction side
4. Shut-off valve to vacuum pump
5. Shut-off valve to charging cylinder
6. Connection to discharge side
7. Shut-off valve to discharge side
8. Shut-off valve to suction side
9. Connection to vacuum pump
10. Connection to charging cylinder

    When a vacuum of 0.5 mbar or lower has been reached, shut off the connection to the vacuum pump by closing all manifold valves.

Repeat the evacuating process once or twice if necessary and then close all manifold valves.
Close the service connector of the suction stop valve (1) by turning the spindle „anticlockwise“ to the rear stop.
Refrigerant charging must take place from equipment not contaminated with refrigerants containing chlorine.
For units with stop valves the rule is that refrigerant should always be charged in liquid form through the discharge stop valve of the unit in order to avoid liquid hammer when the unit is started. If this rule cannot be observed the compressor is not to be started until the pressure and the temperature of the refrigerating system have been equalized.
Open valves (5) and (7) of the valve manifold while keeping the other valves closed.
When all liquid has been transferred to the discharge side of the unit close the service connector of the discharge valve (2) by turning the spindle anticlockwise to the rear stop.
Remove all hose connections.
Fit the union nuts with blind caps on pressure gauge connectors (1) and (2).
Fit and tighten up caps on the valve spindles.

Evacuation

Evacuation (N2, T2, A01 and A04)
Annex C Fig. 2. The process descriptions below are based on the equipment shown.

1. Suction stop valve
2. Discharge stop valve
3. Connection to suction side

4. Shut-off valve to vacuum pump
5. Shut-off valve to charging cylinder
6. Connection to discharge side
7. Shut-off valve to discharge side
8. Shut-off valve to suction side
9. Connection to vacuum pump
10. Connection to charging cylinder

Connect the discharge line to the suction stop valve (1) of the unit.
Connect the suction line, via the filter drier, to the discharge stop valve (2).

- Make the connection (3) between the manifold and the service connector of the suction stop valve (1).
- Make the connection (6) between the manifold and the service connector of the discharge stop valve (2).
- Make the connection (9) between the vacuum pump and the manifold (4).
- Make the connection (10) between the charging cylinder and the manifold (5).
- Remove the protective caps from the spindles of both stop valves (1) and (2).
- Open valves (4), (7) and (8). Open stop valves (1) and (2) to mid position. Start the vacuum pump.
- Vacuum pumps, which are normally used for refrigerants containing chlorine, cannot be used with R134a, R404A/R507 and R452A.
- Only a vacuum pump with special Polyolester oil may be used for systems with refrigerant containing FCKW, HFCKW and HFKW.
- (Contact the pump supplier.)

Evacuation (T0, A00)
Evacuation takes place through the compressor then process connector after complete connection in the refrigerating circuit.
Plan sufficient time for the evacuation as it takes place from the low pressure side only, unless additional measures were taken to speed up the evacuation.
Vacuum pumps normally used for refrigerants containing chlorine must not be used with
R134a and R404A/R507. Only a vacuum pump with special Polyolester oil may be used for systems with refrigerant containing FCKW,
HFCKW and HFKW. (Contact the pump supplier.)

Electrical connections

- Prepare the electrical connections while evacuation is taking place. Do not start the compressor until the vacuum has been broken. Remove the cover over the terminal board. Connect the leads.
- It is impossible to start the unit without a thermostat (1H see Annex C , fig. 2) being connected or a lead between 1 or 2, respectively, and L has been established (Annex C Fig. 3-16).
  Annex C Fig. 3. Wiring diagram for the compressor platform: P, T, N, F, S.
  Annex C Fig. 4. Wiring diagram for the compressor platform: SC with CSR (starting and operating capacitor).
  Annex C Fig. 5. Wiring diagram for the compressor platform: TL, FR and SC condensing units with pressure control.
  Annex C Fig. 6. Wiring diagram for the compressor platform: SC condensing units with combined high and low pressure control andCSR (starting and operating capacitor).
  Annex C Fig. 7. Wiring diagram for the compressor platform: MP & ML condensing units.

Annex C Fig. 8. Wiring diagram for Twin compressor, see SC.

Annex C Fig. 9. Wiring diagram for Twin compressor, with 50% of fan speed.

Annex C Fig. 10-16. Wiring diagram for R290 models.

- 1A. Main winding
- 1B. Start winding
- 1C. Start relay
- 1D. Winding protector
- 1E. Start capacitor
- 1F. Bleeder resistance
- 1G. Run capacitor
- 1H. Thermostat
- 1J. Fan
- 1K. Pressure control

  Fit the terminal board cover.

  Keep away flammables from the electrical equipment.

Declaration of conformity

- All our condensing units are complied with low voltage directive 2014/35/EU and must be incorporated during installation.
- Low Voltage Directive 2014/35/EU

  EN 60335-1:2012 + A11:2014- Household and similar electrical appliances-Safety-Part 1: General requirements-for all above mentioned condensing units with compressor platforms FR, GS, L, P, NF, NL, PL, SC and TL.
- Eco-design DIRECTIVE 2009/125/

  EC, establishing a framework for the setting of Eco-design requirements for energy-related products.
- REGULATION (EU)

  2015/1095, implementing Eco-design Directive 2009/125/EC with regard to

  Eco-design requirements for professional refrigerated storage cabinets, blast cabinets, condensing units and process Chiller.
- Condensing unit measurements are made according to standard “EN 13771-2:2007”
  - Compressor and condensing units for refrigeration-performance testing and test methods- part 2: Condensing units
- The following approvals must be obtained through authorised institutes like Nemko, Demko, BEAB, LCJE, etc. Among others EN 60 335- 2-24, IEC 335-2-89, IEC 79-15.

Safety

Important service and safety tips

The drier must always be replaced when a system has been opened.
Blow through the system with dry nitrogen before soldering.
When a defective system is emptied the refrigerant must be collected without mixing with other refrigerants, and the refrigerant must not leak into the environment.

