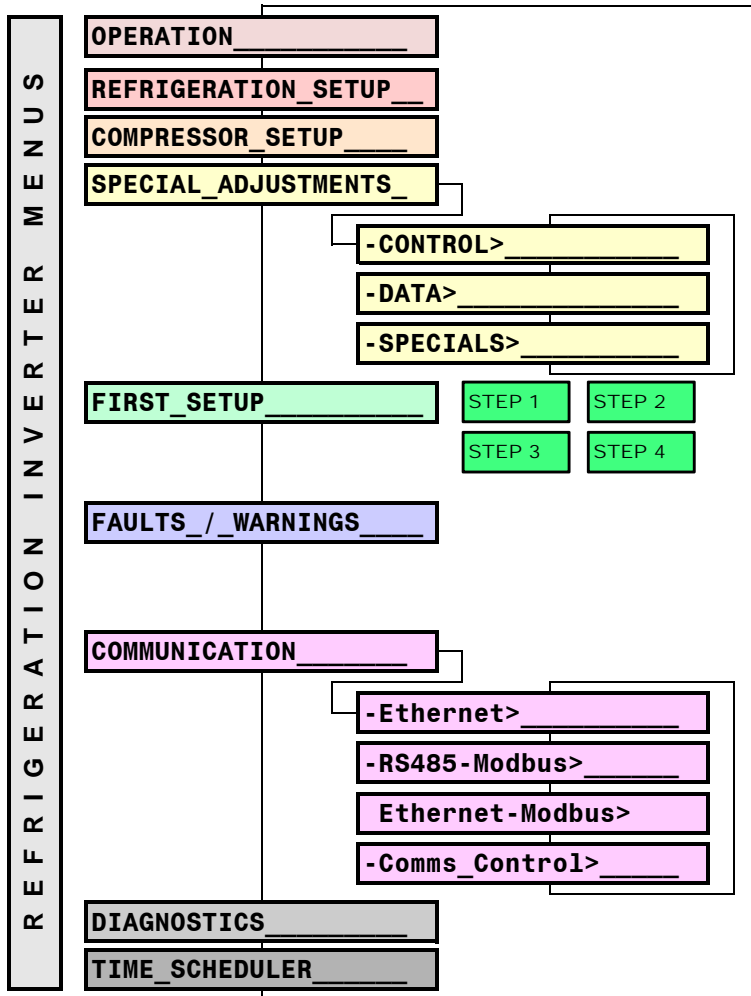




**FrigoPack® FU+**  
A New Generation



Intelligent Refrigeration Control  
Systems for Compressors,  
Condensers, HVAC & Pumps



## OVERVIEW OF MENUS AND INDEX

<b>OPERATION</b>	<b>Page 1</b>
<b>Main refrigeration operating parameters</b> <i>(observation only)</i>	<b>2</b>
<b>Refrigeration setup parameters</b>	<b>3</b>
<b>Compressor setup parameters</b>	<b>4</b>
<b>Three submenus of special adjustments</b>	<b>5,6</b>
Optimizing performance, setting mode of operation	..5
Special performance data	..5
Special functionality, Factory settings	..6
<b>Refrigerant and Compressor data from the SD card</b>	<b>7, 20</b>
Time and Date, Language, Units, Installation Name	<b>7</b>
<b>Faults, Warnings, last 10 Trips with times</b>	<b>8</b>
<b>Trip Messages, Possible Causes, Hints for Fault Finding, Remedies</b>	<b>9</b>
<b>Communication protocols</b>	<b>10</b>
ETHERNET remote communications	..10
RS485 Modbus RTU Field Bus	..10
ETHERNET Modbus	..10
External controller	..10
<b>Diagnostics, monitoring values and serial numbers</b>	<b>11</b>
<b>Time Scheduler</b>	<b>20</b>

### POWER SECTION

#### Power connections:

- Single compressor ..12
- Single compressor with bypass(for emergency operation) ..12
- Variable-speed compressor + second larger compressor with Capacity Control ..12
- Two compressors, each with bypass and rotation ..13
- Three compressors, two Fixed-speed Compressors with rotation ..13

#### Power Terminals

**12,13**

### CONTROL SECTION

#### Key Pad

#### Control connections to the Refrigeration Inverter with internal pressure control

#### Control and Safety circuits

**10,11**

**14,15**

**16,17**

### FIRST TIME POWER UP

#### Important information

**18,19**

### SETTING UP STEP BY STEP



**20**

Manufacturer	Agent / Partner	Customer	Installation	Name, Date
KIMO RHVAC Controls GmbH Hüttendorfer Weg 60 D-90768 Fürth, Germany <a href="http://www.frigokimo.com">www.frigokimo.com</a>				

OPERATION

Automatic (10 min)

View Level	OPERATOR	Operator, End Customer	Monitoring operation	None
Language	TECHNICIAN	Refrigeration technician	Refrigeration Contractor, Installer	Yes
UPDATE FIRMWARE	ENGINEER	KIMO RHVAC Controls	Special optimization, hotline support	Superuser
	ENGLISH	English, French, German, Spanish, Italian, Dutch, Turkish, L7, L8, L9,		None
		Loading firmware and application		Yes

FrigoPack FU+/12 BM-1  
23 A 400 V  
1.18.2  
123.456.789.012

Alternatives depending on Option Modules fitted:  
EXTN | BM-1 | BM-2 | ... | EM-6 | EM-7 | EM-8 | ...  
Rating of Power Section or 21 Zeichen konfigurierbar (p. 7)  
Firmware  
IP address

DIAGNOSTICS  
OPERATION  
REFRIGERATION SETUP

Compressor rack:

Variable-speed Compressor (VsC):

Internal status:

Frequency Inverter:

Condenser:

Performance:

Control Inputs:

Refrigerant:

Variable-speed Compressor (VsC):

Menu OPERATION of operating observation parameters: Users

Type	Explanation	Further Inform.
------	-------------	-----------------

Calculated values	Suction Line, Discharge Line Superheat, Superheat / Subcooling	2.00
Measured values	Gas temperatures: Suction and discharge gas	2.01
Calculated values	Saturated gas temperatures (dew): Evaporating and Condensing	2.02
Measured values	Gas pressures: Suction and Discharge	2.03
Deviations	Temp. Deviations from setpoints: Evaporating and Condensing	2.04
Calculated values	Variable-speed Compressor: Lubrication Pressure, Oil temperature	2.05
Internal value	Motor: Speed, Electrical power	2.06
Output value	Variable-speed Compressor: Hot Gas Bypass: Actuating Value	2.07
Status values	Right: Seq.-Lmts-CpctyCntrl-Compr Left: ARS-AtmptsLeft-Time to start	2.08
Measured values	Variable-speed Compressor, Motor Frequency and Current	2.09
Calculated values	Condenser: Condensing Temp., dew und bubble	2.10
Measured values	Floating control with amb. temp.: Measured: (tc - tamb), Setpoint: tcbs	2.11
Measured value	Air-cooled Condenser: Variab.-speed fan Group, Ambient	2.12
Calculated values	Compressor VsC: Electrical power and energy	2.16
Status values	Digital outputs and inputs: Bitstrings grouped in nibbles	2.20
Input values	Floating setpoints in °C: ted(33: 31..32) tcm(43: 41..42)	2.33/43
Selected value	Refrigerant (SD-MC card) Selection in: FIRST_SETUP ,P. 6	2.25
Selected value	Compressor (SD-MC card) Selection in: FIRST_SETUP ,P. 6	2.60

Abbreviations:

VsC:	Variable-speed Compressor
FsC:	Fixed-speed Compressors
VFsC:	Variable- / Fixed-speed Compressor
VfG:	Variable-speed fan Group (Condenser / Dry cooler)

Optional information not required for operation

Only if EM- Module connected

1 ... 10 Please report these values if there are any problems

OPERATION  
**REFRIGERATION SETUP**  
COMPRESSOR SETUP

Menu REFRIGERATION SETUP for refrigeration settings:  
View Level TECHNICIAN (for Refrigeration Personnel) only, see page 1

Type	Explanation	Further inform.
Setting	Compensation for relative pressure: _____ m	3.24
Limit value	Low-pressure limit: _____ bar _____ °C Pressure (setting) and Temperature <b>Set to just above minimum operating pressure of system (usually 0.1 bar). Must not to be used as a safety device.</b>	3.29
Limit value	Evaporating Temperature (dew): _____ °C Normal Stop as "Pump Down" limit	3.30
Setting 1	Evaporating Temp. (dew): _____ °C <b>Setpoint 1 (lower value)</b>	3.31
Setting 2	Evaporating Temp. (dew): _____ °C Setpoint 2 (higher value)	3.32
Setting 2	Evaporating Temp. (dew): _____ °C Maximum for setpoint control	3.39
Setting	Condensing Temp. (bubble): _____ °C <b>Setpoint 1 (lower value)</b>	3.41
Setting	Condensing Temp. (bubble): _____ °C Setpoint 2 (higher value)	3.42
Limit value	Condensing Temp. (dew point), max.: _____ °C Compr. Capacity reduced above here	3.48
Setting	Discharge Pressure high limit: _____ bar _____ °C Pressure (setting) and Temperature <b>Set to below maximum operating pressure of system. Must not to be used as a safety device.</b>	3.49
Setting	Condensing Temperature (bubble): _____ °C Increase VFG speed above this limit	3.50

Settings

**Altitude**

**Evaporation**

- Low-pressure limit

- Dew Temperatures

**Condensation**

- Bubble Temperatures

- Dew Temperature

- High-pressure limit

- HP. value: Incrs VFG speed

24: ALTITUDE 500 m

29: pe\_LIMIT-emrg\_stop 0.1 bar -25.5 °C

30: ted\_MIN-norm1\_stop -15.0 °C

31: ted\_SETPOINT\_1 -10.0 °C

32: ted\_SETPOINT\_2 -5.0 °C

39: ted\_MAXIMUM 5.0 °C

41: tcb\_SETPOINT\_1 25.0 °C

42: tcb\_SETPOINT\_2 45.0 °C

48: tcd\_MAX-redc\_cpcty 50.0 °C

49: pc\_LIMIT-emrg\_stop 20.0 bar 70.0 °C

50: tcb\_LIMIT-incr-vfg 55.0 °C

REFRIGERATION SETUP

STEP 4

7

8

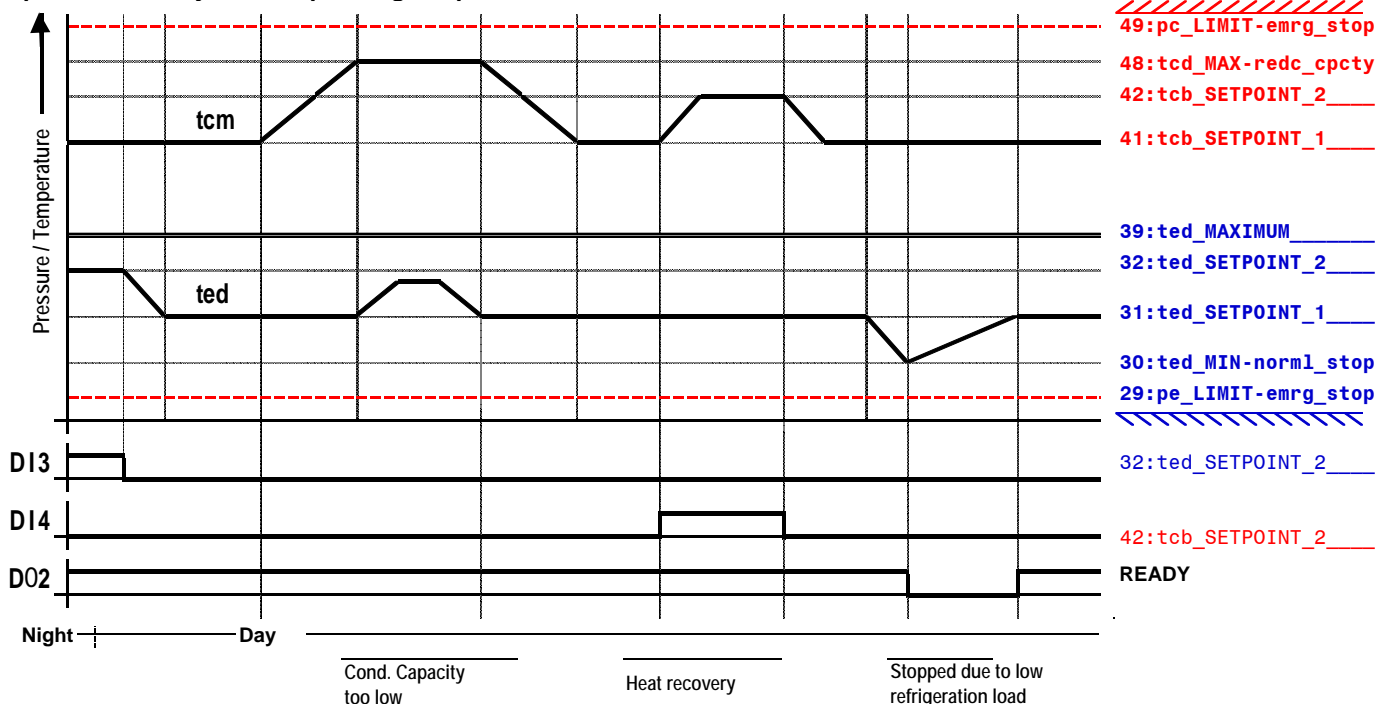
9

10

Password TECHNICIAN for Refrigeration Personnel: 8670

Refer to KIMO to use this special parameter

Explanation of adjustable operating temperatures:



