

QUICK START GUIDE:

Customer:	
Installation:	
Name, Datum:	

FrigoSoft® X.7: Refrigeration Software

- FS 4.7 activated: External Control with 0..10 V / 4..20 mA

View Level	OPERATOR	Operator, End Customer	Monitoring operation	None
Language	TECHNICIAN	Refrigeration technician	Refrigeration Contractor, Installer	Yes
Run Wizard?	ENGINEER	Trained engineer	Special optimization, hotline support	Superuser
	See Page 11:	NO / YES	Resetting to factory settings, loading firmware and application	Yes

OPERATION

FrigoPack FU+ 11	+10V
23 A	400 V
1.9.1	
123.456.789.012	

Alternatives depending on Option Modules fitted:	Operating Mode
+10V BM-1 EM-1 EM-2 EM-3 EM-4 ISES	
Rating of Power Module	
Firmware	
IP address	

DIAGNOSTICS
OPERATION
REFRIGERATION SETUP

06:Spd_VsC_Power_
YYYY/min YY kW

Type	Explanation	Further information
Internal value	Motor: ___/min __. __ kW	Speed, Electrical power

Measured Values
 Variable-speed Compressor (VsC):
 Digital inputs and outputs:

08:Start_S1-Lm-Cc-Cp
YYYY YYYY YYYY

Status values	Right: Sequnc_Limits_CpctyCntrl_Cmpr	Left: ARS AtmptsLeft Time to start	Compressors running	Gray-Code: 0..F
XXXX XXXX XXX 1	VFSc1		Compressors running	Gray-Code: 0..F
XXXX XXXX XXX 2	VFSc2			
XXXX XXXX XXX 4	FsC3			
XXXX XXXX XXX 8	FsC4			
XXXX XXXX XX 1X	FsC5...			
XXXX XXXX X CXX	Capacity Control:	Active		
XXXX XXXX X1/DXX	pc lmt	Active limits		
XXXX XXXX X2/EXX	l lmt			
XXXX XXXX X3/FXX	pc lmt + l lmt			
XXXX XXXX YXXX	0 1 2 3 4 5 6 7 8 9 A B C D E	Sequencing State		
XXXX XYYY XXXX		Time to next start in s		
XXXX YXXX XXXX		Auto Restart: Remaining Attempts		

Frequency Inverter:

09:VsC ELECTRICAL
Y.Y Hz Y.Y A

Measured values	Variable-speed Compressor, Motor Frequency and Current
__._ Hz __._ A	

Performance:

16:Elec Power_Energy
YY.Y kW YY.Y kWh

Calculated values	Compressor Rack: Electrical power and energy
__._ kW __._ kWh	

Digital inputs and outputs:

18:EXT_ACTIVTNG VALUE
YYY.Y % YYY.Y %

Input value	Actuating values:
__._ % __._ %	Left: AI2(0..+10 V), Right: AI1(4..20 mA)

20:OUTPUTS_DIG_INPUTS
YYYY YYYY YYYY YYYY

Status values	Digital outputs and inputs: Bitstrings grouped in nibbles

Refrigerant:

25:REFRIGERANT
<14:R134a

Selected value	Refrigerant (SD-MC card or BEST with PC)
	Selection in: FIRST SETUP ,P. 6

Variable-speed Compressor (VsC):

60:COMPRESSOR
<16 2CES-4Y

Selected value	Compressor (SD-MC card or BEST with PC)
	Selection in: FIRST SETUP ,P. 6

Assistance:

0:OPERATION
OPERATION-Automatic

Internal value	Information on Operating condition

Language:

Language
ENGLISH

Setting	Language Setting

Abbreviations:	
VsC:	Variable-speed Compressor
FsC:	Fixed-speed Compressor
VfSc:	Variable- / Fixed-speed Compressor
VfG:	Variable-speed fan group (Condenser / Dry cooler)
=	YY.Y % : Measured value depending on operating point
→	FFF : Factory default value depending on frame size and rated power

Password for Refrigeration Personnel
 Factory setup: R134a Medium Temperature

IMPORTANT:

The parameters in this menu are only applicable as follows:

oSoft 4.7:

External control
(Actuating Value is a 4...20 mA or 0..+10 V control signal):

The following parameters have been masked
out

REFRIGERATION SETUP
COMPRESSOR SETUP
 SPECIAL ADJUSTMENTS

Menu COMPRESSOR SETUP for setting compressor operation:
 Refrigeration Personnel

Type	Explanation	Further information
Value		

Settings

Variable-speed Compressor (VsC):

Limits:

Resonance avoidance:

Time settings:

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
25.0 Hz

67:VsC SKIP FREQ1 MAX
25.0 Hz

68:VsC SKIP FREQ2 MIN
25.0 Hz

69:VsC SKIP FREQ2 MAX
25.0 Hz

70:VsC tinhibit TIME
300 s

71:VsC tlubrcn TIME
4 s

72:VsC thld fmin TIME
10 s

Setting _____ A VsC Motor current max

CAN ONLY BE CHANGED IF FRIGOPACK FU+ STOPPED FIRST
 Factory preset to maximum continuous Refrigeration Current until a compressor is selected, see page 6/7