(See also “Installation“).
The condenser and the complete condensing unit must be cleaned regularly.
Specified maintenance and cleaning intervals must be observed.
Working on components that are under pressure is dangerous.
Beware of hot and extremely cold components. Beware of moving components (e.g. fan).
Pay attention to sufficient ventilation.
Check the perfect operation of the fan.
The application limits stated by the manufacturer must be observed.
If pressure controls are specified, they must be installed professionally.
The operating condition must be monitored in order to ensure perfect operation.

Check whether the shut-off valves (suction and discharge side) are completely opened. Ensure that EN 378 is observed.
If forced ventilation is necessary, this is to be clearly shown (i.e. by a label).
Do not install in aggressive, moist or dusty environment.
Do not install or start in rooms containing flammable gases or in installations operating with such.
Pressure Equipment Directive 2014/68/EU EN 378-2:2016
Condensing units are no „units“ in accordance with the PED.
The unit/installation into which the condensing unit is mounted/integrated, must be in accordance with the PED.

Maximum refrigerant charges

It is recommended that only the right quantity of refrigerants necessary for correct function of the refrigeration system be added.
For refrigeration systems with capillary tube the charge must be adapted to suit each system type.
The operating charge must never exceed the capacity of condenser and receiver.
Always avoid excess refrigerant charge!Crankcase heater
If the maximum amounts of refrigerant cannot be observed in T0, T2, A01, A02, A04 or T0 condensing units respectively, a crankcase heater or a pump-down transmission must be used. The crankcase heater must be fitted directly over the weld.
The crankcase heater will heat the compressor oil during standstill periods. When the refrigeration system has been at a stand-still for longer periods the crankcase heater must be cut in 2-3 hours before starting. The following crankcase heaters are recommended
TL and FR: 35 W (code no. 192H2095) SC: 55W (code no. 192H2096)

Cold start

After installing the unit the compressor must be allow-ed to assume a temperature higher than 10°C before it is started for the first time. This will prevent possible start problems caused by too high oil viscosity.
At lower temperatures some tripping of the winding protector may be expected until the viscosity of the oil becomes reduced.
See also crankcase heater.
Never start during vacuum!

Winding protector

The compressors have a built-in winding protector. If the protector cuts out while the compressor is cold it may take approx. 5 minutes for the protector to reset.
If the winding protector cuts out while the compressor is hot (compressor housing above 80°C) up to 45 minutes may pass before the protector resets.

Checking the winding protector

In the event of a compressor failure a check must be made by resistance measurement direct on the current lead-in to find out whether the fault is due to motor damage or simply a winding protector trip.
Annex C Fig. 3. Location of the winding protector in the electrical circuit.

1A. Main winding
1B. Start winding
1D. Winding protector
If resistance measuring shows that there is a
connection through the motor windings from points K and S of the current lead-in, but a broken circuit between points K and F or between S and F, this indicates that the winding protector has cut out. Therefore, wait for the protector to reset.

ACB Pressostat setting (mini HP/LP)

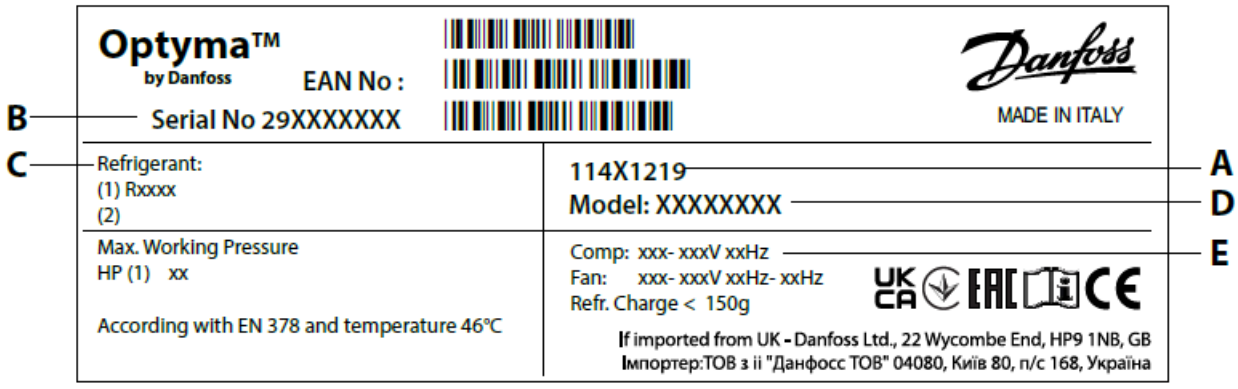
Application	Refrigerant	High Pressure Setting (bar)		Low pressure Setting (bar)	
		ON	OFF	ON	OFF
LBP	R290	16	20	0.3	-0.4
MBP	R290	10	25	1.7	0.7
LBP	R404A	20	25	–	–
MBP	R134a	13	18	1.5	0.1

Dual Pressure Switch Setting

Refrigerants	High pressure settings (bar (g))		Low pressure settings (bar (g))	
	ON	OFF	ON	OFF
R404A/R507/R452A	23	27	2	1
R134a/R513A	13	17	2	1

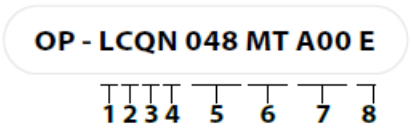
Annex – A, Technical data

Label information



A: Condensing unit code number
B: Production serial number
C: Refrigerant
D: Model designation
E: Power supply for compressor & fan motor

Designation – Catalogue

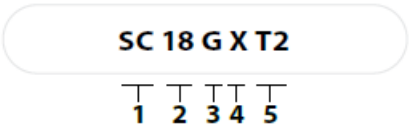


OP = Optyma

1	**Application:** **M** = Medium Back Pressure ; **L** = Low Back Pressure
2	**Compressor Platform:** **C**: Air cooled condensing unit with single fan
3	**Refrigerant:** **G**: R134a, R513A; H: R404A/R507; **Q**: R452A, R404A/R507; **N**: R290
4	**Condenser design:** **C**: Fin & Tube condenser, ambient temperature up to 43°C
5	**Compressor displacement:** Example 048 = 48 cm3
6	**Reciprocating compressor platform:** FR = FR, NF = NF, SC = SC, GS = GS, NX = NX, NB = NBC, NS = NS, NU = NUY, NP = NPT, MP = M PT, MY = MLY, MX = MX, TL = TL, NL = NL
7	**Version:** A00, A01, A04, A09, A10, A11. See table Feature overview, for fea- tures within each version.
8	**Electrical code:** G: Compressor 230V/1P/50Hz, fan 230V/1P/50Hz E: Compressor 400V/3P/50Hz, fan 230V/1P/50Hz