REFRIGERATION SETUP  
**COMPRESSOR SETUP**  
 SPECIAL ADJUSTMENTS

Menu COMPRESSOR SETUP for setting compressor operation:  
 View Level TECHNICIAN (for Refrigeration Personnel) only, see page 1

Type	Explanation	Further inform.
Value		

Settings  
 Variable-speed Compressor (VsC):

Limits:

Resonance avoidance:

Time settings:

Lubrication:

Fixed-speed Compressors  
 Rack design:

Time settings:

Factors:

Commissioning aid:

61:VsC\_CURRENT\_MAX  
 0.0 A

62:VsC\_FREQUENCY\_MAX  
 65.0 Hz

64:VsC\_FREQUENCY\_MIN  
 25.0 Hz

65:VsC\_MOTOR\_NO\_POLES  
 4

66:VsC\_SKIP\_FREQ1\_MIN  
 0.0 Hz

67:VsC\_SKIP\_FREQ1\_MAX  
 0.0 Hz

68:VsC\_SKIP\_FREQ2\_MIN  
 0.0 Hz

69:VsC\_SKIP\_FREQ2\_MAX  
 0.0 Hz

70:VsC\_tinhibit\_TIME  
 300 s

71:VsC\_tlubrcn\_TIME  
 4 s

72:VsC\_thld\_fmin\_TIME  
 10 s

74:VsC\_tmon\_fmin\_TIME  
 300 s

75:VsC\_plub\_press\_MIN  
 1.0 bar

STEP 3  
 ← 4

80:Fsc PRIORITY  
 80000001

81:Fsc\_ton DELAY  
 120 s

82:Fsc\_toff DELAY  
 10 s

83:VsC/FsC\_RATIO  
 100%

84:VsC/FsC\_CC\_RATIO  
 50%

86:\_MANUAL\_FsC\_STATE  
 Y YYYY

<b>Configuration Setting</b>	VsC Motor current max	4.61
CAN ONLY BE CHANGED IF FRIGOPACK FU+ STOPPED FIRST Preset to 1000 A until a compressor is selected, see page 7		

Setting	VsC Motor frequency max.: Max. settable value: Dt0, page 5	4.62
---------	---	------

Setting	VsC Motor frequency min.: Min. settable value: Dt1, page 5	4.64
---------	---	------

Setting	VsC Motor: No. of poles: 2, 4, 6, 8	4.65
---------	--	------

Setting	VsC Resonance Avoid., Skip freq 1 min.: 10.0..65.0 Hz *	4.66
---------	--	------

Setting	VsC Resonance Avoid., Skip freq 1 max.: 10.0..65.0 Hz *	4.67
---------	--	------

Setting	VsC Resonance Avoid., Skip freq 2 min.: 10.0..65.0 Hz *	4.68
---------	--	------

Setting	VsC Resonance Avoid., Skip freq 2 max.: 10.0..65.0 Hz *	4.69
---------	--	------

\* Limited to fmin..fmax and range of next band.  
 Set to 0.0 Hz when not in use.

Setting	VsC Inhibit Time after VsC start: 20..1200 s	4.70
---------	---	------

Setting	VsC Oil Lubrication Pulse time: 0..100 s	4.71
---------	---	------

Setting	VsC Start Hold Time (at fmin): 0..120 s	4.72
---------	--	------

Setting	VsC Monitoring time at fmin: 0..1800 s	4.74
---------	---	------

Setting	VsC Minimum differential oil pressure 0.0 ... 10.0 bar	4.75
---------	---	------

Setting	FsC6..2: 0: Not available 1...6: Priority	4.80
XXXXXXYY:	Lowest identical priorities: Dt7 (page 5) = 0: Rotate (swop) Dt7 (page 5) >= 60 s: First start first stop Also after set time	

000000XE:	Rotation VFsc1 and VFsc2	Two compressors each with bypass
-----------	--------------------------	----------------------------------

000000XF:	TCC	Twin Compressor Control
-----------	-----	-------------------------

000000CX:	Both available	Availabilities
-----------	----------------	----------------

000000DX:	EM-1 / EM-2	"
-----------	-------------	---

000000EX:	DI3 / DI4	"
-----------	-----------	---

000000FX:	DI5 / DI6	"
-----------	-----------	---

X2XXXXXX:	VsC1a + VsC1b	Two inverter compressors
-----------	---------------	--------------------------

8XXXXXXX:	VsC1 => FsC1	Emergency operation without inverter
-----------	--------------	--------------------------------------

3XXXXXXX:	Multiplex of FsC3 at DO1	No activation of FsCs if there is a fault
-----------	--------------------------	---

6XXXXXXX:	Multiplex of FsC6 at DO1	"
-----------	--------------------------	---

BXXXXXXX:	Multiplex of FsC3 at DO1	Multiplex of FsC6 at DO1
-----------	--------------------------	--------------------------

EXXXXXXX:	Multiplex of FsC3 at DO1	"
-----------	--------------------------	---

Multiplex of FsC6 at DO1:  
 Password TECHNICIAN for Refrigeration Personnel: 8670

Modifying

COMPRESSOR SETUP  
**SPECIAL ADJUSTMENTS**  
 FIRST SETUP

Menu SPECIAL ADJUSTMENTS of special parameters:  
 View Level TECHNICIAN (for Refrigeration Personnel) only, see page 1

Type	Explanation	Further inform.
------	-------------	-----------------

Settings

Controllers:

**-CONTROL>**

90:Vsc_Voltage/Freq_	8.00 V/Hz
91:ted_CONTROLLER_P-GN	5.0
92:tcb_CONTROLLER_P-GN	20
93:CND_VFG_SPEED_MIN	20 %
94:CND_VFG_SPEED_MAX	100 %
95:tcd_LIMITER_P-GN	25
97:START_BULGE	2.0%

Units:

98:UNITS	0:bar, °C-K-(SI)
----------	------------------

Operating Mode:

99:OPERATING MODE	D100
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Sub-Menu <CONTROL of Optimizing Parameters

<b>Configuration Setting</b>	Ratio of Voltage / Frequency, usually: 8.00: 400 V/50 Hz // 4.62: 400 V/87 Hz	56.90
Setting	ted Controller, Proportional gain: 1.0 ... 25.0	56.91
Setting	tcm Controller, Proportional gain: 1.0 ... 25.0	56.92
Setting	Condenser, Var.-speed fan Group, min. speed: 0.0 ... 100.0 %	56.93
Setting	Condenser, Var.-speed fan Group, max. speed: 50.0 ... 150.0 %	56.94
Setting	tcd Limiter, Proportional gain: 10 ... 250	56.95
Setting	Optimization of starting torque: 0.0 ... 5.0 %	56.97
<b>Only change after reference to our Applications Department</b>		
Setting	Selectable units: bar, °C, K; psi, °F, °R; bar, °F, °R	56.98
Setting	Defines Operating Mode: Input as hexadecimal	56.98
<b>Setpoints</b>	<b>XXX0</b> Setpoints ted1 / ted2 (DI3: Term. X13.4)	
ted1 / ted2	XXX1 Setpoint tedmax..ted1/ted2 (EM-1..3, 6..8)	
	XXX2 Setpoint ted1..ted2 (EM-1..3, 6..8)	
(DI3: Term. X13.4)	XXX3 Test Setpoint ted = -100 °C	
	XXX4 Cascade: Fast to 31:ted_SETPOINT_1	
	+ XXX8 XXX0..XXX2 for LAS Low-Ambient Start	
	XXXA Floating Control with EM-7, -8 (e.g. Chiller)	
<b>Setpoints</b>	<b>XX0X</b> Setpoints tcb1 / tcb2 (DI4: Term. X12.1)	
tcb1 / tcb2	XX1X Setpoint tcbmax..tcb1/tcb2 (EM-1..3, 6)	
	XX2X Setpoint tcb1..tcb2 (EM-1..3, 6)	
(DI4: Term. X12.1)	XX3X Test Setpoint tcm = +100 °C	
	XX4X Cascade fast operation (relay at AO1)	
To power fans or pumps:	3450 EC: Condenser fans/pump speed: 0..f max	
	3460 EC: Condenser fans speed: -fmin..fmax	
	3470 E: Condenser fans/pump speed: 0..f max	
	3480 E: Condenser fans speed: -fmin..fmax	
	XX9X Floating Control with EM-7, -8 (e.g. tambient)	
<b>Special functionality</b>	<b>X1XX</b> Activate Capacity Controller or VsC1b	
	X2XX Activate GRAY Code	
	X4XX Stop at fmin after 74:VsC_tmon_fmin_TIM	
	X8XX Activate delayed Oil Injection	
	1XXX Trip reset: DI1 (0->1) / 0XXX->1XXX	
	2XXX Allow slow stop ramp	
	0XXX Relay Ready No Fault	
	4XXX DO1: No Fault & Enabled	
	8XXX & DI1 (Control Switch)	
	CXXX Delay OFF (15 min)	

Controllers:

**-DATA>**

Dt0	70.0 Hz
Dt1	20.0 Hz
Dt3	15.0 K
Dt6	20.0Hz/s 20.0Hz/s
Dt7	1200 s
Dt8	CBA9 F009
	00BA F009
	CBA9 F009

Control Mode:

Refer to 62: & 64: on page 4

If Parameter 80: XXXXXXXE / XXXXXXXF (see page 4)

→ Screw Compressor BA: for solenoid valves

\* Gray Code: Activate VsC1

Outputs:					
(DO5)	(DO4)	DO3	DO2	AO2	AO1
					Logic outputs with AO1, AO2

Sub-Menu <DATA of Special Parameters

<b>Configuration Setting</b>	VsC: Motor Frequency max. settable 15.0 ... 120.0 Hz	56.Dt0
<b>Configuration Setting</b>	VsC: Motor Frequency min. settable 15.0 ... 120.0 Hz	56.Dt1
Setting	Condenser: Delta tcm-ta max for control K 0.0 ... 50.0 K	56.Dt3
Setting	Reduce ramp rates above fmin: Acceleration Deceleration Hz/s	56.Dt6
Setting	Compressor rotation after this time: 0 s: none; 60 s ... 65535 s swop	56.Dt7
<b>Configuration Setting</b>	Outputs FFFFFFFF ... 00000000	56.Dt8
XXXX XXX0	Normal	
XXXX XXX1	Activate Envelope Limit	
XXXX XXX2	Activate extended current limit (not yet)	
XXXX XXX4	Activate pc transmitter monitoring	
XXXX XXX8	Activate envelope frequency-range limiting	
XXXX XX0X	Normal	
XXXX XX1X	Activate inverter motor heating	
XXXX XX2X	Activate Autotune if there is a failed start	
XXXX XX4X	View Level OPERATOR: Extend menus	
XXXX XX8X	Activate Serial Communication	
XXXX 00XX	A0: 0..+10 V Variable-speed fan Group	
XXXX 0XXX	A0: Limit, Flash Code // Gray Code:Activ.VsC1*	
XXXX 11XX	A1: 0..+10 V Frequency (10 V = fmax)	
XXXX 22XX	A2: 0..+10 V Hot-Gas Bypass control	
0000 XXXX	D0: Activate Enclosure Fan (Only if DI5 not used)	
1111 XXXX	D1: Reserve	
2222 XXXX	D2: Reserve	
3333 33XX	D3: Monitor fmin (see 74:VsC_tmon_fmin TIME)	
4444 44XX	D4: Inhibit Sump Heater	
5555 55XX	D5: More Condens. capacity required (cascade)	
6666 66XX	D6: Maintenance recommended	
7777 77XX	D7: Connect supply filter trap	
8888 88XX	D8: Activate Capacity Control (CC)	
9999 99XX	D9: Activate Comp VsC1	
AAAA AAXX	DA: Activate Comp FsC2 (Screw:VFsC1: 25%)	
BBBB BBXX	DB: Activate Comp FsC3 (Screw: VFsC1: Oil)	
CBBB BBXX	DC: Activate Comp FsC4 (Screw: FsC2)	
DDDD DDXX	DD: Activate Comp FsC5 (AO2) (Screw: FsC3)	
---- --	DI8:Activate Comp FsC6 (MUX of DO1)	
FFFF FFXX	DF: Activate Expansion Valve TEV / EEV	
Setting	SD Card (Secure Data Memory Card): Revision Designation	56.Dt9
<b>Password TECHNICIAN for Refrigeration Personnel: 8670</b>		

SD Card:

Dt9	_19a
-----	------

Modifying

SPECIAL ADJUSTMENT

**-SPECIALS>**

**Sub-Menu <SPECIALS of Expert Parameters**

Only change after reference to our Applications Department

Pressure transmitters

Sp0  
1222

Setting	4.20 mA	XXX1	0.0 ... 25.0 bar
		XXX2	0.0 ... 30.0 bar
		XX13	0.0 ... 40.0 bar
		XX24	0.0 ... 60.0 bar
		XX35	0 ... 100 bar
		XX46	0 ... 160 bar
		XX57	0 ... 18.0 bar
		XX68	0.0 ... 50.0 bar
		XX-9	
		XX8A	
		XX9B	