Setting _____ Hz VsC Motor frequency max.:
Max. settable value: Dt1, page 4

Setting _____ Hz VsC Motor frequency min.:
Min. settable value: Dt2, page 4

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

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

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

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

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

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

Setting _____ s VsC Restart Inhibit Time after VsC start:
20..1200 s

Setting _____ s VsC Oil Lubrication Pulse time:

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

5.1

5.2

5.3

Modifying

Password for Refrigeration Personnel

COMPRESSOR SETUP

Settings

Operating Mode:

Controllers:

Control Mode:

SD MC Card:

Modifying

<CONTROL

90:VsC Voltage/Freq 8.00 V/Hz

96:START/STOP LEVELS 0000

97:START BULGE 2.0%

99:OPERATING MODE C000

<DATA

Dt0 70.0 Hz

Dt1 25.0 Hz

Dt6 20.0Hz/s 20.0Hz/s

Dt8 DCBA1028

Selectable outputs:

(DO5)	(DO4)	DO3	DO2	AO2	AO1

Settings

- Logic outputs with AO1, AO2 (special ext. relays)

Type	Explanation	Further information
------	-------------	---------------------

Sub-Menu <CONTROL of Optimizing Parameters

Setting	Ratio of Voltage to Frequency, usually; 8.00: 400 V/50 Hz // 4.62: 230 V/50 Hz / 400 V/87 Hz	7.1
Setting	Operation with an external controller:Start / Stop 0000 / 0008	
Setting	Optimization of starting torque: 0.0 ... 5.0 %	7.4
Setting	Defines Operating Mode: Input as hexadecimal	7.6
Special functionality	X1XX Activate Capacity Controller X4XX Stop at fmin after 74:VsC tmon fmin 1XXX Trip reset: DI1 (0->1) / 0XXX->1XXX 2XXX Allow slow stop ramp 0XXX Relay Ready: Safety OK 4XXX DO1 & DI1 (Control Switch) 8XXX & not inhibited CXXX & pe < 39:pe MAXIMUM	

Sub-Menu <DATA of Special Parameters

Setting	VsC: Motor Frequency max. settable 15.0 ... 120.0 Hz	8.1
Setting	VsC: Motor Frequency min. settable 15.0 ... 120.0 Hz	
Setting	Reduce ramp rates above fmin: Acceleration / Deceleration	8.2
Setting	Activations: Functional and Outputs: FFFFFFFF ... 00000000	8.3
XXXX XXX1	Activate Capacity Controller	8.3.1
XXXX XXX2	Activate extended current limit	
XXXX XXX4	Activate pc transmitter monitoring	
XXXX XXX 8	Activate envelope frequency-range limiting	
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	0: 0..+10 V Variable-speed fan Group	8.3.3
XXXX 11XX	1: 0..+10 V Frequency (10 V = fmax)	
XXXX 22XX	2: 0..+10 V Hot-Gas Bypass control	
XXXX 33XX	3: Monitor fmin (see 74:VsC tmon fmin TIME)	
XXXX 44XX	4: Inhibit Sump Heater	
XXXX 55XX	5: More Condens. capacity required (cascade)	
XXXX 66XX	6: Maintenance recommended	
XXXX 77XX	7: Connect supply filter trap	
XXXX 88XX	8: Activate Capacity Control (CC)	
XXXX 99XX	9: Compressor turning / Start lubrication	
AAA AAXX	A: Activate Compressor VFsC1	
BBB BBXX	B: Activate Compressor VFsC2 / FsC2	
CCC CCXX	C: Activate Compressor FsC3	
DDD DDXX	D: Activate Compressor FsC4	
EEE EEXX	E: Activate Expansion Valve	
FFF FFXX	F: Activate Start Unloader and VFsC1	
Setting	SD-MC (Secure Data Memory Card): Revision Designation	8.4

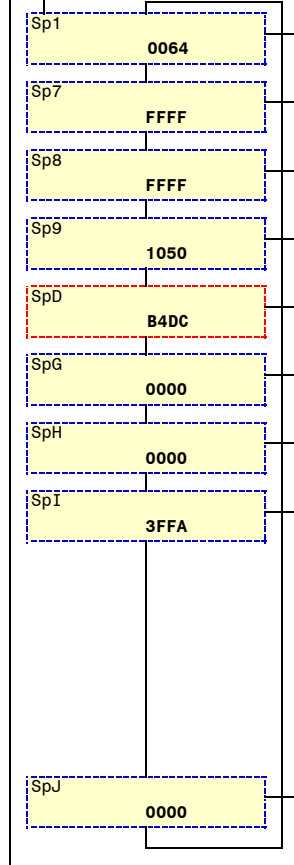
Password for Refrigeration Personnel

<SPECIALS

Sub-Menu <SPECIALS of Expert Parameters

Only change after reference to our Applications Department

- Speed Setpoint Conditioning
- Further Resonance Avoidance
- Sequential Control
- Current Profile
- External Energy Meter
- External input Harmonic Filter
- Other settings
- Resetting values