	Light Commercial			Light Commercial R290		
	A00	A01	A04	A09	A10	A11
Ambient temperature	Up to 43°C			Up to 43°C		
Hermetic reciprocating compressor platform	MPT, MLY, NL, SC, GS, FR, TL, NF			NUY, NBC, NPT, NS, NX		
Unit base	Rails or base plate					
Condenser type	Fin & Tube (painted)					
Fan	AC/ EC	AC/ EC	AC/ EC	EC	EC	EC
Bracket & tube for pressostat mounting	–	yes	yes	yes	–	–
Dual pressure switch – KP 17 WB	–	–	yes	–	–	–
Schrader valve	–	–	–	yes	yes	yes
Wired electrical box	yes	yes	yes	yes	yes	yes
Mini HP/LP pressostat	–	–	–	–	yes	–
Power cord	–	–	yes	–	yes	–
Receiver	–	yes	yes	–	Combo drier + receiver	–

Designation – Non catalogue



1	**Compressor Platform: PL, TL, NL, FR, SC, GS**
2	**Compressor displacement:** Example 048 = 48 cm3
3	**Application and Refrigerant:** **CM** = LBP; R22 **CL** = LBP; R404A/R507 **CN** = LBP/MBP; R290 **CP** = LBP; R404A/R507, R452A **DM** = HBP; R22 **DL** = HBP; R404A/R507 **F** = LBP/(MBP); R134a **FT** = LBP tropical; R134a **G** = LBP/MBP/HBP; R134a & R513A **GH** = Heat pump optimized; R134a **MF** = MBP; R134a **ML** = MBP; R404A/507
4	**Start characteristics: X** = HST K = LST
5	**Version:** N0 – For capillary tube – without stop valves, without receiver N1 – For capillary tube – with 1x stop valve, without receiver N2 – For capillary tube – with 2x stop valve, without receiver T0 – For expansion valve – with receiver without 2x stop valves T1 – For expansion valve – with receiver with 1x stop valves T2 – For expansion valve – with receiver with 2x stop valves

	Light Commercial					
	N0	N1	N2	T0	T1	T2
Ambient temperature	Up to 43°C					
Hermetic reciprocating compressor	NL, SC, GS, FR, TL, NF, DL					
Unit base	Rails or base plate					
Condenser type	Fin & Tube (painted)					
Schrader valve	–	–	–	yes	yes	yes
Wired electrical box	yes	yes	yes	yes	yes	yes
Service valve	–	yes*	yes	–	yes*	yes
Receiver	–	–	–	yes	yes	yes

Catalogue Models

Light Commercial – Technical data

Application	Version			Description	Compressor	Electrical code	Refrigerant	Condenser coil		Fan		Receiver Volume (L)	Suction Line	Liquid line
	A00	A01	A04					Designation	Internal Volume (L)	Number	Blade (mm)			
LBP	114X12 08	114X12 09	114X12 11	OP-LCHC004TL	TL4CL	G	H	BG2	0.25	1	200	0.8	1/4″	1/4″
LBP		114X12 21		OP-LCQC004ML	MLY45LAb	G	Q	BG2	0.25	1	200	0.8	3/8″	1/4″
LBP	114X12 16	114X12 17	114X12 19	OP-LCHC006FR	FR6CL	G	H	BG2	0.25	1	200	0.8	3/8″	1/4″
LBP		114X13 37		OP-LCQC006ML	MLY60LAb	G	Q	BG3	0.31	1	230	1.1	3/8″	1/4″
LBP	114X13 28	114X13 29	114X13 31	OP-LCHC007NL	NL7CLX	G	H	BG3	0.31	1	230	1.1	3/8″	1/4″
LBP	114X13 24	114X13 25	114X13 27	OP-LCHC008FR	FR8.5CL	G	H	BG3	0.31	1	230	1.1	3/8″	1/4″
LBP	114X13 04	114X13 01	114X13 02	OP-LCHC008NL	NL8.4CLX	G	H	BG3	0.31	1	230	1.1	3/8″	1/4″

LBP		114X1341		OP-LCQC008ML	MLY80LAb	G	Q	BG3	0.31	1	230	1.1	3/8″	1/4″
LBP	114X1440	114X1441	114X1443	OP-LCHC012SC	SC12CL	G	H	BG4/5	0.4	1	254	1.1	3/8″	1/4″
LBP	114X1444			OP-LCHC012SC	SC12CLX.2	G	H	BG4/5	0.4	1	254	1.1	3/8″	1/4″
LBP		114X1449		OP-LCQC012ML	MLY12LAb	G	Q	BG4/5	0.4	1	254	1.1	3/8″	1/4″
LBP		114X1569		OP-LCQC012MP	MPT12LA	G	Q	BG4/5	0.4	1	254	1.1	3/8″	1/4″
LBP		114X1573		OP-LCQC014MP	MPT14LA	G	Q	BG4/5	0.4	1	254	1.1	1/2″	1/4″
LBP	114X1548	114X1549	114X1551	OP-LCHC015SC	SC15CLX	G	H	BG4/5	0.4	1	254	1.1	3/8″	1/4″
LBP	114X1556	114X1557	114X1559	OP-LCHC018SC	SC18CL	G	H	BG4/5	0.4	1	254	1.1	1/2″	1/4″
LBP	114X1600	114X1601	114X1602	OP-LCHC021SC	SC21CL	G	H	BG6	0.63	1	300	1.1	1/2″	1/4″
LBP		114X1673		OP-LCHC026GS	GS26CLX	G	H	BG6	0.63	1	300	2.4	1/2″	3/8″
LBP		114X1781	114X1783	OP-LCHC034GS	GS34CLX	G	H	BG7	0.84	1	300	2.4	1/2″	3/8″
MBP	114X0104	114X0105	114X0107	OP-MCGC003TL	TL3GX	G	G	BG1	0.13	1	172	0.8	1/4″	1/4″
MBP	114X0108	114X0109	114X0111	OP-MCGC004TL	TL4GX	G	G	BG1	0.13	1	172	0.8	1/4″	1/4″
MBP	114X0301	114X0302	114X0303	OP-MCHC004TL	TL4DL	G	H	BG3	0.31	1	230	1.1	3/8”	1/4”
MBP	114X0112	114X0113	114X0115	OP-MCGC005TL	TL5GX	G	G	BG1	0.13	1	172	0.8	1/4″	1/4″