Pressure transmitters, measurement ranges: pc, pe (4...20 mA)	1.0 ... 9.0 bar -0.5 ... 7.0 bar 0.0 ... 25.0 bar 0.0 ... 30.0 bar 0.0 ... 40.0 bar 0.0 ... 60.0 bar 0 ... 100 bar 0 ... 160 bar -0.8 ... 7.0 bar 0.0 ... 18.0 bar 0.0 ... 50.0 bar
--	---

56.Sp0

Speed Setpoint Conditioning

Sp1  
7764

Setting  
0..F: 0..F: XXXX

Demo tcb ted || Lub.- Force Freq:  
7764 = tcb | ted || 50.0 Hz

56.Sp1

Limiter Gains

Sp2  
64C8

Setting

Demo operation deviations  
Discharge Temperature:  
P Gain, Limit (10.00|100.0 °C)

56.Sp2

Sp3  
6400

Setting

Suction-gas Superheat limiter:  
P gain, ts - ted (10.00|1.00 K)

56.Sp3

Sp4  
6400

Setting

Discharge-gas Superheat limiter:  
P gain, td - tcd (10.00|1.00 K)

56.Sp4

Sp5  
6482

Setting

Lubrication Overheat limiter:  
P gain, tl - ted (10.00|19.05 K)

56.Sp5

Sp6  
641E

Setting

Oil Lubrication:  
P gain, Press. (10.00| 2.09 bar)

56.Sp6

Further Resonance Avoidance

Sp7  
FFFF

Setting

Further Skip Frequency 3:  
(fmax: 127.5 Hz | fmin: 127.5 Hz)

56.Sp7

Sp8  
FFFF

Setting

Further Skip Frequency 4:  
(fmax: 127.5 Hz | fmin: 127.5 Hz)

56.Sp8

Limit electrical power

Sp9  
14FF

Setting

Limit electrical power:  
P gain, limit (10.0, 127.5%)

56.Sp9

Capacity Controller

SpA  
0000

Setting

VFsC controller:  
I time const. (0.0 s), P gain (0.0)

56.SpA

SpB  
6446

Setting

Capacity control (Hot Gas Bypass):  
P Gain, Reserve (10.00, 5.01)

56.SpB

SpC  
F882

Setting

Capacity Control (solenoid valve):  
ton (<=302 s), toff (>=19,95 s)

56.SpC

Current Profile

Passwort Engineer

Other settings

SpD  
B4DC

Setting

Max. Current as a function of speed:  
at fmax and at fmin in %

56.SpD

SpE  
EE8C

Setting

tc, te Controllers, I time constants:  
ltcb, lted

56.SpE

SpF  
0000

Setting

Reserve

56.SpF

External Energy Meter

SpG  
0000

Setting

External Energy Meter:  
Pulses each kWh

56.SpG

External input Harmonic Filter

SpH  
0000

Setting

Ext. supply filter | Nibbles 1,0 (below):  
Release trap < value | Nibbles 1,0

56.SpH

Other settings

SpI  
3FFA

Setting

LOCAL Energy Saving  
Flux reduction Flux characteristic

56.SpI

Base Voltage:	XXXX	F..A.0: Max(110 %). Normal(100%). Min(80%)
Energy Saving, Max Reduction:	XXFX	F..0: None(100%)..Min(70%)
Min. acting freq.:	XFXX	0..F: fmin +(0..15 Hz)
LOCAL Automatic, Sweep rate:	0XXX	0.1 Hz / s
	1XXX	0.2 Hz / s
	2XXX	0.5 Hz / s
	3XXX	1 Hz / s

14XXX	2 Hz / s
5XXX	5 Hz / s
6XXX	10 Hz / s

SpL, Nibble:  
0: Tlog: 0..7:  
None,24,12,  
8,6,5,4,3[s]

Resetting values

SpJ  
0000

Setting

Reset of various settings

56.SpJ

Present Values are shown in Menu DIAGNOSTICS:	0000	No reset
	116D	VsC Compr equiv. 50 Hz Shaftseal rem. time (days)
	2721	Fan equiv 40 °C time FP fan reming. time (days)
	4PPP	Reset Installation Name
	5PPP	Reset no. of compressor starts
	APPP	Set special fieldbus type
	CPPP	Set RS485 Modbus RTU to 9600 Baud
	DPPP	Release Extension Module lock
	EPPP	Reset webserver password to initial value
	FPPP	Reset to factory defaults

1: Weekday  
3:1: Modules

SpM, Nibble:  
0-0:3:Flux shp  
0-4: Stabilization  
0-8: Parker-flux  
Motor type  
RTC Trimm  
RTC Trimm

Factory settings

SpK  
C8C8

Setting

Ext. Module EM 2.. Active, limits:  
----VfG(links)---- VsC(rechts)----

56.SpK

Limiting Ranges (night operation)

SpL  
YY00

Setting

Special purpose L:  
Erw. Mod., Basic Mod., Weekday, Tlog

56.SpL

Special Purpose

SpM  
2800

Setting

Special purpose M:  
---RTC Trim---, Motor type, Motor fluxing

56.SpM

SpN  
0000

Setting

Special purpose N:  
Drive, specials, Specials, Fluxing

56.SpN

SpN, Nibble 3:8: Scroll, 3.1: Screw, 0: Reciprocating

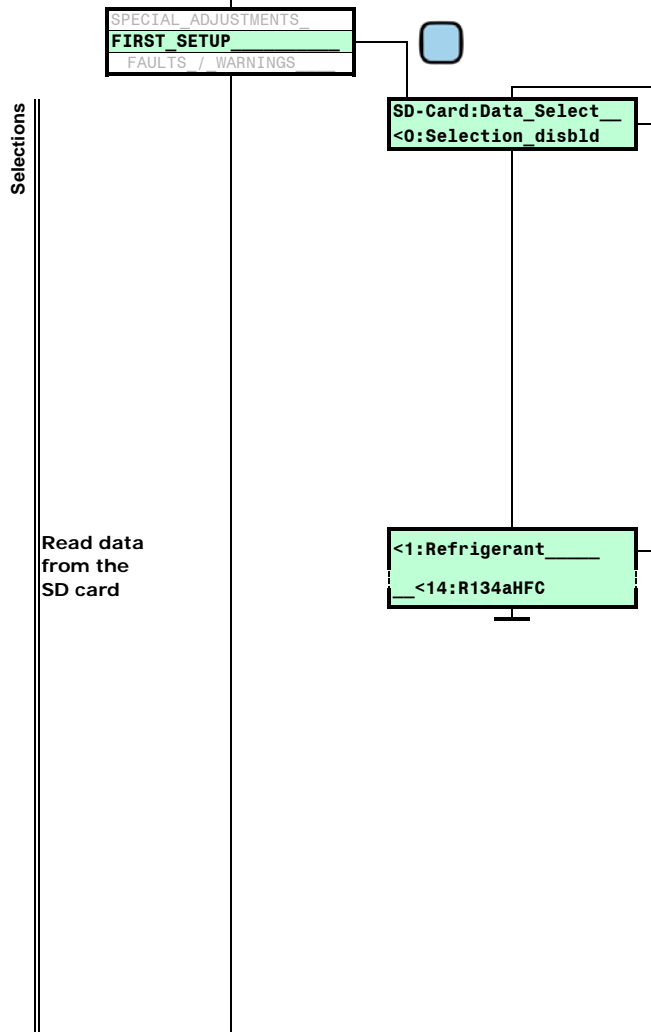
SpN, Nibble:  
0-1: tvsc extend  
0-2: lvfg extend  
0-4: Dly EV ON

0-8: Dly VsC strt  
2-1: Reserve  
2-2: Inhibit stop  
2-4:Act Ext. Ctrlr

SPECIAL\_ADJUSTME

Only if Extension Module fitted: Envelope limiting:

Menu FIRST SET-UP for settings with a SD card with valid data:  
View Level TECHNICIAN (for Refrigeration Personnel) only, see page 1



Type Value	Explanation	Further inform.
Settings:	One of the following must be activated	7.01
<0:Selection_disblD <1:Refrigerant	Selection not activated (normal) Refrigerant <b>PRESS SOFTKEY ABOVE LEFT ON KEYPAD TO EXIT ==&gt;DO NOT CONTINUE WITH FOLLOWING UNLESS NEW COMPRESSOR DATA REQUIRED</b>	
<2:VFsc_Manufactur <3:VFsc_Type <4:VFsc_Cylinders <5:Motor_Voltage <6:VFsc_Compressor <<TO ENTER DATA>>	Compressor: Manufacturer Compressor: Type Compressor: Number of cylinders Electrical Supply Voltage Compressor selection <b>&lt;PRESS GREEN KEY ' ' &gt;</b>	
Selection: Tip 'DOWN' arrow key		
Settings:	Selection: Tip 'DOWN' arrow key Choice: Tip 'LEFT'/'RIGHT' arrow keys	
<b>KEYS FOR SELECTION:</b>	Next data set Previous data set	
<b>IMPORTANT:</b>	Requirement for Selection: - SD memory card with valid authorized data plugged into slot of the FU+ Refrigeration Inverter - The selection parameter SD Data_Selection must be set to: <b>&lt;0:Selection_disblD</b> to return to normal operation	
<b>REFER TO BACK PAGE FOR DETAILS</b>		

Selectable data from the SD card	SD-MC: Secure Digital - Memory Card																
FrigoSoft 1.7: Basic Pressure Control																	
<b>REFRIGERANT selection:</b> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;">STEP 1</div> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;">→ 2</div> </div>	R134a, R14, R22, R23, R32, R134a, R152a, R170, R227ea, R236fa, R245fa, R290 R404A, R407A, R407C, R407F, R410A, R417A, R417B, R422A, R422D, R427A, R434A, R437A, R438A, R442A, R448A, R449A, R450A, R452A, R452B, R454B, R507A, R508A, R508B, R513A, R600, R600a, R717, R723, R744 sbrcr/trcrt, R1150, R1234yf, R1234ze, R1270																
Compressor pre-select	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>&lt;20:no_name</td> <td>&lt;24:DORIN</td> <td>&lt;28:GEA-Bock</td> <td>&lt;2C:LGE</td> </tr> <tr> <td>&lt;21:BITZER</td> <td>&lt;25:EMERSON</td> <td>&lt;29:HANBELL</td> <td>&lt;2D:SANYO</td> </tr> <tr> <td>&lt;22:CARLYLE</td> <td>&lt;26:FRASCOLD</td> <td>&lt;2A:HITACHI</td> <td>&lt;2E:TECUMSEH</td> </tr> <tr> <td>&lt;23:DANFOSS</td> <td>&lt;27:FRIGOPOL</td> <td>&lt;2B:J&amp;EHALL</td> <td>&lt;2F:other</td> </tr> </table>	<20:no_name	<24:DORIN	<28:GEA-Bock	<2C:LGE	<21:BITZER	<25:EMERSON	<29:HANBELL	<2D:SANYO	<22:CARLYLE	<26:FRASCOLD	<2A:HITACHI	<2E:TECUMSEH	<23:DANFOSS	<27:FRIGOPOL	<2B:J&EHALL	<2F:other
	<20:no_name	<24:DORIN	<28:GEA-Bock	<2C:LGE													
	<21:BITZER	<25:EMERSON	<29:HANBELL	<2D:SANYO													
	<22:CARLYLE	<26:FRASCOLD	<2A:HITACHI	<2E:TECUMSEH													
<23:DANFOSS	<27:FRIGOPOL	<2B:J&EHALL	<2F:other														
<table border="1" style="width: 100%; text-align: center;"> <tr> <td>&lt;30:no_type</td> <td>&lt;34:Recip_open</td> <td>&lt;38:Screw_Open</td> </tr> <tr> <td>&lt;31:Recip_Hermetic</td> <td>&lt;35:Screw_Hermetic</td> <td>&lt;39:Scroll</td> </tr> <tr> <td>&lt;32:Recip_Semihermtc</td> <td>&lt;36:Screw_semihermtc</td> <td>&lt;3A:Reserve</td> </tr> <tr> <td>&lt;33:Recip_2-stage</td> <td>&lt;37:Screw_Compact</td> <td></td> </tr> </table>	<30:no_type	<34:Recip_open	<38:Screw_Open	<31:Recip_Hermetic	<35:Screw_Hermetic	<39:Scroll	<32:Recip_Semihermtc	<36:Screw_semihermtc	<3A:Reserve	<33:Recip_2-stage	<37:Screw_Compact						
<30:no_type	<34:Recip_open	<38:Screw_Open															
<31:Recip_Hermetic	<35:Screw_Hermetic	<39:Scroll															
<32:Recip_Semihermtc	<36:Screw_semihermtc	<3A:Reserve															
<33:Recip_2-stage	<37:Screw_Compact																
<table border="1" style="width: 100%; text-align: center;"> <tr> <td>&lt;40:No_cylinders</td> <td>&lt;44:4_cylinders</td> <td>&lt;48:8_cylinders</td> <td>&lt;4C:12_cylinders</td> </tr> <tr> <td>&lt;41:1_cylinder</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>&lt;42:2_cylinders</td> <td>&lt;46:6_cylinders</td> <td>&lt;4A:10_cylinders</td> <td>-</td> </tr> <tr> <td>&lt;43:3_cylinders</td> <td>-</td> <td>-</td> <td>&lt;4F:(15+ cylinders)</td> </tr> </table>	<40:No_cylinders	<44:4_cylinders	<48:8_cylinders	<4C:12_cylinders	<41:1_cylinder	-	-	-	<42:2_cylinders	<46:6_cylinders	<4A:10_cylinders	-	<43:3_cylinders	-	-	<4F:(15+ cylinders)	
<40:No_cylinders	<44:4_cylinders	<48:8_cylinders	<4C:12_cylinders														
<41:1_cylinder	-	-	-														
<42:2_cylinders	<46:6_cylinders	<4A:10_cylinders	-														
<43:3_cylinders	-	-	<4F:(15+ cylinders)														
<table border="1" style="width: 100%; text-align: center;"> <tr> <td>&lt;50:notdefined</td> <td>&lt;54:50_Hz_420_V</td> <td>&lt;58:60_Hz_200_V</td> <td>&lt;5C:60_Hz_460_V</td> </tr> <tr> <td>&lt;51:50_Hz_200_V</td> <td>&lt;55:50_Hz_500_V</td> <td>&lt;59:60_Hz_208_V</td> <td>&lt;5D:60_Hz_575_V</td> </tr> <tr> <td>&lt;52:50_Hz_230_V</td> <td>&lt;56:50_Hz_690_V</td> <td>&lt;5A:60_Hz_230_V</td> <td>&lt;5E:60_Hz_660_V</td> </tr> <tr> <td>&lt;53:50_Hz_400_V</td> <td>&lt;57:50_Hz_tbd_V</td> <td>&lt;5B:60_Hz_380_V</td> <td>&lt;5F:other</td> </tr> </table>	<50:notdefined	<54:50_Hz_420_V	<58:60_Hz_200_V	<5C:60_Hz_460_V	<51:50_Hz_200_V	<55:50_Hz_500_V	<59:60_Hz_208_V	<5D:60_Hz_575_V	<52:50_Hz_230_V	<56:50_Hz_690_V	<5A:60_Hz_230_V	<5E:60_Hz_660_V	<53:50_Hz_400_V	<57:50_Hz_tbd_V	<5B:60_Hz_380_V	<5F:other	
<50:notdefined	<54:50_Hz_420_V	<58:60_Hz_200_V	<5C:60_Hz_460_V														
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<53:50_Hz_400_V	<57:50_Hz_tbd_V	<5B:60_Hz_380_V	<5F:other														
<b>VsC COMPRESSOR selection:</b> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;">STUFE 2</div> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;">→ 3</div> </div> <No_Data_selected>																	