Setting	Lubricating / Force Frequency: 0064 = 50.0 Hz	9.1
Setting	Further Skip Frequency 3: Frequency, Band	9.7-8
Setting	Further Skip Frequency 4: Frequency, Band	
Setting	RHVAC Sequencing Logic: Start Delay1: 0.1 s, Start Delay2: 0.01 s	9.9-A
Setting TBD	Max. Current as a function of speed: fmax in %, fmin in 10%	9.D
Setting TBD	External Energy Meter: Pulse in kW	9.G
Setting TBD	External input harmonic filter: Activate trap connect	9.H
Setting TBD	LOCAL_Energy Saving_ Flux reduction_Flux characteristic	9.I
Base Voltage:	XXXA F..A.: Max(110%)..Normal(100%)..Min(80%)	
Energy Saving,		
- Max Volt. Reduction:	XXFX F..0: None(100%)..Min(70%)	
- Min. acting freq.:	XFX F: fmin +(0..15 Hz)	
LOCAL Automatic,	0XXX 0.1 Hz / s	
Sweep rate:	1XXX 0.2 Hz / s	
	2XXX 0.5 Hz / s	
	3XXX 1 Hz / s	
	4XXX 2 Hz / s	
	5XXX 5 Hz / s	
6XXX 10 Hz / s		
Setting TBD	Reset of various settings	9.J
Reset Values shown in Menu	XXX0 No reset	
DIAGNOSTICS:	XXX1 CONTROL SCREEN Installation Name	
	XXX2 DIAGNOSTICS VsC equiv. 50 Hz time	
	XXX3 DIAGNOSTICS Fan equiv. 40 °C time	
	XXX4 FAULTS / WARN Trips Accumulated Primes	

SPECIAL ADJUSTMENTS

Modifying

Modifying

Password for Refrigeration Personnel

Password for Refrigeration Personnel with FrigoPack FU+ Training required

Select data from the SD-MC card

SD-MC:Data Select
 <0:Selection disabled

Read data from the SD-MC card

SD-MC:Data Read
 <14:R134aHFC
 <Long_Selectin_List

Value	Explanation	Further
Settings:	One of the following must be activated	0.1, 0.2
<0:Selection disabled	Selection not activated (normal condition)	
<1:Refrigerant	Refrigerant selection	
<2:VFsc Manufacturer	Manufacturer selection	
<3:VFsc Type	Compressor Type selection	
<4:VFsc Cylinders	Compressor number of cylinders	
<5:Supply Voltage	Electrical Supply Voltage	
<6:VFsc Compressor	Compressor selection	

Measured value	Read selected data from SD-MC card
	Selected compressor

KEYS FOR SELECTION:

- Select next data set (short tip >= 0.5 s)
- Select previous data set (short tip >= 0.5 s)

IMPORTANT:

Requirement for Selection:

- SD-MC memory card with valid authorized data plugged into SD slot of the FU+ Refrigeration Inverter:
- The selection parameter SD Data_Selection must be set to:

<0:Selection disabled
 after selection for normal operation

Selectable data from the SD-MC card	SD-MC: Secure Digital - Memory Card
FrigoPack EC / FrigoSoft 4.7: Option	FrigoPack E / FrigoSoft 1.7/ Standard FrigoPack / FrigoSoft 2.7:

FIRST SETUP

REFRIGERANT selection:

<1:Refrigerant	R600, R600a
R134a, R14, R22, R23, R32, R134a, R152a, R170, R227ea, R236fa, R245fa, R290	R717, R723, R744, R1150, R1234yf, R1234ze, R1270
R404A, R407A, R407C, R407F, R410A, R417A, R417B, R422A, R422D, R427A, R434A, R437A, R438A, R442A, R442A, R448A, R449A, R507A, R508A, R508B, R513A,	

VsC Compressor Manufacturer:

<2:VFsc Manufacturer	<20:noname	<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	

VsC Compressor Types:

<3:VFsc Type	<30:notype	<34:Recipopen	<38:ScrewOpen
<31:RecipHermetic	<35:ScrewHermetic	<39:Scroll	
<32:RecipSemihermc	<36:ScrewSemihermc	<3A:Reserve	
<33:Recip2-stage	<37:ScrewCompact		

VsC Number of cylinders with reciprocating compressors:

<4:VFsc Cylinders	<40:Nocylinders	<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)

Supply Voltage at 50/60 Hz:

<5:Supply Voltage	<50:notdefined	<54:50Hz20V	<58:60Hz200V	<5C:60Hz460V
<51:50Hz200V	<55:50Hz500V	<59:60Hz208V	<5D:60Hz575V	
<52:50Hz230V	<56:50Hz690V	<5A:60Hz230V	<5E:60Hz660V	
<53:50Hz400V	<57:50Hztbdv	<5B:60Hz380V	<5F:other	

VsC COMPRESSOR selection: <6:VFsc Compressor
 <No_Data_selected_

Real Time Clock:

