



SCM FRIGO SPA

LEAN LINE

CO2 BOOSTER SYSTEM FOR CONVENIENCE STORES

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1- MAIN FEATURES



2- STRENGTHS

STAINLESS STEEL PIPING ON DISCHARGE LINE

SUCTION ACCUMULATOR INCLUDING DOUBLE SAFETY VALVE* WITH CHANGEOVER VALVE

MAINTENANCE FREE HIGH EFFICIENCY HERMETIC OIL SEPARATOR (EFFICIENCY 98,5%)

ELECTRONIC MINIMUM OIL LEVEL GUARD

HIGH EFFICIENCY FILTER DRIER, REPLACEABLE CORE WITH BY-PASS ON THE LIQUID LINE

REGENERATIVE SHELL & TUBE HE (FLASH-LIQUID)

3- CONFIGURATIONS / RANGE

MT + LT COMPRESSORS	COOLING CAPACITY MT SIDE* (kW)		COOLING CAPACITY LT SIDE* (kW)	
	MIN. CAPACITY	MAX. CAPACITY	MIN. CAPACITY	MAX. CAPACITY
2+1	18	29	2	7
2+2	17	54	4	13
3+1	18	48	2	7
3+2	27	103	4	21

*DESIGN DATA: MT SIDE EVAP. TEMPERATURE -8 °C, LT SIDE EVAP. TEMPERATURE -35 °C, AMBIENT TEMPERATURE +32 °C



4- MECHANICAL FEATURES

FRAME

Open frame made of thick galvanized sheet, additionally protected with a coat of oven-baked polyester-based thermosetting paint. Stainless steel screws and bolts.

On request: "reach in" box for outdoor installation or "Plug'n cool" version with integrated gascooler.

RAL 9006

MT SIDE - COOLING

Transcritical Compressors

- Lead compressor INVERTER DRIVEN (30-70Hz)
- Crankcase heater
- Discharge & suction valve
- SE-B1/B2
- Stainless Steel piping on discharge line

Suction line

- K65 piping on suction line
- Suction accumulator including double safety valve* with changeover valve
- Suction line shut off valve
- Insulation 19 mm

Oil circuit

- Maintenance free high efficiency hermetic oil separator (efficiency 98,5%), double safety valve* with changeover valve

- Oil reserve, double safety valve* with changeover valve
- Electronic minimum oil level guard
- Electronic oil equalization system (TRAXOIL oil regulator each compressor) for both MT and LT compressors

Flash Gas Station / Liquid line

- High pressure valve (CCMT)
- PED vertical liquid receiver 70 or 100 litres with shut off valves, double safety valve* with changeover valve and three sight glass (min, operation, max)
- Electronic minimum liquid level alarm
- Medium pressure valve (CCMT)
- High efficiency filter drier, replaceable core with by-pass
- Regenerative shell & tube HE (flash-liquid)
- Liquid injection to suction line
- Insulation 19 mm
- Pressure gauges

Safety

- 1x PSH type approved high pressure limiter each compressor
- 1x PSL type approved low pressure limiter for pack
- 1x PZHH type approved safety high pressure cut out for pack
- 1x LP sensor
- 1x HP sensor
- HP and LP pressure gauges

LT SIDE - FREEZING

Subcritical Compressors

- Lead compressor INVERTER DRIVEN (30-70Hz)
- Crankcase heater
- Discharge & suction valve
- SE-B1/B2
- K65 piping on discharge and suction lines

Suction

- Suction line shut off valve
- Shell & tube HE (suction-liquid)
- Insulation 19 mm

Safety

- 1x PSH type approved high pressure limiter each compressor
- 1x PSL type approved low pressure limiter for pack
- 1x LP sensor
- 1x HP sensor

*Safety valves according to EN 378-2

STANDARD DESIGN PRESSURES

HP	120 BAR
LIQUID LINE	60 BAR
LIQUID RECEIVER	60 BAR
LP MT	52 BAR
LP LT	30 BAR



5 - MECHANICAL OPTIONS

- DESIGN PRESSURES 120/60/60/60 BAR (LT 60 BAR)
- "REACH IN" BOX FOR OUTDOOR INSTALLATION
- "PLUG'N COOL" VERSION WITH INTEGRATED AIR COOLED GASCOOLER
- LT LEAD COMPRESSOR INVERTER DRIVEN (30-70Hz)
- HEAT RECOVERY SYSTEM + 3 WAY MOTORIZED VALVE SYSTEM (MAX ONE HEAT RECOVERY LEVEL)
- LTGC – LT AIR COOLED DESUPERHEATER (SUPPLIED LOOSE)
- GD – GAS DETECTOR
- RU134A SAFETY CONDENSING UNIT (SUPPLIED LOOSE)
- CCMT RESERVE VALVE FOR HP VALVE BACKUP
- CCMT RESERVE VALVE FOR FLASH VALVE BACKUP
- POSSIBILITY TO SUPPLY 3WAY VALVE FOR GASCOOLER BYPASS (LOOSE AND NOT MANAGED BY CONTROLLER)
- POSSIBILITY TO SUPPLY HEAT RECOVERY PUMP (LOOSE AND NOT MANAGED BY CONTROLLER)