Selections	Setting	Time and Date of RTC (if module A FU+ CM-1 fitted)	7.05
Real Time Clock:	Time and Date	2015/07/04 16:08:51	
Language:	Language	ENGLISH	7.03
Units:	98:UNITS	0:bar, °C-K-(SI)	7.03
Installation ID:	Installation_Name	FrigoPack_FU+	7.02

FIRST SETUP  
**FAULTS / WARNINGS**  
 COMMUNICATION

All Users

Measured Values

Trips:

First Trip

Active 1 - 32

Active 33 - 64

Warnings:

Warnings 1 - 32

Warnings 33 - 64

Type	Explanation	Further inform.
Measured value	Trip which caused shut down	89.01
Measured value	Code of active trips (hexadecimal)	89.02
Measured value	Code of active trips (hexadecimal)	89.03
Measured value	Code of active warnings (hexadecimal)	89.04
Measured value	Code of active+ warnings (hexadecimal)	89.05

Trips:

Recent Trips[ ]

Recent Trips[0]

Recent Trips[1]

Recent Trips[2]

Recent Trips[3]

Recent Trips[3]

Recent Trips[5]

Recent Trips[6]

Recent Trips[7]

Recent Trips[8]

Recent Trips[9]

Menu	Recent Trips Times (last 10)	89.06
Measured value	Recent Trip 1 (latest)	
Measured value	Recent Trip 2	
Measured value	Recent Trip 3	
Measured value	Recent Trip 4	
Measured value	Recent Trip 4	
Measured value	Recent Trip 6	
Measured value	Recent Trip 7	
Measured value	Recent Trip 8	
Measured value	Recent Trip 9	
Measured value	Recent Trip 10 (oldest)	

Times:

Recent Trip Times[ ]

Recent Trip Times[0]

Recent Trip Times[1]

Recent Trip Times[2]

Recent Trip Times[3]

Recent Trip Times[4]

Recent Trip Times[5]

Recent Trip Times[6]

Recent Trip Times[7]

Recent Trip Times[8]

Recent Trip Times[9]

Menu	Recent Trips Times (last 10)	89.07
Measured value	Recent Trip Time 1 (latest)	
Measured value	Recent Trip Time 2	
Measured value	Recent Trip Time 3	
Measured value	Recent Trip Time 4	
Measured value	Recent Trip Time 5	
Measured value	Recent Trip Time 6	
Measured value	Recent Trip Time 7	
Measured value	Recent Trip Time 8	
Measured value	Recent Trip Time 9	
Measured value	Recent Trip Time 10 (oldest)	

Control Board Up Time

AR Restarts Remaining

AR Time Remaining

Measured value	Control board powered-up time (to time-stamp trips if no RTC)	89.08
Measured value	Reset to 15(F) after running 5x 70:VsC_tinhibit_TIME	89.09
Measured value	t remaining until next start attempt AR: Auto Restart	89.10

Extens.Module (when fitted):

EM-:Trips Warnings

Measured value	Extension Module: Trips Warnings	89.11
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# Trips, Diagnosis, Fault Finding

Trip Message	Possible Cause	Hints for Fault Finding	Remedies
<b>01 OVER VOLTAGE</b>	<ul style="list-style-type: none"> <li>Voltage of supply too high</li> <li>Compressor motor defect</li> </ul>	<ul style="list-style-type: none"> <li>Measure and document three input voltages</li> <li>Test Compressor motor. Disconnect cables from the Refrigeration Inverter. Connect direct to the input supply through a suitable motor circuit breaker. Monitor if compressor runs normally by verifying current taken agrees with compressor manufacturer's data.</li> <li>Measure resistance of motor winding and compare with manufacturer's data</li> <li>Disconnect Refrigeration Inverter and check winding insulation between phases and to earth</li> <li>Check wiring of control circuit and compare function with recommendations</li> </ul>	<ul style="list-style-type: none"> <li>Rectify cause of any high voltage</li> <li>Replace compressor motor</li> <li>Modify wiring</li> </ul>
<b>02 UNDER VOLTAGE</b>	<ul style="list-style-type: none"> <li>Voltage of supply too low</li> <li>Phase of supply voltage missing</li> </ul>	<ul style="list-style-type: none"> <li>Measure and document three input voltages</li> </ul>	<ul style="list-style-type: none"> <li>Rectify cause of any low voltage</li> </ul>
<b>03 OVER CURRENT</b>	<ul style="list-style-type: none"> <li>Isolating contactor not controlled correctly</li> </ul>	<ul style="list-style-type: none"> <li>Check wiring of control circuit and compare function with recommendations</li> </ul>	<ul style="list-style-type: none"> <li>Modify wiring</li> </ul>
<b>04 STACK FAULT</b>	<ul style="list-style-type: none"> <li>Compressor motor defect</li> </ul>	<ul style="list-style-type: none"> <li>Test Compressor motor. Disconnect cables from the Refrigeration Inverter. Connect direct to the input supply through a suitable motor circuit breaker. Monitor if compressor runs normally by verifying current taken agrees with compressor software data.</li> </ul>	<ul style="list-style-type: none"> <li>Replace compressor motor</li> </ul>
<b>05 STACK OVER CRRNT</b>			
<b>21 PHASE FAIL</b>		<ul style="list-style-type: none"> <li>Measure resistance of motor winding and compare with manufacturer's data</li> </ul>	
<b>22 VDC RIPPLE</b>	<ul style="list-style-type: none"> <li>Refrigeration Inverter faulty</li> </ul>	<ul style="list-style-type: none"> <li>Disconnect Refrigeration Inverter and check winding insulation between phases and to earth</li> <li>Remove motor cable connections to Refrigeration Inverter</li> <li>Check if operation of Refrigeration Inverter without a motor connected is possible</li> <li>Test operation with a small test motor</li> <li>Check wiring to motor terminals (choice of star/delta, part winding etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Replace Refrigeration Inverter</li> <li>Modify wiring</li> </ul>
<b>08 INVERSE TIME</b>	<ul style="list-style-type: none"> <li>Compressor start aborted</li> </ul>	<ul style="list-style-type: none"> <li>Liquid refrigerant in compressor?</li> <li>Defect compressor</li> </ul>	<ul style="list-style-type: none"> <li>Contact Supplier for advice</li> </ul>
<b>09 MOTOR I2T</b>			
<b>14 START FAILED</b>		<ul style="list-style-type: none"> <li>Incorrect size of Refrigeration Inverter or motor connected in delta instead of star</li> </ul>	
<b>27 STO ACTIVE</b>	<ul style="list-style-type: none"> <li>Safety circuit tripped. Problem with ext Safety Module</li> <li>Safety relay or contactor not controlled correctly</li> <li>Wiring fault in safety circuit</li> <li>DC 24 V control voltage missing</li> </ul>	<ul style="list-style-type: none"> <li>Check safety circuits. Possibly missing supply voltage at a monitoring device.</li> <li>Check wiring of control circuit and compare function with recommendations</li> <li>Check DC 24 V control voltage at Refrigeration Inverter</li> <li>Short circuit with DC 24 V control voltage ?</li> </ul>	<ul style="list-style-type: none"> <li>Reset if necessary</li> <li>Verify wiring</li> <li>Modify wiring</li> <li>Verify wiring</li> </ul>
<b>33 PRESSURE TRANSMITT</b>	<ul style="list-style-type: none"> <li>Suction-pressure transmitter not connected or connections swapped</li> <li>Transmitter suction pressure faulty Verify setting Sp0 (p. 6)</li> </ul>	<ul style="list-style-type: none"> <li>Check if blue LED at the input of the Basic Module lights</li> <li>Check if blue LED at the input of the Basic Module lights</li> <li>Ratiometric Types: Check connections</li> </ul>	<ul style="list-style-type: none"> <li>Verify correct connection of suction pressure transmitter. Exchange leads if necessary</li> <li>Replace faulty pressure transmitter</li> </ul>
<b>34 PRESS RANGE EXCEED</b>	<ul style="list-style-type: none"> <li>Pressure outside range or unsuitable pressure transmitter fitted</li> </ul>	<ul style="list-style-type: none"> <li>Verify Pressure Transmitter</li> </ul>	<ul style="list-style-type: none"> <li>Exchange Pressure Transmitter or correct wiring</li> </ul>
<b>35 DISCH TEMP TOO HGH</b>	<ul style="list-style-type: none"> <li>Discharge-gas temperature too high</li> </ul>	<ul style="list-style-type: none"> <li>Suction-gas superheat too high</li> <li>Damaged compressor valves or leaking gasket</li> <li>Unsuitable refrigerant</li> </ul>	<ul style="list-style-type: none"> <li>Investigate refrigeration components</li> </ul>
<b>36 SUPERHEATS TOO LOW</b>	<ul style="list-style-type: none"> <li>Suction and Discharge-Gas superheats too low</li> </ul>	<ul style="list-style-type: none"> <li>Problem with an expansion valve</li> <li>Liquid in suction line</li> </ul>	<ul style="list-style-type: none"> <li>Investigate refrigeration components</li> </ul>
<b>37 LUBRC TEMP TOO LOW</b>	<ul style="list-style-type: none"> <li>Lubricant Overtemperature too low</li> </ul>	<ul style="list-style-type: none"> <li>Suction-gas superheat too low</li> <li>Liquid in suction line</li> <li>Sump heater not used, not connected correctly or faulty</li> </ul>	<ul style="list-style-type: none"> <li>Investigate refrigeration components</li> </ul>
<b>38 LUBRC PRES TOO LOW</b>	<ul style="list-style-type: none"> <li>Low lubricant pressure</li> </ul>	<ul style="list-style-type: none"> <li>Lubricant migration</li> <li>Problem with refrigeration piping</li> </ul>	<ul style="list-style-type: none"> <li>Investigate refrigeration circuit</li> </ul>
<b>39 EXT MODULE FAULT</b>	<ul style="list-style-type: none"> <li>External Module or cable fault</li> </ul>	<ul style="list-style-type: none"> <li>Verify wiring</li> </ul>	<ul style="list-style-type: none"> <li>Correct wiring</li> </ul>
<b>40 MAINTENANCE NECESS</b>	<ul style="list-style-type: none"> <li>Proactive Maintenance due</li> </ul>	<ul style="list-style-type: none"> <li>Investigate Maintenance parameters in the menu DIAGNOSTICS</li> </ul>	<ul style="list-style-type: none"> <li>Organize parts required and plan maintenance</li> </ul>
<b>?? OTHER TRIP</b>	<ul style="list-style-type: none"> <li>Other</li> </ul>		<ul style="list-style-type: none"> <li>Contact supplier for advice</li> </ul>

ELECTRICAL → REFRIGERATION ←

FAULTS / WARNINGS  
**COMMUNICATION**  
 DIAGNOSTICS

Menu COMMUNICATION for setting up Communications:  
 View Level TECHNICIAN (for Refrigeration Personnel) only, see page 1

Type	Explanation	Further inform.
Value		

Settings Ethernet:

**-Ethernet>**

DHCP	TRUE
IP Auto	TRUE
User_IP_Address	FFF.FFF.FFF.FFF
User_Subnet_Mask	FFF.FFF.FFF.FFF
User_Gateway_Address	FFF.FFF.FFF.FFF