Time and Date
 2015/07/04 16:08:51

Setting	Set Time and Date of RTC if module A FU+ CM-1 fitted	0.3

Language:

Language
 ENGLISH

Setting	Set Language	0.4

Installation ID:

Installation Name
 VARIPACK_FU+
 FrigoPack_FU+

Setting	Welcome text in Control Menu: 16 settable characters:	0.5

Selections

Setting-up step by step

Starting condition:

```
SD-MC:Data Select -
<0:Selection disabl
```

```
SD-MC:Data Read -
```

1: REFRIGERANT:

Set Refrigerant selection mode:



```
SD-MC:Data Select -
<1:Refrigerant
```

Modify as follows if necessary:
I - After 1 s on release: +1 Refrigerant

Select Refrigerant:

```
SD-MC:Data Read -
<14:R134aHFC
```

O - After 1 s on release: -1 Refrigerant

2a..d: Compressor pre-selections:

2a. Set Manufacturer selection mode:



```
SD-MC:Data Select -
<2:VFsc Manufacturer
```

Modify if necessary:
I - After 1 s on release: +1 Manufacturer

Select manufacturer:

```
SD-MC:Data Read -
<21:BITZER
```

O - After 1 s on release: -1 Manufacturer

2b. Set Type selection mode:



```
SD-MC:Data Select -
<3:VFsc Type
```

Modify if necessary:
I - After 1 s on release: +1 Type

Select Type:

```
SD-MC:Data Read -
<32:RecipSemihermtc
```

O - After 1 s on release: -1 Type

2c. Set no of cylinders (0 for screw or scroll):



```
SD-MC:Data Select -
<4:VFsc Cylinders
```

Modify if necessary:
I - After 1 s on release: +1 Cylinder

Select no.:

```
SD-MC:Data Read -
<44:4 cylinders
```

O - After 1 s on release: -1 Cylinder

2d. Set Supply voltage:



```
SD-MC:Data Select -
<5:Supply Voltage
```

Modify if necessary:
I - After 1 s on release: +1 Voltage

Select supply voltage:

```
SD-MC:Data Read -
<53:50Hz400V
```

O - After 1 s on release: -1 Voltage

2: COMPRESSOR:

Set Compressor selection mode:



```
SD-MC:Data Select -
<6:VFsc Compressor
```

Select compressor:
I - After 1 s on release: +1 Compressor

Select compressor:

```
SD-MC:Data Read -
<Long_Selectin_List
```

O - After 1 s on release: -1 Compressor

VERY IMPORTANT:
 Reset after completion of steps 1 and 2a...2d:

Reset to starting position:



```
SD-MC:Data Select -
<0:Selection disabl
```

Alternative: Wait 60 s, then automatic reset:

Indication:

```
SD-MC:Data Read -
```

VERIFICATION OF SETTINGS:

Select menu:
 Verify settings:

```
OPERATION -
```

```
25:REFRIGERANT -
<14:R134a HFC
```

```
60:COMPRESSOR -
<6 2CES-4Y
```

Example compressor

Settings

First Trip NONE

Active 1 - 32 XXXXXXXX

Active 33 - 64 000000XX

Warnings 1 - 32 XXXXXXXX

Warnings 33 - 64 000000XX

Recent Trips[] >>

Recent Trips[0]

Recent Trips[1] NONE

Recent Trips[2] NONE

Recent Trips[3] NONE

Recent Trips[3] NONE

Recent Trips[5] NONE

Recent Trips[6] NONE

Recent Trips[7] NONE

Recent Trips[8] NONE

Recent Trips[9]

Recent Trip Times[] >>

Recent Trip Times[0] YYYYYYYY s

Recent Trip Times[1] YYYYYYYY s

Recent Trip Times[2] YYYYYYYY s

Recent Trip Times[3] YYYYYYYY s

Recent Trip Times[4] YYYYYYYY s

Recent Trip Times[5] YYYYYYYY s

Recent Trip Times[6] YYYYYYYY s

Recent Trip Times[7] YYYYYYYY s

Recent Trip Times[8] YYYYYYYY s

Recent Trip Times[9] YYYYYYYY s

Control Board Up Time YYYYYYYY s

AR Restarts remaining YY

AR Time remaining YYYYYY.Y s

COMMON TRIPS YY

Type	Value	Explanation	Further information
Measured value		Trip which caused shut down	10.0
Measured value		Code of active trips (hexadecimal)	
Measured value		Code of active trips (hexadecimal)	
Measured value		Code of active warnings (hexadecimal)	
Measured value		Code of active+ warnings (hexadecimal)	
Menu		Recent Trips Times (last 10)	
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)	
Menu		Recent Trips Times (last 10)	
Measured value	_____ s		
Measured value	_____ s		
Measured value	_____ s		
Measured value	_____ s		
Measured value	_____ s		
Measured value	_____ s		
Measured value	_____ s		
Measured value	_____ s		
Measured value	_____ s		
Measured value	_____ s	Control board powered-up time in s (used to time-stamp trips if no RTC)	
Measured value	_____	Autorestarts remaining	
Measured value	_____ s	Autorestart time remaining until next start attempt	
Measured value	_____	Accumulation of trip prime numbers	