6- ELECTRICAL FEATURES

Panels general details

Standard power supply:	400V±10% / 3Ph+N+PE / 50Hz
System:	TT, TN-S
Icw (kA) :	10kA with any circuit breaker that ensures tripping in less than 0,3"
Command line voltage:	230Vac
Signals line voltage:	24Vac
Degree of protection:	IP40 for indoor installation - IP54 for outdoor installation
Included accessories:	Internal lights, power socket 10A with earth leakage protection 30mA for person safety



Power line details

Power cable inlet:	From the bottom of the panel
Main isolator:	Load brake switch AC23 class with external door interlock handle
Compressors supply line:	Motor protection circuit breaker with adjustable tripping current thermal protection. Transcriticals compressors inverter driven are always supplied with 230V three phase connection and 30-70Hz operation (biggest compressor is 17,8 m3/h)
Motor protection:	Motor protection circuit breaker with adjustable tripping current thermal protection
Protection of lines:	MCBs only



Auxiliary lines

Command line:	command line is supplied by a command transformer 400V on primary, 230V on secondary protected by MCBs; two bridged terminal are available to wire an external emergency push button
Compressors auxiliary lines:	come from main command line, individually protected by 1 pole MCB ad supply, the alarm chain (high pressure, low pressure, oil level/pressure, thermal protection), the contactor, the oil level regulator (with 230V power supply) and the crankcase heater with another MCB dedicated to its line. Selectors on the panel front (OFF/AUTO) to enable or disable each compressor. Only 1 alarm relay per compressor (cumulative).
Common devices lines:	It supplies devices that are commons for the system like PSU of controllers, valves, functional relays, 230V sensors.
Low voltage line:	Come from a 24Vac SELV transformer, that line is used to supply 24Vac devices (main controllers excluded) like oil regulators valves driver or actuator and external dry contact signals. Standard given inputs are: <ul style="list-style-type: none"> - Remote ON/OFF - Remote CO2 leakage alarm - Remote Gas cooler alarm (if external) - Heat recovery request (if any)





Alarm signals:

The following general alarm signals are ever acquired by the controller:

- Low oil level
- Low liquid level
- General high pressure alarm
- General low pressure alarm (one for each suction)
- MT gas cooler alarm
- CO2 leakage alarm
- A single cumulative alarm signal for each compressor

Given signals:

The following general alarm signals are ever acquired by the controller:

- 0-10V signal for EC fans in case of remote gas cooler
- General alarm dry contact signal is available
- Users valve enable signal is available on request

Controllers and interfaces

Standard brands:

Danfoss AK-PC 772 or alternatively Carel pR300T medium with built-in driver.

Configuration limits:

The above controller are all-integrated systems that can manage an entire booster but with some limits described below:

- maximum configuration 3+2, 1 inverter per suction
- Only one heat recovery step, with 0-10V or T probe for request and a digital signal to enable.
- No Gas cooler bypass valve on Danfoss, possible on Carel

If some of those options are requested, the controllers have to be changed and the panel could become larger (L

Power supply:

Each controller is supplied by a dedicated PSU or transformer (for Carel) to avoid external noise to come in the controller, also the input signals share the same philosophy, so interface relays are usually used on digital inputs.

Safety closing of HP valves:

Stepper valves are closed in case of power loss by a battery module on Carel controller or by a 230V UPS that supplies the PSU of Danfoss controllers, only the closing time of the valves has guaranteed.

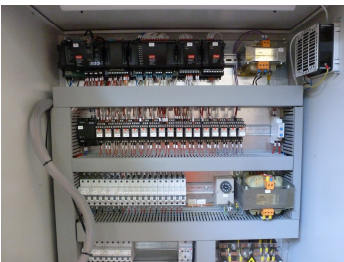
BMS connections:

RS485 Lon and RS485 (carel/mobus) are ever available on terminals, with three terminals in and three terminals out available, internal connection between controllers is done by factory with adequate BELDEN wire type.

HMI:

Each controller is supplied with a graphic display interface (AK-MMI for Danfoss and PGD1 for Carel) mounted on the external panel to monitor the unit and change the parameter, alarms that are not managed by the controllers are signaled by alarms lamps (since Danfoss and Carel have both general configurable alarm input, this case is quite uncommon)

If a power meter (option) is requested it will be also panel mounted



7- ELECTRICAL OPTIONS

Accessories on request (options)

Power meter:	Socomec or Carlo Gavazzi power meter with pulse output or RS485 on request
Heat recovery:	one step of heat recovery on MT discharge is available, one digital input for HR activation and one analog input for 0-10V (HR % of request) or T probe must be wired, CO2 3-way valve management, HR OFF-AUTO selector on panel, Forced HR digital input on terminals.
Backup system:	Danfoss AK-PC 772 or pR300T medium + built-in driver as back-up controller activated with delay by high pressures on suctions, set and reset backup push buttons and yellow status led on panel
Gas cooler protection:	Single MCB to supply gas cooler panel or individual MCB for each fans on request; gas cooler technical data is needed
RCDs/RCCB switches:	Residual current protection on request, it must be verified by our technical office, not possible on standard size panel in case of Backup option. Id=300mA AC protection for each compressor, gas cooler fan and auxiliary transformer on primary side.
Emergency stop push button:	Emergency push button can be supplied loose or mounted and wired on the unit on request, it stops the 230V command line supply and opens all contactors and alarms relay, remotely trippable main switch is also available on request with 230V shunt trip coil.



Environmental sustainability
Refrigeration technologies

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