**Ethernet local area network**

Setting	Explanation	Value
Setting	Ethernet local area network	10.1.01
Setting	Automatic IP generation	10.1.02
Setting	User set IP address	10.1.03
Setting	User set Subnet Mask	10.1.04
Setting	User set Gateway Address	10.1.05

Previous three parameters only visible if DHCP or IP Auto are both set to FALSE

Settings RS485 Modbus RTU:

**-RS485-Modbus>**

Modbus Device Address	1
Modbus RTU Baud Rate	9600 BPS
Parity And Stop Bits	EVEN, 1 STOP
High Word First RTU	FALSE
Modbus RTU Timeout	3.0 s

**RS485 Modbus RTU with Option Module A FU+ CM-1**

Setting	Address	Value
Setting	Address	1..247
Setting	Baud Rate	1200..115200 BPS
Setting	Parity and Stop Bits	
Setting	16-Bit High-word first for 32-Bit interrogations	
Setting	No activity Timeout (Watchdog)	0.0 .. 65.0 s

Settings Ethernet Modbus:

**Ethernet-Modbus>**

Maximum Connections	2
High Word First	FALSE
Modbus Timeout	3.0 s
Modbus Conn Timeout	66 s

**Modbus over ETHERNET**

Setting	Maximum number of connections	Value
Setting	Maximum number of connections	10.3.01
Setting	16-Bit high-word first for 32-Bit interrogations	10.3.02
Setting	No Modbus RTU activity Timeout	0.0 .. 65.0 s
Setting	No Ethernet Fieldbus activity	0 .. 100000 s

Settings Ethernet Modbus:

**-Comms\_Control>**

Refrig_Control_Word	0000
LODAM_Control_Word	0000
Refrig_Status_Word	YYYY
Comms_Reference	0.00 %
EM_Control_Word	0.00 %

**Comms remote control**

Setting	Refrigeration Comms Control Word	Value
Setting	Refrigeration Comms Control Word	10.4.01
Setting	LODAM Comms Control Word	10.4.02
Setting	Refrigeration Status Word	10.4.03
Setting	Comms Reference (Setpoint)	10.4.04
Setting	Extension Module Control Word	10.4.05

Modifying

Password TECHNICIAN for Refrigeration Personnel: 8670

Keypad FU+ PROG:



Key	Navigation Mode	Edit Mode
Softkey 1	Select level menu	-
Softkey 2	Select Data (p7), Select Information (p19)	-
UP	Moves up list of parameters, see also p19	Increments displayed parameter
DOWN	Moves down list of parameters, see also p19	Increments displayed parameter
LEFT	Prev. menu or parameter, see also p7 and p19	Selects the digit to be changed
RIGHT	Next menu or parameter, see also p7 and p19	Selects the digit to be changed
OK	Next level menu or parameter	Edit mode when a parameter is selected
'1' '0'	Refer to pages 7, 19	Refer to pages 7, 19

Menu, Diagnostics:  
Diagnostics and other Monitoring Data

Diagnostics

COMMUNICATION
<b>DIAGNOSTICS</b>
TIME SCHEDULER

Sequencing and Limits:

SEQUENCR Refr VSD
YY Y

STARTS---ENABLES---
YYYY YYYY YYYY YYYY

LIMITING CONDITIONS
YYYY YYYY YYYY YYYY

Relative Rack Capacity (volume flow):  
Electrical Values:

Avr_Rack-POWR_Actual_
YYY.Y % Y.YYY %

DC-LINK MOTOR
YYY V YYYV V

BASE-FRQ POWER
YY.Y Hz YYY.Y kW

Temperatures:

Cntrl_Mod1_Heat_Sink
YY.Y °C YY.Y °C

Power Module:

Power Stack Fitted
YYYYYYYYYYYYYYY

Stack Serial No
YYYYYYYYYYYYYYY

HV SMPS Up Time
YYYYYYYYYYY s

HV Power On Count
YYYYYYYYYYYYYYY

Control Module:

Control Module Serial
YYYYYYYYYYYYYYY

Control Board Up Time
YYYYYYYYYYY s

Compressor:

VsC_Serial_Number
YYYYYYYYYYYYYYY

Motor Run Time
YYYYYYYYYYY s

VFsC-numbr_Starts_nmb
YYYYYYYYYYY

Maintenance :

VsC_equiv_50_Hz_time
YYYYYYYYYYY s

Fan_equiv_40_°C_time
YYYYYYYYYYY s

Type	Explanation
Internal value	Left: RHVAC sequencer 0 .. 13, Right: Internal sequencer 0 .. 7
Left:	Right:
0:Stoppd Rly to Start	0:NOT_READY_TO_SWITCH_ON
1:Start_Delay	1:SWITCH_ON_DISABLED
2:Autotuning	2:READY_TO_SWITCH_ON
3:Aligning	3:SWITCHED_ON
4:Prefluxing	4:OPERATION_ENABLED
5:Starting	5:QUICKSTOP_ACTIVE
6:Lubricating	6:FAULT_REACTION_ACTIVE
7:Hold_at_fmin	7:FAULTED
8:Normal_operation	
9:Stopping	
10:Stopped,_Inhibited	
11:Compressor_Heating	
12:Local_operation	
	13:Serial_communicatns
	15:Fault_not_cleared

Further Inform. 11.01

Internal value	Logical conditions:
xxxx xxxx xxx1	Safety Circuit (STO) Not active (OK)
xxxx xxxx xx1X	Refrigeration inverter Enabled (fault free)
xxxx xxxx xxx1	Ext. Module EM1..3.6..8 Enable or not present
xxxx xxxx 1xxx	ISESCO Enable or not present
xxxx xxxx xxx1 xxx	pe >> pe min limit Suction pressure
xxxx xxxx xx1X xxx	ted > ted min Evaporating temperature
xxxx xxxx x1XX xxx	tcd < tcd max Discharge temp
xxxx xxxx 1xxx xxx	pc << pc max limit Exhaust gas pressure
xxxx xxx1 xxxx xxx	DI1 Start input
xxxx xx1X xxx xxx	ted > ted setpoint/ Force Controller start / DI2
xxxx x1XX xxx xxx	External Module EM1..3 Module start
xxxx 1xxx xxx xxx	ISESCO ISESCO start
xxx1 xxx xxx xxx	External Start Signal AI1 or AI2 > 0.0 V
xx1X xxx xxx xxx	Compr. Swop active Swop time >= 0 s
x1XX xxx xxx xxx	Compressor VFSc1 Available
1XX xxx xxx xxx	Compressor VFSc2 Available

11.02

Internal value	Logical conditions:
xxxx xxxx xxx1	tcd >= tcd max Condensing Temperature
xxxx xxxx xx1X	Suction Gas Superheat too low
xxxx xxxx xxx1	Discharge gas Superheat too low
xxxx xxxx 1xxx	Lubrication Overheat too low
xxxx xxxx xxx1 xxx	pl Lubrication Differential pressure
xxxx xxxx 1xxx xxx	tenc Enclosure Too warm
xxxx xxx1 xxx xxx	Envel. current limiting Active
xxxx xx1X xxx xxx	ted > tedmax Starting
xxxx x1XX xxx xxx	Rack increase fmin Too long at min capacity
xxxx 1XXX xxx xxx	Scroll increase fmin Too long at min speed
xxx1 xxx xxx xxx	Icomp >= Icomp max Current
xx1X xxx xxx xxx	LAS Low Ambient Start Active
x1XX xxx xxx xxx	RAS Active

11.03

Measured value	Compressor Rack power: Average_Actual:
._. %	._. %

11.04

Calculated values	DC Link and motor voltages
._. V	._. V

11.05

Calculated value	Base Frequency Motor power
._. Hz	._. kW

11.06

Measured value	Heatsink and Control Module Temperatures
._. °C	._. °C

11.07

Measured value	Power Size Code
._.	._.

11.08

Measured value	Stack Serial Number
._.	._.

11.09

Measured value	Switched-Mode Power Supply ON time
._. s	._. s

11.10

Measured values	Number of times the supply has been connected
._.	._.

11.11

Measured value	Control Board Serial Number
._.	._.

11.12

Measured value	Control board powered-up time in s
._. s	._. s

11.13

Measured values	VsC Compressor Serial Number
._. s	._. s

11.14

Measured values	Compressor ON time
._. s	._. s

11.15

Measured values	Number of compressor and number of starts
._.	._.

11.16

Measured values	VsC Compr equiv. 50 Hz
._. s	._. s

11.17

Measured values	Fan equiv 40 °C time
._. s	._. s

11.18

Password TECHNICIAN for Refrigeration Personnel with training

Keypad FU+ PROG:  
Diagnosis:

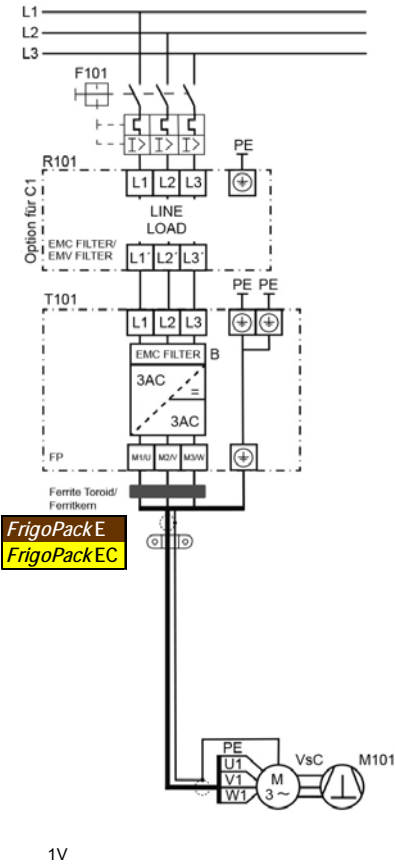


Light	Explanation
OFF	Stopping
Fast Flashing	Stopped, no Start input
ON	Stopped, no refrigeration requirement
ON	Running
Fast Flashing	Auto Start pending, Starting
Slow Flashing	Started, Inhibit Time running
Green then Red Flashing	Tripped / Fault

DIAGNOSTICS

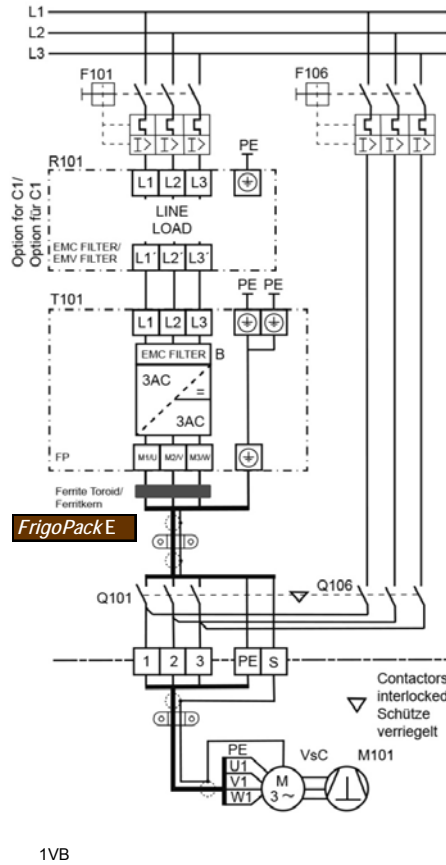
# POWER SECTION

## Power connections



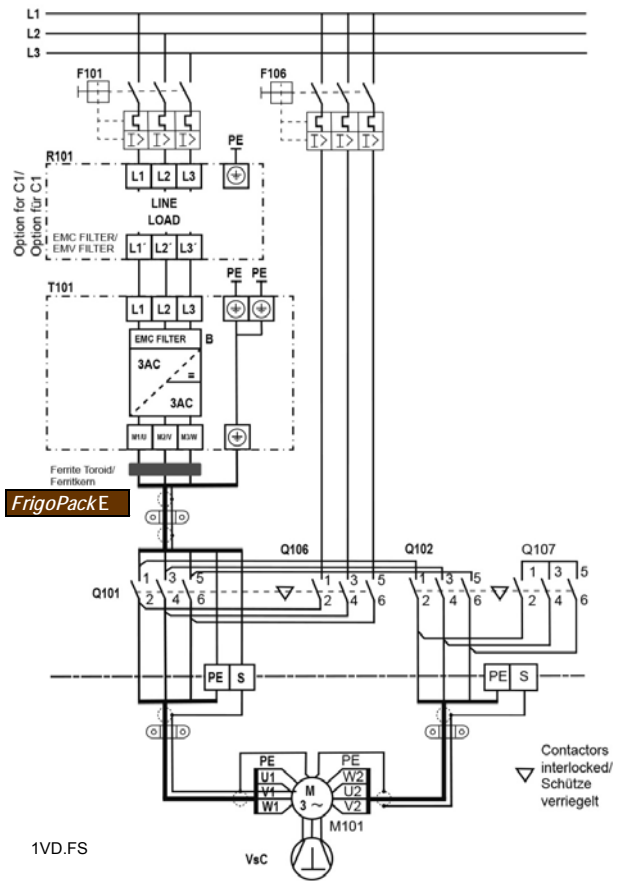
Single compressor

Settings: 80:FsC **PRIORITY** 00000000 (See page 4) --Compressors in use  
 Dt8: 0BF98008 (See page 5)