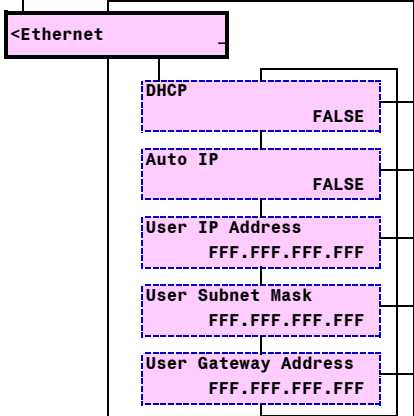
Trips, Diagnosis, Fault Finding

ELECTRICAL → REFRIGERATION ←

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

Menu COMMUNICATION for setting up Communications:
 Trained Refrigeration Personnel

Settings
 Ethernet:

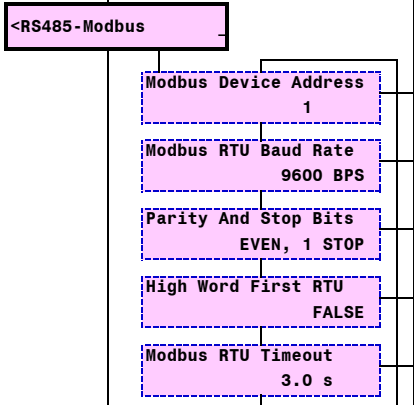


Type	Value	Explanation	Further information
------	-------	-------------	---------------------

Ethernet local area network

Setting	_____	Ethernet local area network	12.1
Setting	_____	Automatic IP generation	
Setting	____.____.____.____	User set IP address	
Setting	____.____.____.____	User set Subnet Mask	
Setting	____.____.____.____	User set Gateway Address	

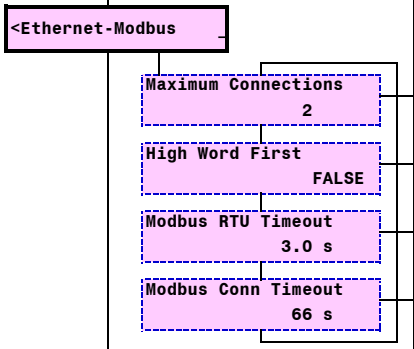
RS485 Modbus RTU:



Modbus RTU RS485 if Module A FU+ CM-1 fitted

Setting	_____	Address	12.2
Setting	_____ BPS	Baud Rate	
Setting	_____	Parity and Stop Bits	
Setting	_____	High-word first (word order in Protocol) for 32-Bit interrogations	
Setting	__._ s	No activity Timeout (Watchdog)	

Ethernet Modbus:

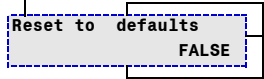


Modbus over Ethernet

Setting	_____	Maximum number of connections	12.2
Setting	_____	High-word first (word order in Protocol) for 32-Bit interrogations	
Setting	__._ s	No Modbus RTU activity Timeout	
Setting	_____ s	No Ethernet Fieldbus activity	

Menu 'Run Wizard?' to reset to factory defaults:
 Trained Refrigeration Personnel

Reset to factory settings:



Type	Value	Explanation	Further information
------	-------	-------------	---------------------

Setting	_____	Reset to factory defaults	13.1
Set to TRUE followed by pressing the central blue key 4 times			

**CAUTION: Reset ALL settings to factory defaults:
 USE WITH GREAT CARE**

Modifying

Password for Refrigeration Personnel

Diagnostics

Sequencing and Limits:

2090_578_2091

SEQUENCING STATES
 YY _ Y

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

LIMITING CONDITIONS
 YYYY YYYY YYYY YYYY

Relative Rack Capacity (volume flow):

Electrical Values:

Temperatures:

Power Module:

Control Module:

Compressor:

Maintenance :

Keypad FU+ PROG required for Diagnosis:

Avg_Rack-Power_Actl
 YYY.Y % Y.YYY %

DC LINK MOTOR
 YYY V YYY V

BASE FRQ POWER
 YY.Y Hz YY.Y kW

Cntrl Modl_Heat Sink
 YY.Y °C YY.Y °C

Power Stack Fitted
 YYYYYYYYYYYYYY

Stack Serial No
 YYYYYYYYYYYYYY

HV SMPS Up Time
 YYYYYYYYYY s

HV Power On Count
 YYYYYYYYYYYYYY

Control Module Serial
 YYYYYYYYYYYYYY

Control Board Up Time
 YYYYYYYYYY s

VsC Serial Number
 YYYYYYYYYYYYYY

Motor Run Time
 YYYYYYYYYY s

Motor start count
 YYYYYYYYYY

VsC equiv 50 Hz time
 YYYYYYYYYY s

Fan equiv 40 °C time
 YYYYYYYYYY s

Type	Explanation	Further information
------	-------------	---------------------

Internal value	Modbus over Ethernet	11.1
Left: 0:Stppd Rdy to Start 1:Start Delay 2:Autotuning 3:Aligning 4:Prefluxing 5:Starting 6:Lubricating 7:Hold at fmin 8:Normal_operation 9:Stopping 10:Stopped, Inhibited 11:Compressor_Heating 12:Local_operation 13:Serial_communicatns	Right: 0:NOT READY TO SWITCH ON 1:SWITCH ON DISABLED 2:READY TO SWITCH ON 3:SWITCHED ON 4:OPERATION ENABLED 5:QUICKSTOP ACTIVE 6:FAULT REACTION ACTIVE 7:FAULTED	