MBP	114X00200	114X00201	114X00203	OP-MCGC006FR	FR6GX	G	G	BG2	0.25	1	200	0.8	3/8″	1/4″
MBP	114X23316	114X23317	114X23319	OP-MCHC006FR	FR6DLX	G	H	BG3	0.31	1	230	1.1	3/8″	1/4″
MBP	114X00228			OP-MCGC006NL	NL6.1MF	G	G	BG2	0.25	1	200	0.8	3/8″	1/4″
MBP	114X00216	114X00217	114X00219	OP-MCGC007FR	FR7.5GX	G	G	BG2	0.25	1	200	0.8	3/8″	1/4″
MBP	114X00244			OP-MCGC007NL	NL7.3MF	G	G	BG2	0.25	1	200	0.8	3/8″	1/4″
MBP	114X24424	114X24425	114X24427	OP-MCHB007NF	NF7MLX	G	H	BG4/5	0.4	1	254	1.1	3/8″	1/4″
MBP	114X00224	114X00225	114X00227	OP-MCGC008FR	FR8.5GX	G	G	BG2	0.25	1	200	0.8	3/8″	1/4″
MBP	114X00204	114X00205		OP-MCGC008NL	NL8.4MF	G	G	BG2	0.25	1	200	0.8	3/8″	1/4″
MBP	114X03352			OP-MCGC008NL	NL8.4MF	G	G	BG3	0.31	1	230	–	3/8″	1/4″
MBP			114X00223	OP-MCGC010SC	SC10GX	G	G	BG2	0.25	1	200	0.8	3/8”	1/4”
MBP	114X04003	114X04004	114X04005	OP-MCHC010SC	SC10MLX	G	H	BG4/5	0.4	1	254	1.1	3/8”	1/4”
MBP	114X00336	114X00337	114X00339	OP-MCGC011FR	FR11GX	G	G	BG3	0.31	1	230	1.1	3/8″	1/4″
MBP	114X03340	114X03341	114X03343	OP-MCGC012SC	SC12GX	G	G	BG3	0.31	1	230	1.1	3/8″	1/4″
MBP	114X04006	114X04007	114X04008	OP-MCHC013SC	SC12MLX	G	H	BG4/5	0.4	1	254	1.1	3/8”	1/4”
MBP	114X04048	114X04049	114X04051	OP-MCGC015SC	SC15GX	G	G	BG4/5	0.4	1	254	1.1	3/8″	1/4″

MBP		114X2649	114X2651	OP-MCHC015SC	SC15MLX	G	H	BG6	1.1	1	300	1.1	1/2″	1/4″
MBP	114X0556	114X0557	114X0559	OP-MCGC018SC	SC18G	G	G	BG4/5	0.4	1	254	1.1	3/8″	1/4″
MBP		114X0702	114X0703	OP-MCHC018SC	SC18MLX	G	H	BG7	0.84	1	300	1.1	1/2″	1/4″
MBP	114X0568			OP-MCGC021SC	SC21MF	G	G	BG4/5	0.4	1	254	1.1	3/8″	1/4″
MBP	114X0564	114X0565	114X0567	OP-MCGC021SC	SC21GX	G	G	BG4/5	0.4	1	254	1.1	3/8″	1/4″
MBP		114X2765	114X2767	OP-MCHC021GS	GS21MLX	G	H	BG7	0.84	1	300	1.6	5/8″	3/8″
MBP		114X0773		OP-MCGC026GS	GS26MFX	G	G	BG7	0.84	1	300	2.4	3/8″	1/4″
MBP		114X0781		OP-MCGC034GS	GS34MFX	G	G	BG7	0.84	1	300	2.4	1/2″	3/8″

R290 – Technical data

Application	version			Description	Compressor	Electrical code	Refrigerant	Condenser coil		Fan		Receiver Volume (L)	Suction Line (mm)	Liquid line (mm)
	A09	A10	A11					Designa- tion	Internal Volume (L)	Number	Blade (mm)			
LBP	114F0202	114F0203	114F0201	OP-LCNC004NU	NUY45LAb	G	N	BG2	0.25	1	200	0.114	6	6
LBP	114F0205	114F0206	114F0204	OP-LCNC006NU	NUT60CAe	G	N	BG2	0.25	1	200	0.114	6	6
LBP	114F0308	114F0309	114F0307	OP-LCNC008NU	NUY80LAb	G	N	BG3	0.31	1	230	0.114	6	6
LBP	114F0411	114F0412	114F0410	OP-LCNC011NY	NPY12LAb	G	N	BG4/5	0.4	1	254	0.165	8	6