Single compressor with bypass (for emergency operation)

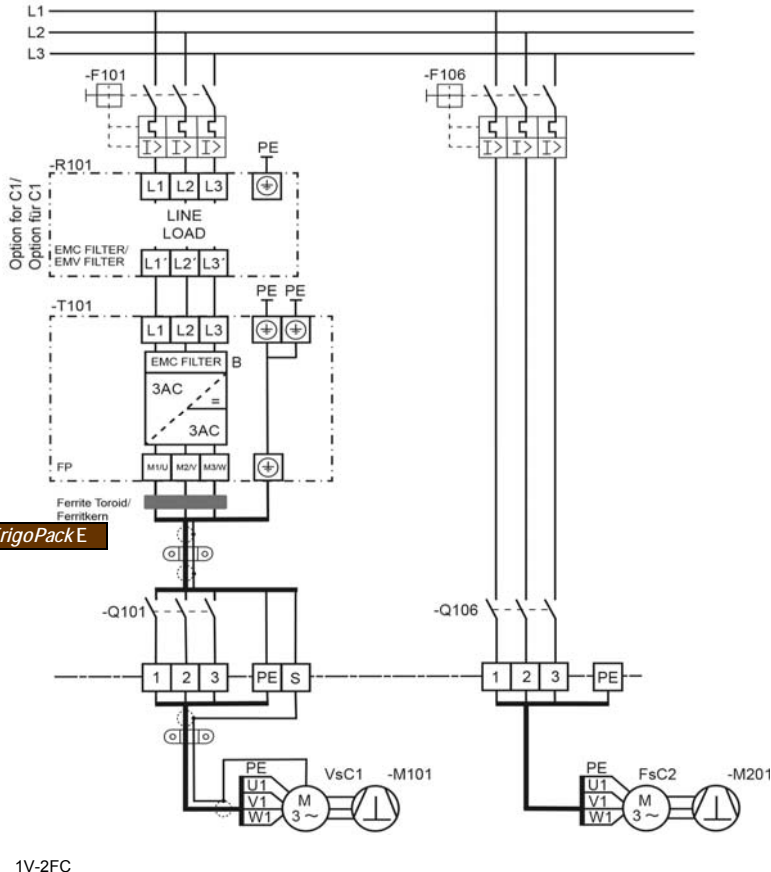
Settings: 80:FsC **PRIORITY** 00000000 (See page 4) --Compressors in use  
 Dt8: 0BF98008 (See page 5)



Single compressor in DELTA with bypass in STAR (for emergency operation)

Digital Control Outputs		Place/Part
Relay DO1	Ready: FrigoPack	FrigoPack
Relay DO3	Expansion (recommended)	FrigoPack

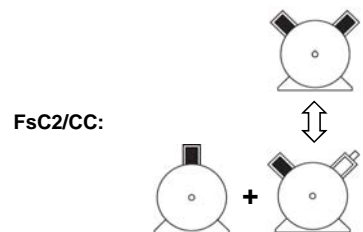
POWER SECTION



Variable-speed compressor + second larger compressor with Capacity Control

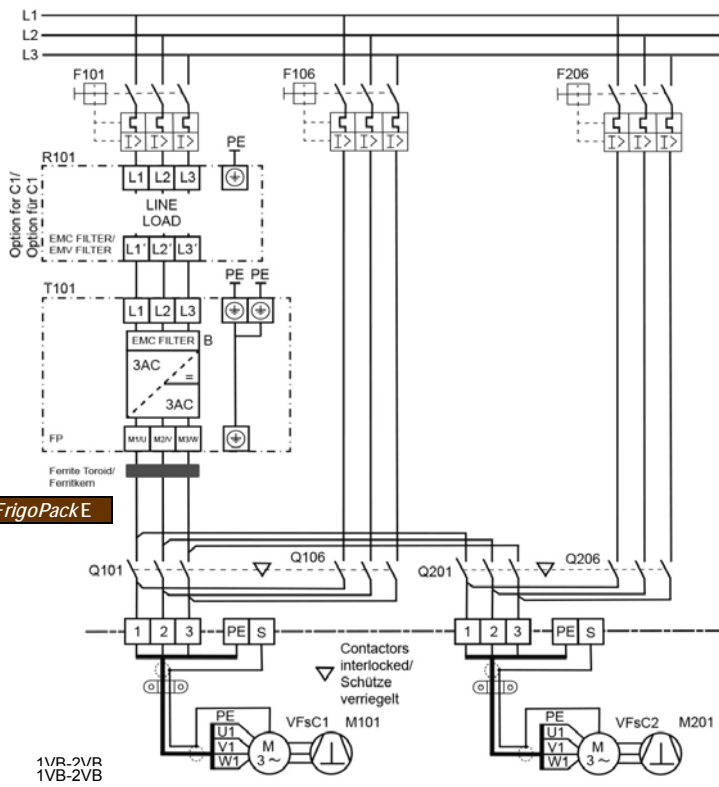
Settings: 80:FsC **PRIORITY** 00000001 (See page 4) --Compressors in use  
 Dt8: DA9A9F008

Digital Control Outputs		Place/Part
Relay DO1	Ready: FrigoPack	FrigoPack
Relay DO2	Operation: VsC1	FrigoPack
Relay DO3	Operation: FsC2	FrigoPack
Relay DO4	Capacity Control	Extern.P24 V
Relay AO2	Expansion (recommended)	Ext. P12 V *



\* Zubehörteil benötigt: A FU+ DC12V RL/11 (Special low coil-current relay module)

QSG12120



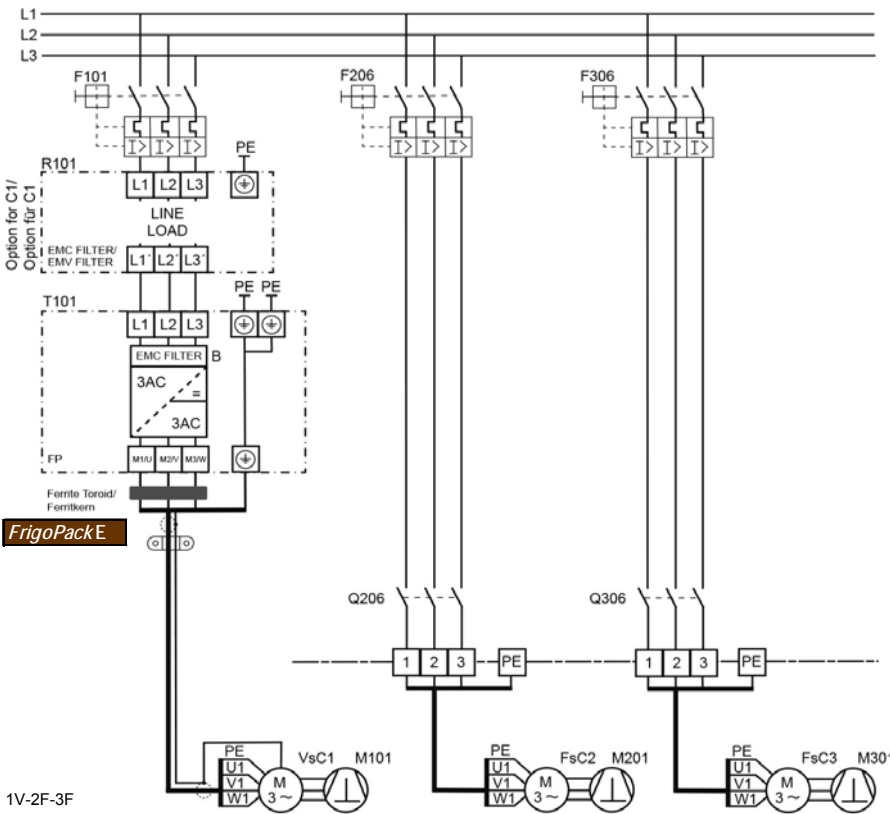
Two compressors, each with bypass and rotation

Digital Control Outputs		Place/Part
Relay DO1	Ready: FrigoPack	FrigoPack
Relay DO2	Operation: VFSc1	FrigoPack
Relay DO3	Operation: VFSc2	FrigoPack
Relay AO2	Expansion (recommended)	Extern.P24 V

**Note:**  
This connection requires a special arrangement of auxiliary contacts on the contactors.  
Alternatively a special control module from KIMO RHVAC Controls may be used.

Settings:

Dt8: **DFBA8008**  
80:FsC **PRIORITY** 000000**CE** / (See page 4)  
000000**DE** /  
--Compressor enables----- 000000**EE** /  
000000**FE**



Three compressors, two Fixed-speed Compressors with rotation

Settings: 80:FsC **PRIORITY** 000000**11** (See page 4) --Compressors in use  
Dt8: **OCBAF008** (See page 5)

Digital Control Outputs		Place/Part
Relay DO1	Ready: FrigoPack	FrigoPack
Relay DO2	Operation: VsC1	FrigoPack
Relay DO3	Operation: FsC2	FrigoPack
Relay DO4	Operation: FsC3	Ext. P24 V
Relay AO2	Expansion (recommended)	Ext. P12 V *

\* Accessory required: A FU+ DC12V RL/11 (Special low coil-current relay module)

Various other configurations are possible (e.g. up to 6 compressors), please enquire.

### Power terminals

Terminal / Designation	Signal / Function	Explanation	Further information
PE	Protective Earth connection 1 to supply	- Observe all safety and EMC requirements	7.7.1
L1	Three phases of voltage supply	- Ensure that supply voltage agrees with data on name plate	7.7.1
L2			
L3			
PE	Protective Earth connection 2 to supply	- Observe all safety and EMC requirements	6.7
M1/U	Motor of Variable-speed Compressor	Through interlocked isolating contactor if required	7.7.1/ 7.7.2
M2/V			
M3/W			
PE	Protective earth connection to compressor motor		7.7.2

Analog Inputs:

Pressure transmitter for Suction Pressure pe (LP)  
 Pressure transmitter for Discharge / Condensing Pressure pc

Supply for contacts of digital inputs:

Digital Inputs:

Start (Enable)

Activate the lubrication speed (>=50 Hz)

Activate Setpoint ted2

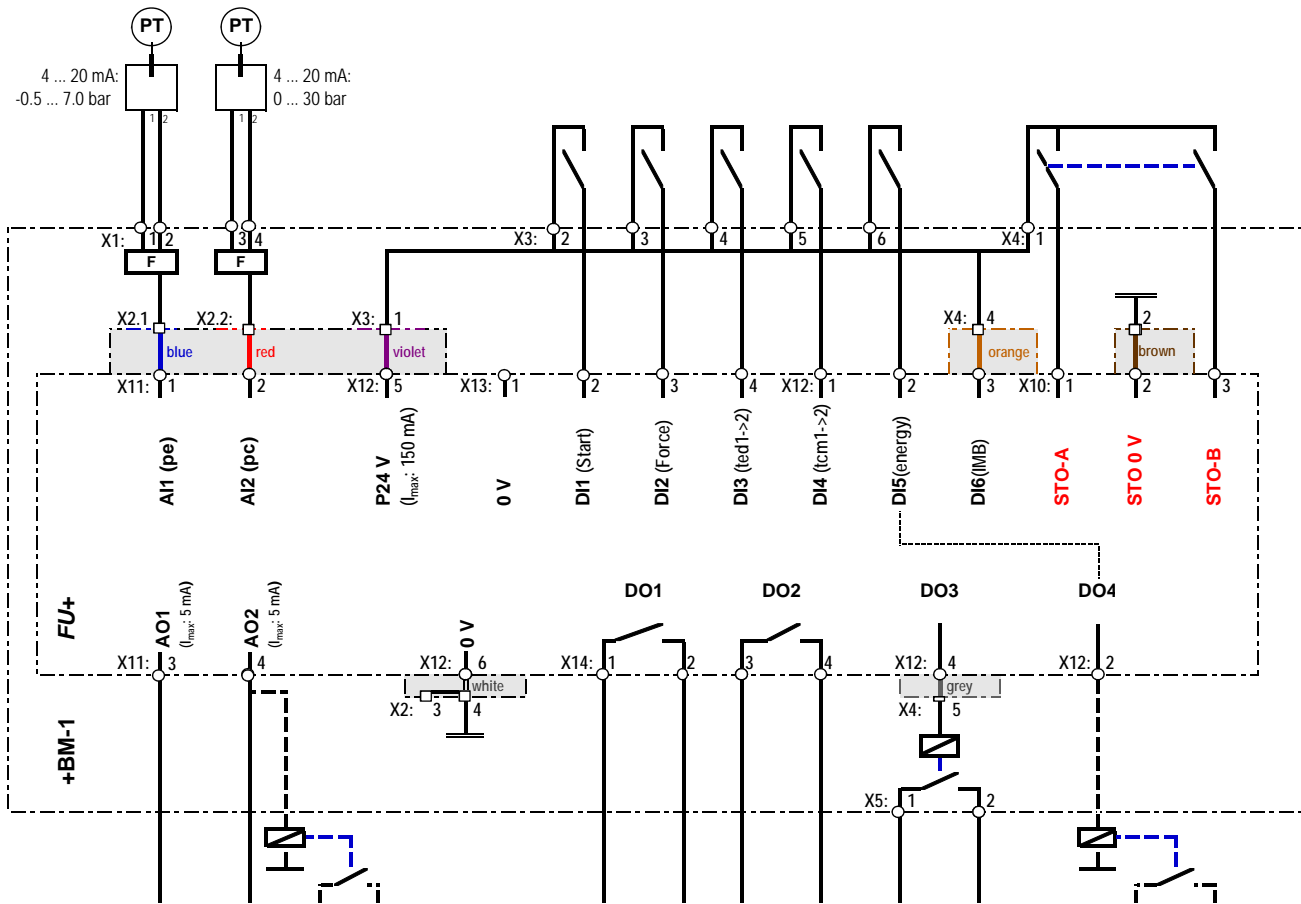
Activate Setpoint tcm2

External energy meter (SO: 1000 pulses / kWh)