Internal value	Logical conditions: Starting, Limiting	11.1
XXXX XXXX XXXX xxx1	Safety Circuit (STO) Not active (OK)	
XXXX XXXX XXXX xx1X	Refrigeration Inverter Enabled (fault free)	
XXXX XXXX XXXX x1XX	External Module EM1..3 Enable or not present	
XXXX XXXX XXXX 1XXX	ISESCO Enable or not present	
XXXX XXXX xxx1 XXXX	pe >= pe min limit Suction pressure	
XXXX XXXX xx1X XXXX	ted > ted min Evaporating temperature	
XXXX XXXX x1XX XXXX	tod < tod max Discharge temp	
XXXX XXXX 1XXX XXXX	pc << pc max limit Exhaust gas pressure	
XXXX XXXX1 XXXX XXXX	DI1 Start input	
XXXX xx1X XXXX XXXX	ted > ted setpoint/ Force Controller start / DI2	
XXXX x1XX XXXX XXXX	External Module EM1..3 Module start	
XXXX 1XXX XXXX XXXX	Isesco start Isesco start	
xxx1 XXXX XXXX XXXX	External Start Signal AI1 or AI2 > 0.0 V	
xx1X XXXX XXXX XXXX	Compr. Swop active Swop time >= 0 s	

Internal value	Logical conditions: Limiting conditions	11.1
XXXX XXXX XXXX xxx1	tod >= tod max Condensing Temperature	
XXXX XXXX XXXX xx1X	lcmp >= lcmp max Current	
XXXX XXXX XXXX x1XX	LAS, RAS Low Ambient Start	
XXXX XXXX XXXX 1XXX	Reserve Reserve	
XXXX XXXX xxx1 XXXX	td Discharge gas temperature limiting	
XXXX XXXX xx1X XXXX	pl Lubrication Differential pressure	
XXXX XXXX x1XX XXXX	ts Suction Gas Superheat	
XXXX XXXX 1XXX XXXX	td Discharge gas Superheat	
XXXX XXXX1 XXXX XXXX	il Lubrication Overheat	

Measured value	Compressor Rack, Relative Capacity: 30(long) / 7 day(short) average and Actual	11.2
YYY.Y % Y.YYY %		

Calculated values	DC Link and motor voltages	11.2
YYY V YYY V		

Calculated value	Actual Base Frequency _ Motor power	11.2
YY.Y Hz YY.Y kW		

Measured value	Heatsink and Control Module Temperatures	11.3
YY.Y °C YY.Y °C		

Measured value	Power Size Code	11.4
YYYYYYYYYYYYYY		

Measured value	Stack Serial Number	11.4
YYYYYYYYYYYYYY		

Measured value	Switched-Mode Power Supply ON time in s	11.4
YYYYYYYYYY s		

Measured values	Number of times the supply has been connected	11.4
YYYYYYYYYYYYYY		

Measured values	Control Board Serial Number	11.7
YYYYYYYYYYYYYY		

Measured value	Control board powered-up time in s	11.7
YYYYYYYYYY s		

Measured values	VsC Compressor Serial Number	11.5
YYYYYYYYYYYYYY		

Measured values	Compressor ON time in s	11.5
YYYYYYYYYY s		

Measured values	Number of motor starts	11.5
YYYYYYYYYY		

Measured values	VsC Compr. Equiv. 50 Hz remaining operation	11.6
YYYYYYYYYY s		

Measured values	Fan equivalent 40 °C remaining operation (for planned exchange of fans)	11.6
YYYYYYYYYY s		

Password for Refrigeration Personnel
Password for Refrigeration Personnel with FrigoPack FU+ Training reqd



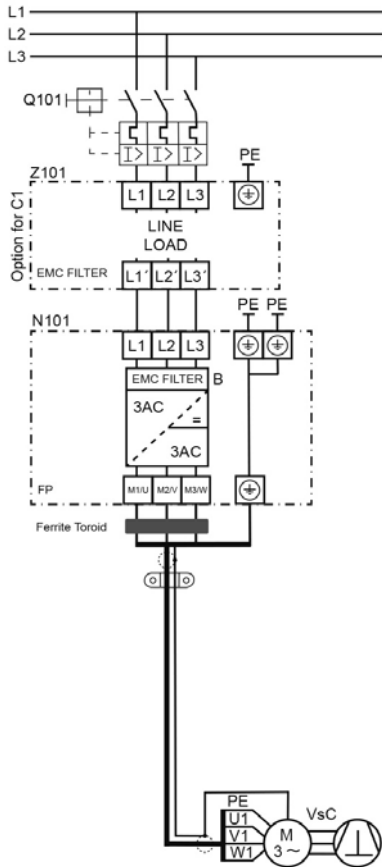
Light Status	Explanation
OFF	Stopping
OFF Flashing	Stopped
ON	Running
Flashing	Auto Start
Flashing OFF	Not Operational
Flashing Flashing	Tripped / Fault
Green then Red Flashing	Tripped / Fault

Übersetzung?