LBP	114F0414	114F0415	114F0413	OP-LCNC016NP	NPT16LA	G	N	BG4/5	0.4	1	254	0.165	8	6
LBP	114F0417	114F0418	114F0416	OP-LCNC023NX	NX23FBa	G	N	BG4/5	0.4	1	254	0.165	10	6
LBP	114F0620	114F0621	114F0619	OP-LCNC034NS	NS34FB	G	N	BG6	0.63	1	300	0.32	12	6
MBP	114F1202	114F1203	114F1201	OP-MCNC003NB	NBC30RA	G	N	BG2	0.25	1	200	0.114	6	6
MBP	114F1205	114F1206	114F1204	OP-MCNC004NU	NUY45RAb	G	N	BG2	0.25	1	200	0.114	6	6
MBP	114F1308	114F1309	114F1307	OP-MCNC006NU	NUY60RAb	G	N	BG3	0.31	1	230	0.114	6	6
MBP	114F1411	114F1412	114F1410	OP-MCNC008NU	NUY80RAb	G	N	BG4/5	0.4	1	254	0.165	6	6
MBP	114F1414	114F1415	114F1413	OP-MCNC009NU	NUY90RAb	G	N	BG4/5	0.4	1	254	0.165	6	6
MBP	114F1417	114F1418	114F1416	OP-MCNC011NY	NLY12RAb	G	N	BG4/5	0.4	1	254	0.165	8	6
MBP	114F1420	114F1421	114F1419	OP-MCNC014NP	NPT14RA	G	N	BG4/5	0.4	1	254	0.165	8	6
MBP	114F1623	114F1624	114F1622	OP-MCNC016NP	NPT16RA	G	N	BG6	0.63	1	300	0.32	8	6
MBP	114F1626	114F1627	114F1625	OP-MCNC018NX	NX18TBa	G	N	BG6	0.63	1	300	0.32	10	6
MBP	114F1629	114F1630	114F1628	OP-MCNC020NX	NX21TBa	G	N	BG6	0.63	1	300	0.32	10	6

Non catalogue – Technical data

	version				Fan	
Appl						Receiv

ication	T0	T1	T2	N0	N2	Compressor	Refrigerant	Condenser	Number	Diameter (mm)	er Volume (L)
LBP	–	–	–	–	114G1600	TL3F	F	BG2	1	200	0.8
LBP	–	–	114E2471	114H1506	–	TL4CL	CL	BG1	1	170	0.8
LBP	–	–	–	114E2123 114E2227	114G1602	TLS5F	F	BG1	1	170	0.8
LBP	–	–	114H2726	114E2454 114E2503	–	FR6CL	CL	BG2	1	200	0.8
LBP	–	–	–	114G1512	114G1612	NL9F	F	BG2	1	200	0.8
LBP	–	–	–		114G2613	NL11F	F	BG2	1	200	0.8
LBP	–	–	–	114E2603	–	NL8.4MF	MF	BG2	1	200	0.8
LBP	–	–	–	114E2577 114H3546	–	NL8.4CLX	CL	BG3	1	230	1.1
LBP	114E2593	114E2517	114H3728	–	–	FR8.5CL	CL	BG3	1	230	1.1
LBP	–	114E2156	114H3730	114E2198 114E2452 114E2534	–	SC10CL	CL	BG3	1	230	1.1
LBP	–	–			114G1611	NL7F	F	BG4/5	1	254	1.1
LBP	–	–	114H4731			SC12CL	CL	BG4/5	1	254	1.1
LBP	114E2536	–	114H5732		114E2361	SC15CL	CL	BG4/5	1	254	1.1

LBP	114E4007	–	114H5733	114H5533 114E2172	–	SC18CL	CL	BG4/5	1	254	1.1
LBP	114E2353 114E2555 114E4003	–	–	–	–	SC21CL	CL	BG4/5	1	254	1.1
LBP	–	–	114H6735 114H6335	–	–	SC10/10CL	CL	BG6	1	300	2.4
LBP	–	–	114H7736 114H7336 114F5052	–	–	SC12/12CL	CP	BG7	1	300	2.4
LBP	–	–	114H7337 114F5053 114H7737	–	–	SC15/15CL	CL	BG7	1	300	2.4
LBP	114E2546	–	114H7338 114H7738	–	–	SC18/18CL	CP	BG7	1	300	2.4
LBP	–	–	114H7339 114H7739	–	–	SC21/21CL	CP	BG7	1	300	2.4
MBP	–	–	–	114G0503	–	PL35G	G	BG0	1	172	–

MBP	–	–	–	114E2203 114G0502	–	PL50F	F	BG0	1	172	–
MBP	114B0017	–	–	–	–	BD250GH	G	BG0.5	1	172	–
MBP	–	–	114G1706	114G1506	114G1606	TL4G	G	BG1	1	170	0.8
MBP	114E2548	–	114G1708	114E2492 114E2541	–	TL5G	G	BG1	1	170	0.8
MBP	–	–	–	114B0006 114G1901	–	TL4GH	G	BG1	1	170	0.8
MBP	–	–	–	114G2515	114G2615	FR6G	G	BG2	1	200	0.8
MBP	–	–	–	114G2518	–	FR7.5G	G	BG2	1	200	0.8
MBP	114E2346	–	114G2716	114E2201 114E2332 114G2516	114G2616	FR8.5G	G	BG2	1	200	0.8
MBP	114E2410 114E2519 114E2522	–	–	114E2362	–	FR8.5G	G	BG2	1	200	0.8

Application	version					Compressor	Refrigerant	Condenser	Fan		Receiver Volume (L)
	T0	T1	T2	N0	N2				Number	Diameter (mm)	

MBP		–	114G2719	–	–	FR10G	G	BG2	1	200	0.8
MBP	114E2347 114E2411 114E2520 114E2544	–	–	114E2333 114E2523	–	SC10G	G	BG2	1	200	0.8
MBP	–	–	114E2527 114H3727	–	–	FR6DL	DL	BG3	1	230	1.1
MBP	–	–	114G3717	114G3517	114G3617	FR11G	G	BG3	1	230	1.1
MBP	–	–	–	114G3536	–	NL10MF	MF	BG3	1	230	1.1
MBP	114E2351 114E2390 114E2549 114E2545 114E2457 114E2521	–	114G3726	114E2434 114G3526 114G9350 114G4565	114G3626	SC12G	G	BG3	1	230	1.1
MBP	–	–	114E2528 114H5743	–	–	SC10DL	DL	BG4/5	1	254	1.1
MBP	–	–	114H5744	–	–	SC12DL	DL	BG4/5	1	254	1.1