Identification Module BM-1

Safety Circuit of the VsC compressor

Safety Circuit of the VsC compressor



Variable-speed fan Group (VfG) on Condenser, Actuating Value  
 Analog Output (also to power an optional special relay for special functions)  
 External DC 12 V relay: A FU+ DC12V RLU11

Ready for operation  
 Different modes can be set at: 99 : OPERATING\_MODE\_\_\_\_\_  
 Compressor VFsc1 operating  
 Compressor VsC active:  
 Crankcase heater, Condenser fan, Cylinder-head fan, Start unloader

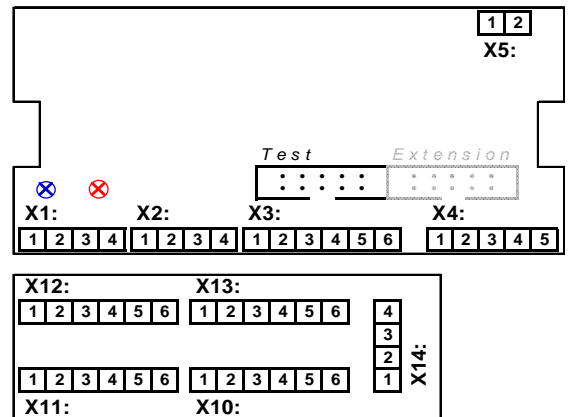
Activate Compressor VFsc2  
 External DC 24 V relay (optional)  
 Activate Compressor VFsc3

Analog Outputs:

Relays:

- VfG: Variable-speed fan group (Condenser / Dry cooler)
- VFsc1: Variable-speed Compressor 1 (also used as a Fixed-speed Compressor in some connections)
- VFsc2: Fixed-speed Compressors 2 (also used as a Variable-speed Compressor in some connections)

Terminal position:



Internally connected to FrigoPack FU+ functional earth (chassis) - No connection necessary.  
 Connection with the functional earth required - e.g. a wire connection to an earth terminal

# Terminal List for control functions

## FrigoSoft 1.7 activated: Basic Pressure Control:

29.01.2019

Terminal / Designation	Signal / Function	Explanation	Further information
BM-1: X1.1 / 2	AI1 <b>Analog Input:</b> <b>Pressure transmitter for Suction Pressure pe (LP)</b> 4...20 mA: -0.5 ... 7.0 bar 0 mA: Fault	- Must be used - Suitable pressure transducer: - A REFR-P-TRANSM-LP7N+PL - Connections: 1-->X1.1, 2-->X1.2	
BM-1: X1.3 / 4	AI2 <b>Analog Input:</b> <b>Pressure transmitter for Discharge / Condensing</b> 20 mA: 0 ... 30 bar 0 mA: Fault	- Optional use - Suitable pressure transducer: - A REF-P-TRANSM-HP30N+PL Connections: 1-->X1.3, 2-->X1.4	
X11.5	P10 V Universal Analog Output (5 mA max. load)	- Do not use	
X11.6	N10 V Universal Analog Output (5 mA max. load)	- Do not use	
X12.5	+24 V Supply for contacts of digital inputs	- Not available	
BM-1: X3.1 / X13.2	DI1 <b>Digital Input:</b> <b>Start (Enable)</b> +24 V: Start 0 V: Controlled stop	- <b>Must be used:</b>  - Load: 3.3 kΩ, 7.3 mA	
BM-1: X3.2/ X13.3	DI2 <i>Digital Input:</i> <i>Activate Lubrication Speed (50 Hz)</i> +24 V: Lubrication speed 0 V: Normal operation	- <i>Optional use</i>  - Load: 3.3 kΩ, 7.3 mA	
BM-1: X3.3/ X13.4	DI3		
BM-1: X3.4/ X12.1	DI4 <i>Digital Input:</i> <i>Activate Setpoint tcb2</i> +24 V: Setpoint tcb2 0 V: No action	- <i>Optional use</i>  - Load: 3.3 kΩ, 7.3 mA	
BM-1: X3.5/ X12.2	DI5 <i>Digital Input:</i> <i>Pulses from Energy Meter</i> +24 V: Pulse 0 V: Not activated	- <i>Optional use</i>  - Load: 3.3 kΩ, 7.3 mA	
X12.3	DI6 <b>Digital Input:</b> <b>Identification Module BM-1 (&gt;=50 Hz)</b> +24 V: IMB Coding (mark) 0 V: IMB Coding (space)	- <b>Must be used:</b> - <i>Connect to Module BM-1, terminal X4.5</i>  - Load: 3.3 kΩ, 7.3 mA	
X10.1	STO-A <b>Digital Input STO (Safe Torque Off), Channel A</b> +24 V: Operation Enable 0 V: Safe Stop	- <b>Must be used:</b> - Enable from contact pair of safety relay - Active if Channel B simultaneously activated - Load: 3.3 kΩ, 7.3 mA	
X10.2	0 V <b>Functional earth for Safe Torque Off</b>	- <b>Must be used</b>	
X10.3	STO-B <b>Digital Input STO (Safe Torque Off), Channel B</b> +24 V: Operation Enable 0 V: Safe Stop	- <b>Must be used:</b> - Enable from contact pair of safety relay - Active if Channel A simultaneously activated - Load: 3.3 kΩ, 7.3 mA	
X14.1 / X14.2	DO1 <b>Relay Output:</b> <b>"Ready" (without fault)</b> Closed: Ready (no fault) Open: No supply, fault or alarm	- Ready (no fault): - Function depends on the following setting: SPECIAL_ADJUSTMENTS_   DATA   DI1 - Max load: AC 230 V / 250 VA	
X14.3 X14.4	DO2 <b>Relay Output with alternative functionality:</b> <b>Single compressor:</b> - <b>Activate VsC1 (Operating)</b> <b>2 or more compressors without rotation:</b> - <b>VsC1 Operating</b> Closed: Operation / Activate Open: Stop, Deactivated	- To control auxiliaries such as: Crankcase heater, Condenser fan, Start unloader  Activate VsC1 - Max load: AC 230 V / 250 VA	
BM-1: X5:1 / X5:2	DO3 <b>Relay Output with alternative functionality:</b> - <b>2 or more compressors:</b> - <b>Activate Compressor FsC2</b> - <b>2 compressors with rotation:</b> - <b>VFSc2 Operating</b> Closed: Operation / Activate Open: Stop, Deactivated	Activate FsC2  - Activate VFSc2  - Max load: AC 230 V / 250 VA	
X13:2	DO4 <b>Relay Output with alternative functionality:</b> - <b>1, 3 or more compressors:</b> - <b>Activate Compressor FsC3</b> Closed: Operation / Activate Open: Stop, Deactivated	- Activate FsC3  - External relay DC 24 V required  - Max load: AC 230 V / 250 VA	
X11.3	AO1 <b>Analog Output with alternative functionality:</b> <b>VfG Condenser fan, actuating value</b> 0...+10 V: 0.0 ... 100.00 %	Function depends on the following setting: <b>SPECIAL_ADJUSTMENTS_   Dt8</b> - Max load: 5 mA	
X11.4	AO2 <b>Analog Output with alternative functionality:</b> <b>P10 V</b> 0...+10 V: 0.0 ... 100.00 %	Function depends on the following setting: <b>SPECIAL_ADJUSTMENTS_   Dt8</b> - Max load: 5 mA	

VsC: Variable-speed Compressor  
FsC: Fixed-speed Compressors  
VFSc: Variable- / Fixed-speed Compressor

VfG: Variable-speed fan group  
(Condenser / Dry cooler)

CONTROL SECTION

## Control and Safety Circuits

### FrigoSoft 1.7 activated: Basic Pressure Control:

The regulations for refrigeration equipment reference the safety standard EN 60204-1 (Safety of machinery - Electrical equipment of machines - Part 1 General requirements).

It is established and proven practice that safety circuits (including pressure-limiting devices) are processed by electromechanical devices such as relays or contactors.

It is not permissible to use standard software-based automation controls (such as PLCs) as these are not functionally fail-safe or a software error can result in dangerous operating conditions.

In an emergency (such as a pressure-limit reached) the Stop Category 0 (immediate removal of power) is appropriate.

Contactors interruption in the energy supply to the compressor is a proven circuit technique for the immediate and safe stopping of compressor motors in an emergency condition.

The integrated Safe Torque-Off (STO) function of this Refrigeration Inverter may be used as an alternative method provided that a bypass contactor is not used. With correct installation a Safety Integrity Level of SIL3 can be achieved.

A typical safety circuit would normally consist of the following:

- Essential safety-relevant devices such as approved over-pressure switches
- Optional devices such as low-pressure switches, oil pressure or level monitoring controls

The safety circuit should terminate at a safety relay with two normally-open contacts wired as follows:

- Two individual or a single common connection from P24 V from the Refrigeration Inverter to the supply side of these two contacts.
- Two independent normally-open contacts dedicated to the Safe-Torque Off function of the refrigeration inverter wired to inputs STO-A and STO-B

The previously described standards and recommendations are general guidelines for the safety-relevant design of the installation.

However it is the installer or contractor's responsibility to assess the risk of each installation and to ensure that all safety measures are appropriate and functional.

#### Functional recommendations

A control switch should be provided with the following functionality:

- |                    |             |   |
|--------------------|-------------|---|
| - Middle position: | <b>OFF</b>  | Controlled STOP of the compressor or compressor rack                                |
| - Right position:  | <b>AUTO</b> | AUTOMATIC controlled operation  |
| - Left position:   | <b>MAN</b>  | MANUAL test or emergency operation without activation of the Refrigeration Inverter |

The normal automatic stopping and starting of the compressor should only be by using the AUTOMATIC (start) command at Digital Input DI1 of the Refrigeration Inverter.

Opening contactors in the input or output of the Refrigeration Inverter during operation must not be used for normal starting or stopping of the compressor as this will stress the Refrigeration Inverter and reduce the working life.

To ensure correct monitoring and fault logging the operating commands should be separate from the safety circuit.

The MANUAL mode of operation should preferably make use of a pump-down pressure switch to enable controlled operation.

It is recommended that control circuit automatically reverts to MANUAL operation if the FrigoPack Refrigeration Inverter is not available. This condition should be signalled to a supervising or warning system.

If in a fault condition no compressor is available, then a means of stopping the evaporation is recommended to minimize the risk of liquid in the suction line should be provided.

#### Example of suitable safety and control circuits

The following simplified overview of the safety and control wiring of a typical system only includes the wiring for AUTOMATIC operation.

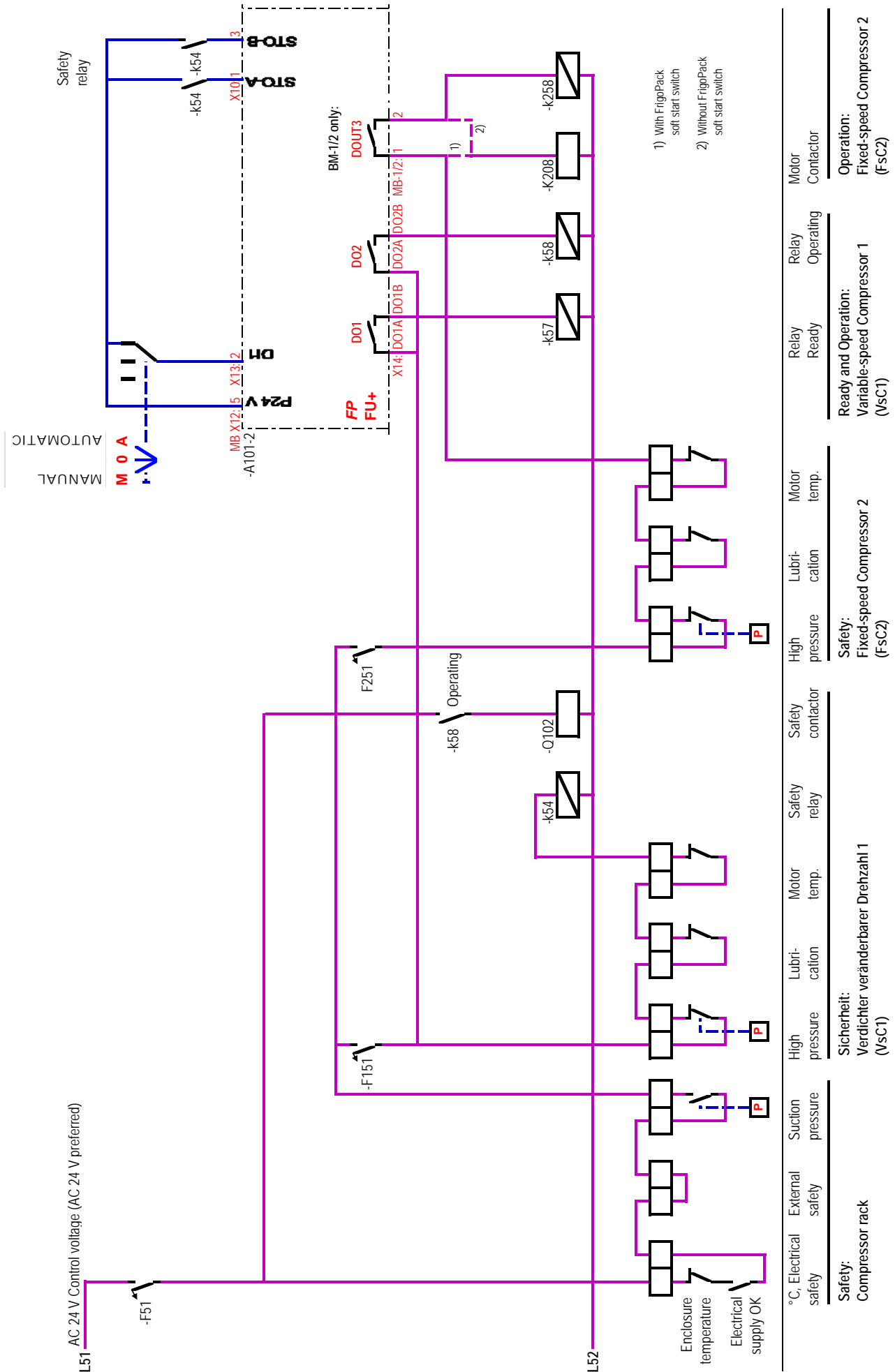
Suggestions for the safety and control wiring with these features are available on request.