POWER SECTION

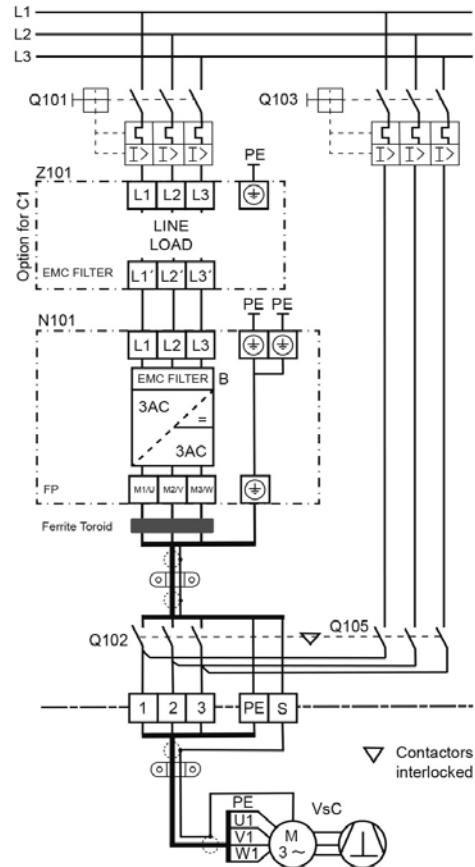
Power connections

QSG12841.1



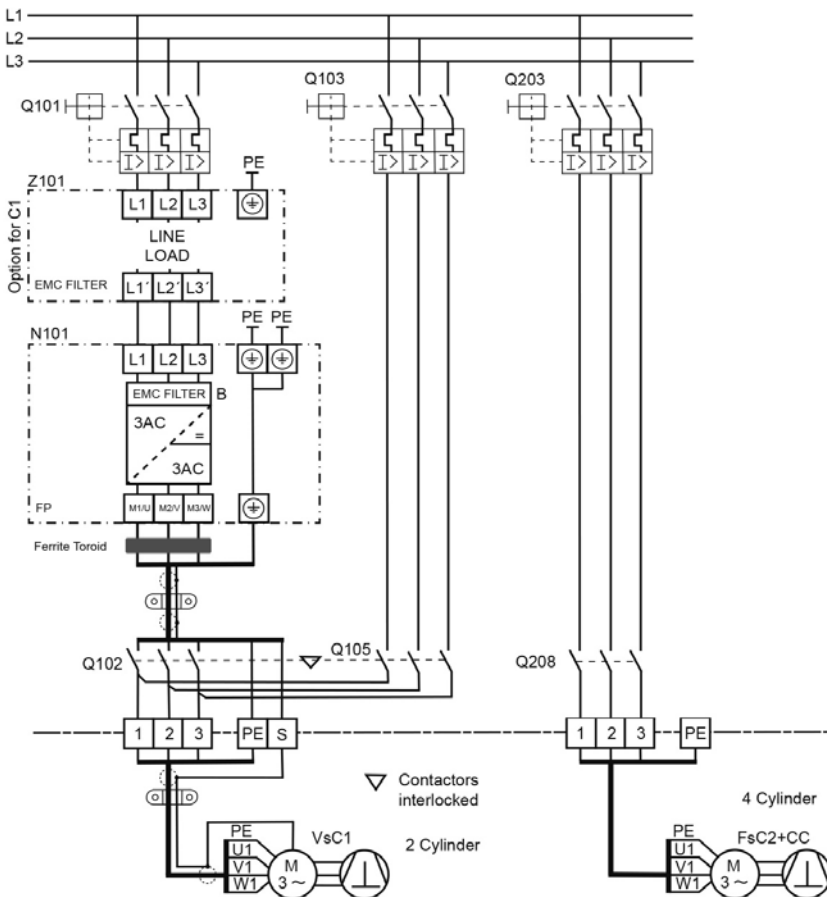
Settings: 80:Fsc PRIORITY CNTRL 00000000 (See page 3)
Dt8: DCBA1028 (See page 4)

Single compressor (basic connection)