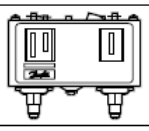
MBP	114E2352 114E2391 114E2550	–	114G4727	114E2435 114G4527	114G4627	SC15G	G	BG4/5	1	254	1.1
MBP	114E2442 114E2567 114E4023	–	114G5728	114E2357 114E2418 114G5528	–	SC18G	G	BG4/5	1	254	1.1
MBP	114E2459 114E2551	–	114G5730	114E2419 114G5530	–	SC21G	G	BG4/5	1	254	1.1
MBP	114E2540	–	114E2529 114H6745	–	–	SC15DL	DL	BG6	1	300	2.4
MBP	–	–	114E2586	–	–	SC15MLX	ML	BG6	1	300	2.4
MBP	–	–	114E2587	–	–	SC18MLX	ML	BG7	1	300	2.4
MBP	–	–	114G6380 114G6780	–	–	SC12/12G	G	BG6	1	300	2.4
MBP	–	–	114H7347 114H7747	–	–	SC10/10DL	DL	BG7	1	300	2.4
MBP	–	–	114H7348 114H7748	–	–	SC12/12DL	DL	BG7	1	300	2.4

MBP	–	–	114G7381 114G7781	–	–	SC15/15G	G	BG7	1	300	2.4
MBP	–	–	114H7349 114H7749	–	–	SC15/15DL	DL	BG7	1	300	2.4
MBP	114E2128	–	114G7382 114G7782	–	–	SC18/18G	G	BG7	1	300	2.4
MBP	114E2149	–	114G7383 114G7783	–	–	SC21/21G	G	BG7	1	300	2.4
LBP/MBP	–	–	–	114F1504	–	TL5CN	CN	BG1	1	170	–
LBP/MBP	–	–	–	114F1508	–	TL4CN	CN	BG1	1	170	–
LBP/MBP	–	–	–	114F2505	–	NL7CN	CN	BG2	1	200	–
LBP/MBP	–	–	–	114F3500	–	SC10CN	CN	BG3	1	230	–
LBP/MBP	–	–	–	114F3509	–	NL9CN	CN	BG2	1	200	–
LBP/MBP	–	–	–	114F4501	–	SC12CN	CN	BG4/5	1	254	–
LBP/MBP	–	–	–	114F4502	–	SC15CN	CN	BG4/5	1	254	–
LBP/MBP	–	–	–	114F4503	–	SC18CN	CN	BG4/5	1	254	–

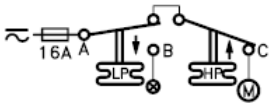
Application	Version				Compressor	Refrigerant	Condenser	Fan		Receiver Volume (L)
	T0	T1	T2	N0				Number	Diameter (mm)	
LBP			114G2573		NL11F	F	BG2	1	200	0.8
LBP	114E2403				SC10CLX	CL	BG3	1	230	1.2
LBP	114H4515		114E4018		SC12CL	CL	BG4/5	1	254	1.1
LBP				114H5953	SC18CLX	CL	BG4/5	1	254	1.1
LBP			114E2495		SC15CLX	CL	BG4/5	1	254	1.1
LBP			114E4024		SC15CLX	CL	BG4/5	1	254	1.1
LBP				114F5062	SC12/12CL	CL	BG4/5	1	254	1.1
LBP	114F0207 114F0208				DLE4.8CN	CN	BG2	1	200	0.8
MBP	114G1900	114G1660		114G1760 114G1940	TL4G	G	BG1	1	170	0.8
MBP			114E4020		FF8.5GX	G	BG3	1	230	1.2
MBP			114E4021	114G3768	FF10GX	G	BG3	1	230	1.2
MBP	114E2397		114E4022	114G3942	SC12G	G	BG3	1	230	1.2
MBP			114E4002		SC15G	G	BG4/5	1	254	1.1
MBP				114G5946	SC18GH	G	BG4/5	1	254	1.1

Annex – B, KP switch settings

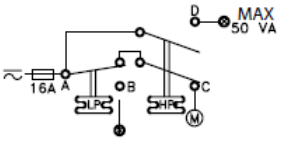
KP 15, 15A, 17W, 17B



SPDT + LP signal



LP + HP signal



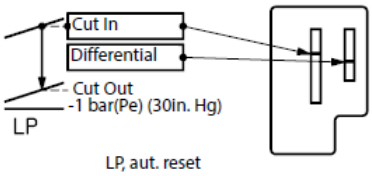
Listed refrigeration controller 61B5

Con-tacts	Voltage AC	Voltage DC	FL A	LR A	Resist. load	Pilot duty
A-B	240		8	48	8A	3A
A-C	120		16	96	16A	
		240				12W
A-D	240					50VA

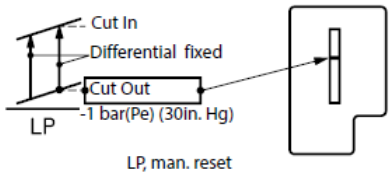
Use copper wire only
Tightening torque 20lb. in.

When used acc. to UL regulations

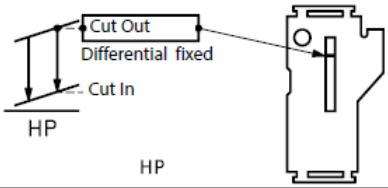
LR 112A	AC1 16 A AC3 16 A AC11 10 A	400 V ?	DC 11 12 W 220 V ?	



LP, aut. reset

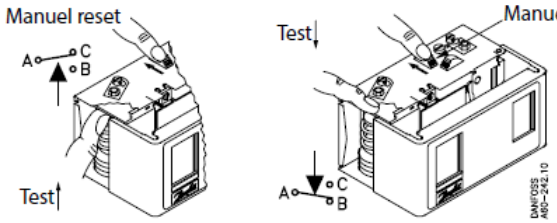


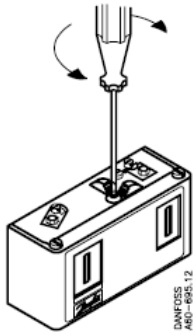
LP, man. reset



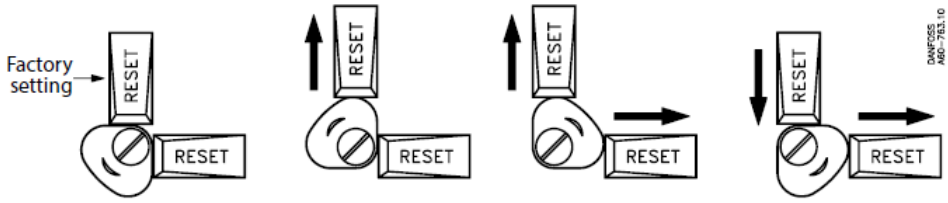
HP

Manual test





Convertible reset
KP 15 060-1154, 060-1220, 060-1261, 060-1263, 060-1283

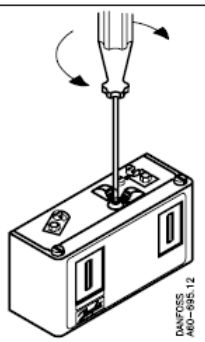


LP - man.
HP - man.