Please enquire at your supplier for assistance with the planning of complex systems or systems with special requirements.



# SAFETY CIRCUIT

## FrigoSoft 1.7 activated: Basic Pressure Control:



Component	Function	Operation
°C, Electrical safety	External safety	Compressor rack
Enclosure temperature	Electrical supply OK	
High pressure	Lubrication	Sicherheit: Verdichter veränderbarer Drehzahl 1 (VsC1)
High pressure	Motor temp.	
Safety relay	Safety relay	
Safety contactor	Safety contactor	
High pressure	High pressure	Safety: Fixed-speed Compressor 2 (FSC2)
Lubrication	Lubrication	
Motor temp.	Motor temp.	
Relay Ready	Relay Ready	Ready and Operation: Variable-speed Compressor 1 (VsC1)
Relay Operating	Relay Operating	
Motor Contactor	Motor Contactor	Operation: Fixed-speed Compressor 2 (FSC2)

# FIRST-TIME POWER UP

Mounting and electrical safety:

Ensure that all recommendations in the Product Manual have been adhered to.

UL compliance where appropriate:

Ensure that all recommendations in the Product Manual for UL compliance have been adhered to.

EMC compliance:

Ensure that all recommendations in the Product Manual for EMC compliance have been adhered to.

View Level:

There are three basic view levels selectable in the Wizard (see page 2):

**OPERATOR:**

Available without password as it is not possible to change any settings at this level.

**TECHNICIAN:**

For refrigeration-trained and authorized personnel (Password 8670). This level is sufficient for normal commissioning.

**ENGINEER:**

Special applications and usage (special Super-User password).

Language:

The language selection is only relevant when the 4-line Graphic Key Pad is fitted to the inverter

The following languages can be selected (see page 2):

English, German

(French, Spanish and Italian in preparation)

Refrigeration application:

The following refrigeration applications are automatically selected by fitting the correct Basic Module (auto-detection):

**FrigoSoft® 1.7:** Upper module for pressure transmitters: BM-1 (4 ... 20 mA).

Optional External Modules:

CM-1, EM-6/7.

Pressure transmitters:

This refrigeration application is preset for use with the following pressure transducers:

Industry-Standard 4 ... 20 mA relative (gauge) pressure transmitters:

- pe: -0.5 ... 7.0 bar (-7.25...101.53 psig) A REFR-P-TRANSM-LP7N+PL	- pc: 0...30 bar (0.0...101.5 psig) A REFR-P-TRANSM-HP30N+PL
--	--

For alternative other preset pressure ranges refer to page 6.

**WARNING:** Only use approved pressure transmitters

Recommended basic commissioning steps:

- Verify that the power circuit corresponds to the suggestions on the previous pages 12/13
- In particular ensure that an interlocked safety contactor is fitted between the Refrigeration Inverter and the compressor if a parallel bypass connection is used.
- Verify that the control circuit corresponds to the suggestions on the previous pages 14...16.
- In particular ensure that two isolated contacts of the safety relay are connected to the Safe Torque Off inputs of FrigoPack: STO-A (Terminal X10.1) / STOP-B (Terminal X10.3)
- Remove Start Input: DIN1: X13:2.
- Connect main power supply.
- Verify that the blue LED for Suction Pressure near terminals BM-1: 1 & 2 lights. If not, then check that the wiring to the pressure transmitter is correct
- If a high-pressure pressure transmitter is used, then verify that the red LED near terminals BM-1: 3 & 4 for the high pressure lights. If not, then check that the wiring
- Measure the pressures with a pressure gauge. Verify that the pressure indicated at parameters 03:pe\_\_\_VsC\_pc\_PRESS agree with these external measurements.

# FrigoSoft 1.7 activated: Basic Pressure Control:

## Recommended basic commissioning steps (cont.):

- Set the Refrigerant at the following parameter:  
**FIRST\_SETUP\_\_\_\_\_ | SD-Card:Data\_Select\_\_ |**  
**<1:Refrigerant\_\_\_\_\_**

as described on pages 7,20  
**PRESS SOFTKEY ABOVE LEFT ON KEYPAD TO EXIT**  
**==>DO NOT CONTINUE WITH FOLLOWING UNLESS NEW COMPRESSOR DATA REQUIRED**

PRESS SOFTKEY ABOVE LEFT ON KEYPAD TO EXIT,==>DO NOT CONTINUE WITH FOLLOWING

- Set the Compressor at the following parameter:  
**FIRST\_SETUP\_\_\_\_\_ | SD-Card:Data\_Select\_\_ |**  
**<2:VFsc\_Manufacturrr\_\_\_\_\_**  
**<3:VFsc\_Type\_\_\_\_\_**  
**<4:VFsc\_Cylinders\_\_\_\_\_**  
**<5:Motor\_Voltage\_\_\_\_\_**  
**<6:VFsc\_Compressor\_\_\_\_\_**  
**<<<TO\_ENTER\_DATA>>>**  
 as described on pages 7,20

- Reset to the following starting position (IMPORTANT):  
**FIRST\_SETUP\_\_\_\_\_ | SD-Card:Data\_Select\_\_ |**  
**<0:Selection\_disblD\_\_\_\_\_**

## MULTI-FUNCTIONAL SPECIAL KEYS 'I' & 'O' AND SOFT KEYS

Timed Operation:	Key:	Action:	Explanation:
	<b>I</b>	<b>Reset Inhibit Timer:</b>	<b>Digital Eing. DE1 (start):</b> Only if in View Level <b>Start ==&gt; Stop ==&gt; Start</b> ENGINEER
		<b>Modify ted setpoints to correspond to:</b>	Press Green Key 5 s and release: See page 3: <b>31:ted_SETPOINT_1_____</b>
	<b>O</b>	<b>Reset trip and Autorestart:</b>	Press Red Key 1 s and release
		<b>Stop and LOCAL reset:</b>	Press Red Key 2 s and release  <b>Restart will occur automatically when the inhibit time is expired</b>

FIRST-TIME POWER UP

Timed Operation:	Key:	Action:	Explanation:
	<b>I + O</b>	<b>Interrogate Project Description:</b>	Navigate to Welcome Menu FrigoPack_FU+/12 Press GREEN+RED Key together 2 s and release
		<b>Refrig. Softw., language:</b>	+10 s ↓ /   1-FrigoSft 1.7.2
		<b>File:</b>	+10 s ↓ /   2-FS27_18a_____
		<b>Initials, Date created:</b>	+10 s ↓ /   3-JPG:01.07.2019
		<b>TEST and DEMO Modes:</b>	+10 s ↓ /   4- !TEST-MODE 0!_
		<b>- LOCAL Mode automatic:</b>	Change direction with LEFT / RIGHT keys, see below 4- !TEST-MODE+2!_
		<b>- LOCAL Mode manual:</b>	LEFT / RIGHT keys: Increase or decrease speed 4- !TEST-MODE+1!_
		<b>- Back to Welcome Menu:</b>	+10 s ↑ /  4- !TEST-MODE 0!_
		<b>- TEST / DEMO Mode -1:</b>	Simulated pressure values, uses set compressors 4- !TEST-MODE -1!_
		<b>- TEST / DEMO Mode -2:</b>	Modified pressure values, uses set compressors 4- !TEST-MODE -2!_
		<b>- PROD Mode -3:</b>	Production: shorter times: 4- !TEST-MODE -3!_

**Reset various values:** Press GREEN+RED Key together and hold  
 Refer to SPECIALS | SpJ on page 6:

		<b>Increase LOCAL speed:</b>	Press LEFT Key 1 s and release	<b>+1 Hz</b>
		<b>Reduce LOCAL speed:</b>	Press RIGHT Key 1 s and release	<b>-1 Hz</b>
		<b>Reset to top level:</b>	Press Right Soft Key 5 s and release	

# Setting-up step by step

Starting condition:

SD-Card:Data_Select	<0:Selection_disblD
SD-Card:Data_Read	<NORMAL OPERATION>

05|FS+|01.01a

## 1: REFRIGERANT:

Not available with FrigoSoft 4.7

**STEP 1**

Set Refrigerant selection mode:

SD-Card:Data_Select	
---------------------	--

Modify as follows if necessary:

Select Refrigerant:

SD-Card:Data_Read	<14:R134aHFC
-------------------	--------------

- Forwards

Backwards -

PRESS SOFTKEY ABOVE LEFT ON KEYPAD TO EXIT  
 ==>DO NOT CONTINUE WITH FOLLOWING UNLESS NEW COMPRESSOR DATA REQUIRED

## 2: COMPRESSOR:

**2**

Compressor pre-selections:

Enter and verify compressor data:

2a.



Set Manufacturer selection mode:

SD-Card:Data_Select	<2:VFsc_Manufactur
---------------------	--------------------

Modify as follows if necessary:

Select manufacturer:

SD-Card:Data_Read	<21:BITZER
-------------------	------------

- Forwards

Backwards -

2b.



Set Type selection mode:

SD-Card:Data_Select	<3:VFsc_Type
---------------------	--------------

Modify as follows if necessary:

Select Type:

SD-Card:Data_Read	<32:Recip_Semihermtc
-------------------	----------------------

- Forwards

Backwards -

2c.



Set no of cylinders (0: screw or scroll):

SD-Card:Data_Select	<4:VFsc_Cylinders
---------------------	-------------------

Modify as follows if necessary:

Select no.:

SD-Card:Data_Read	<44:4_cylinders
-------------------	-----------------

- Forwards

Backwards -

2d.



Set Supply voltage:

SD-Card:Data_Select	<5:Motor Voltage
---------------------	------------------

Motor voltage (NOT SUPPLY VOLTAGE):  
 Modify as follows if necessary:

Select supply voltage:

SD-Card:Data_Read	<53:50 Hz 400 V
-------------------	-----------------

- Forwards

Backwards -

2e.



Set Compressor selection mode:

SD-Card:Data_Select	<6:VFsc_Compressor
---------------------	--------------------

Modify as follows if necessary:

Select compressor:

SD-Card:Data_Read	<<2CES-4-40S
-------------------	--------------

- Forwards

Backwards -

2f.

Enter selected data:

SD-Card:Data_Select	<<<TO ENTER DATA>>>
---------------------	---------------------

To activate:

SD-Card:Data_Read	<<<PRESS KEY "   ">>>
-------------------	-----------------------

2a .. 2f

**STEP 2**  
 →4

Select menu:  
 Verify settings:

OPERATION	
25: REFRIGERANT	<14:R134a HFC
60: COMPRESSOR	<6 2CES-4Y

Example compressor

## Expert Overview

Not available with FrigoSoft 4.7

DIAGNOSTICS	
EXPERT OVERVIEW	
OPERATION	

02:ted_RACK_tcd	Y.Y °C YY.Y °C
04:ted_RACK_tcb_Diff	Y.Y K Y.Y K
08:Start_S1-Lm-Cp	YYYY YYYY YYYY
09:VsC_ELECTRICAL	Y.Y Hz Y.Y A

Time Scheduler

Type Value	Explanation	Further inform.
Calculated values	Saturated gas temperatures (dew): Evaporating and Condensing	9.01
Deviations	Temp. Deviations from setpoints: Evaporating and Condensing	9.02
Status values	Right: Seq.-Lmts-CpctyCntrl-Compr Left: ARS--AttmptsLeft-Time to start	9.03
Measured values	Variable-speed Compressor, Motor Frequency and Current	9.04

## Time scheduler

Not available with FrigoSoft 4.7

Under Development

DIAGNOSTICS	
TIME SCHEDULER	
EXPERT OVERVIEW	

Schdl_Wkdy_tcb_tev	YYYY
Hours_Minutes_Seconds	YY:YY:YY

Type Value	Explanation	Further inform.
States	Schdule (15..0)   Weekday (6..0)   tcb   tev	10.01
Time	Hours:Minutes:Seconds	10.02