LP - auto
HP - man.

LP - auto
HP - auto

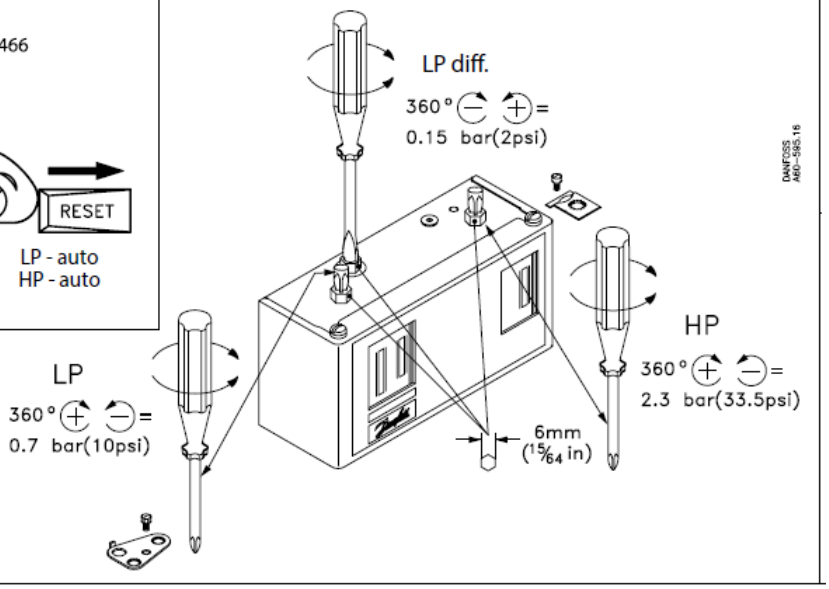
LP - man.
HP - auto



Convertible reset
KP 17B 060-539366, 060-539466

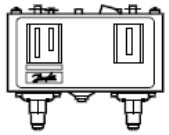
LP - auto
HP - man.

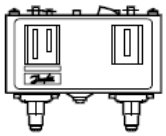
LP - auto
HP - auto



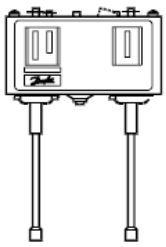
KP 15, 15A, 17W, 17B, 17 WB

KP 15, 17W, 17B, 17 WB: CFC, HFC, HCFC
KP 15A: R 717 (NH_3)

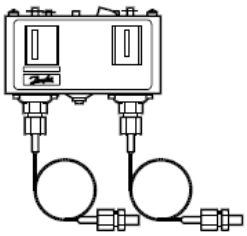




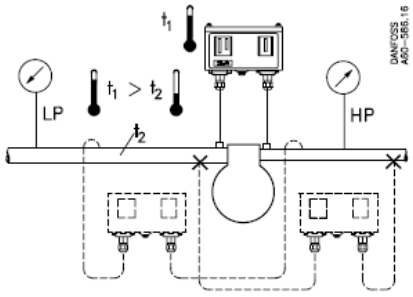
KP 15, 17



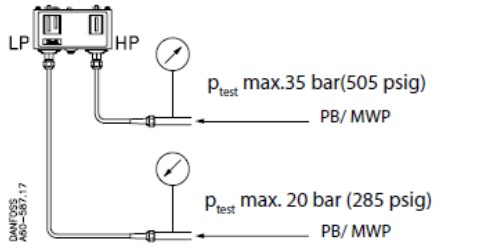
KP 15, 17



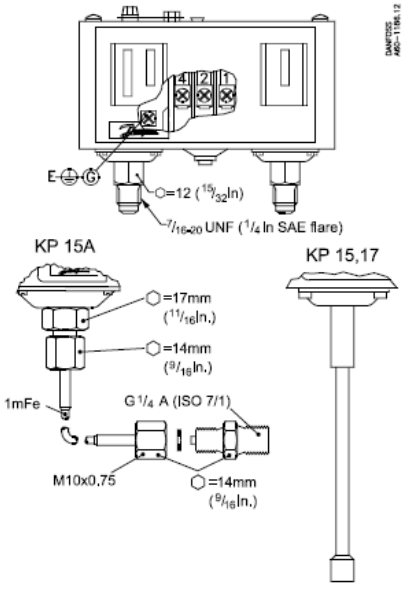
KP 15A

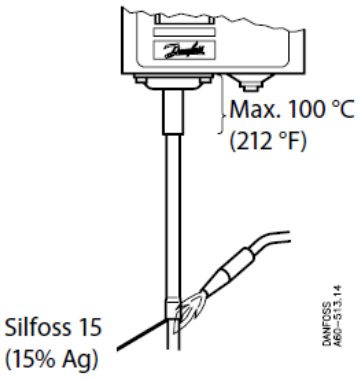


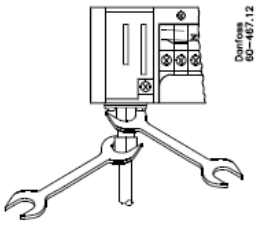
t_1 min. KP 15: –40°F (–40°C)
KP 17: –25°C (–13°F)
t_1 max. 65°C (150°F)

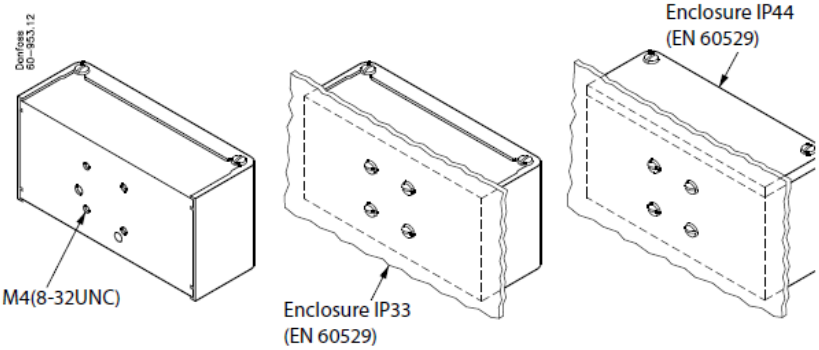


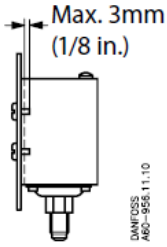
Type	Range			PB	MWP
KP 15	LP: -0.2	→	7.5 bar	17 bar	250 psi
	HP: 8	→	32 bar	35 bar	505 psi
KP 15	LP: -0.9	→	7 bar	17 bar	250 psi
	HP: 8	→	32 bar	35 bar	505 psi
Reset					
KP 17	LP: -0.2	→	7.5 bar	17 bar	250 psi
	HP:8	→	32 bar	35 bar	505 psi



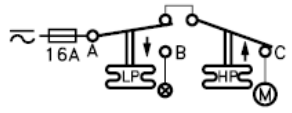




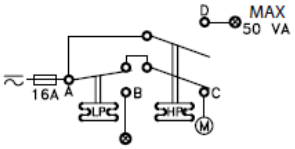




SPDT + LP signal



LP + HP signal



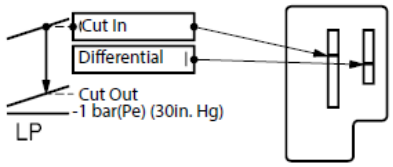
When used acc. to UL regulations

c UL us **Listed refrigeration controller 61B5**

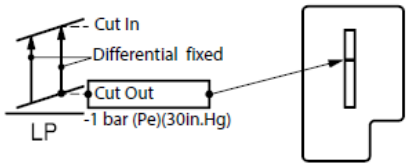
Con-tacts	Voltage AC	Voltage DC	FL A	LR A	Resist. load	Pilot duty
A-B	240		8	48	8A	3A
A-C	120		16	96	16A	
		240				12W
A-D	240					50VA

Use copper wire only
Tightening torque 20lb. in.

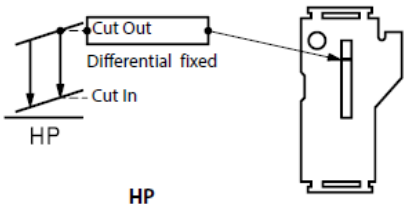
LR 112A	AC1 16 A AC3 16 A AC11 10 A		400 V~	DC 11 12 W 220 V~



LP, aut. reset

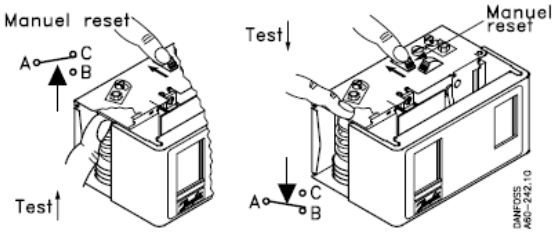


LP, man. reset

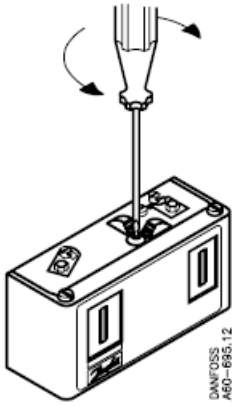


HP

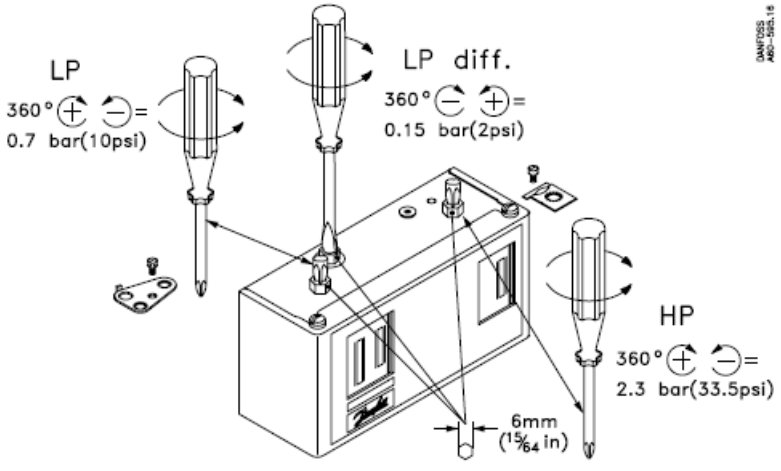
Manual test



Convertible reset
KP 15 - LP/HP convertible, KP17WB - HP convertible



LP-man. HP-man. | LP-auto. HP-man. | LP-auto. HP-auto. | LP-man. HP-auto.



legend

- 1A – Main winding
- 1B – Start winding
- 1C – Start relay
- 1D – Winding protector
- 1E – Start capacitor
- 1F – NTC
- 1G – Run capacitor
- 1H – Thermostat
- 1J – Fan
- 1K – Pressure control
- CP1 – Compressor 1
- CP2 – Compressor 2
- D – Bridge or Time Delay
- P – Pressostat
- T – Bridge or Thermostat

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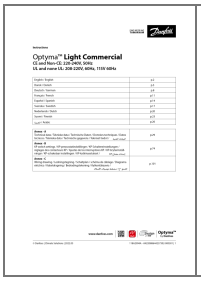
Documents / Resources

	**Danfoss Danfoss Light Commercial** [pdf] Instructions Danfoss Light Commercial, Danfoss, Light, Commercial

References

- **Danfoss - Engineering Tomorrow | Danfoss**