Settings: 80:Fsc PRIORITY CNTRL 00000000 (Siehe Seite 3)
Dt8: DCBA1028

Single compressor with bypass for emergency operation

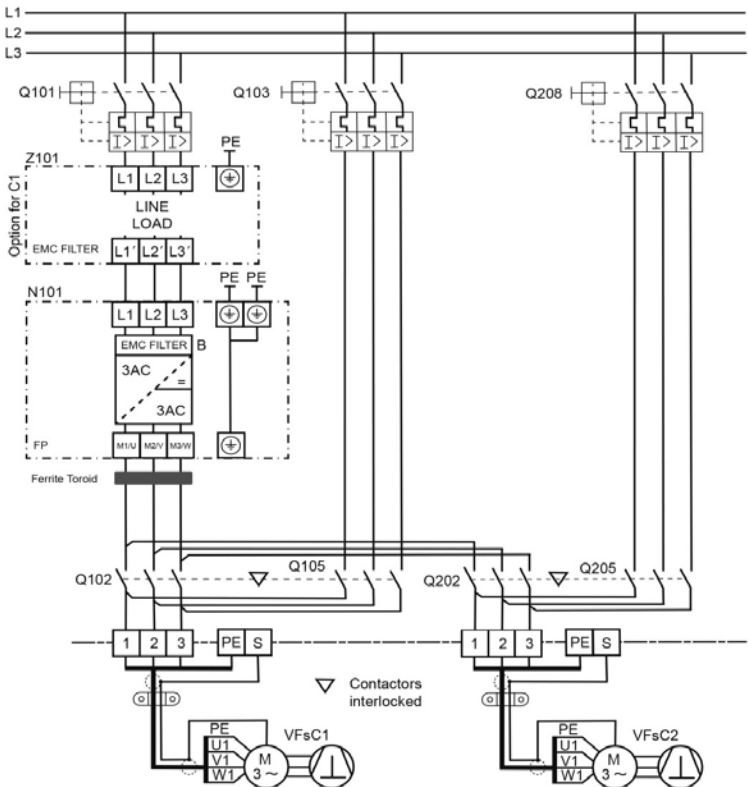


Settings: 80:Fsc PRIORITY CNTRL 00000000 (See page 3)
Dt8: DCBA8028 (See page 4)

Variable-speed compressor with second larger compressor with Capacity Control

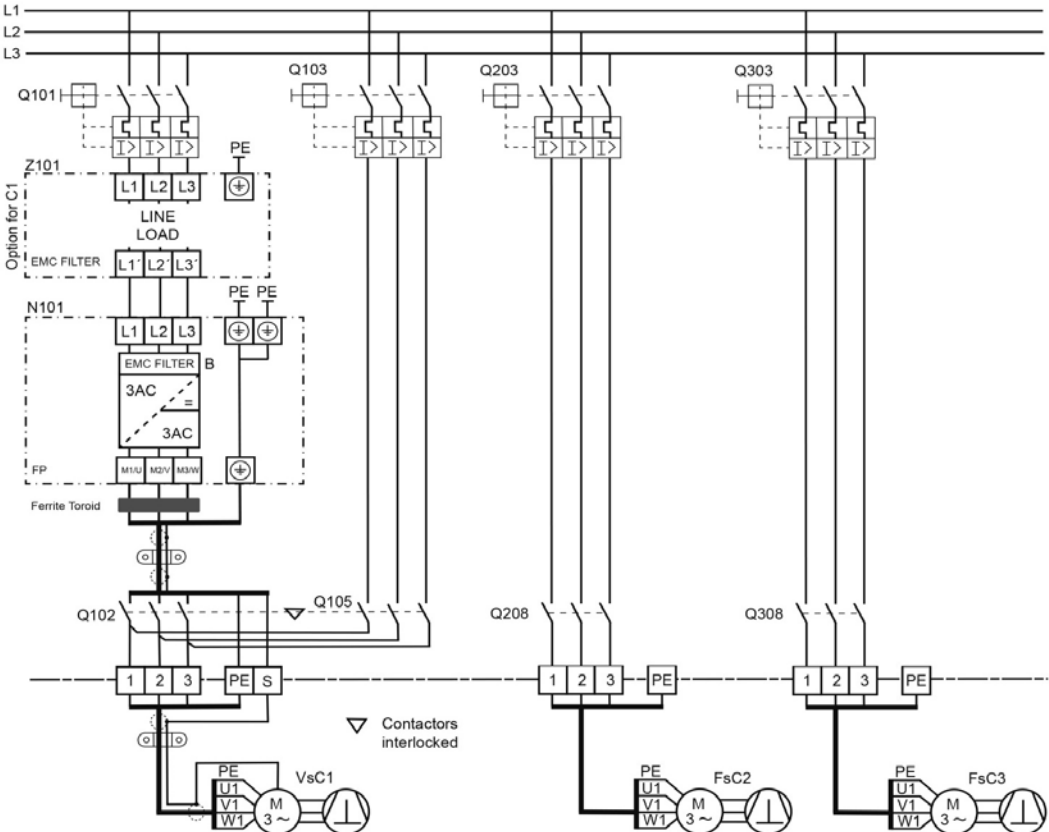
Accessory required: A FU+ DC12V RL/11

POWER SECTION



80:Fsc PRIORITY CNTRL 000000EE / 000000FF
Dt8: DCBA1028

Two compressors, each with bypass and swapping



Three compressors, two Fixed-speed Compressors with swapping

80:Fsc PRIORITY CNTRL: 00000011
Dt8: DCBA1028

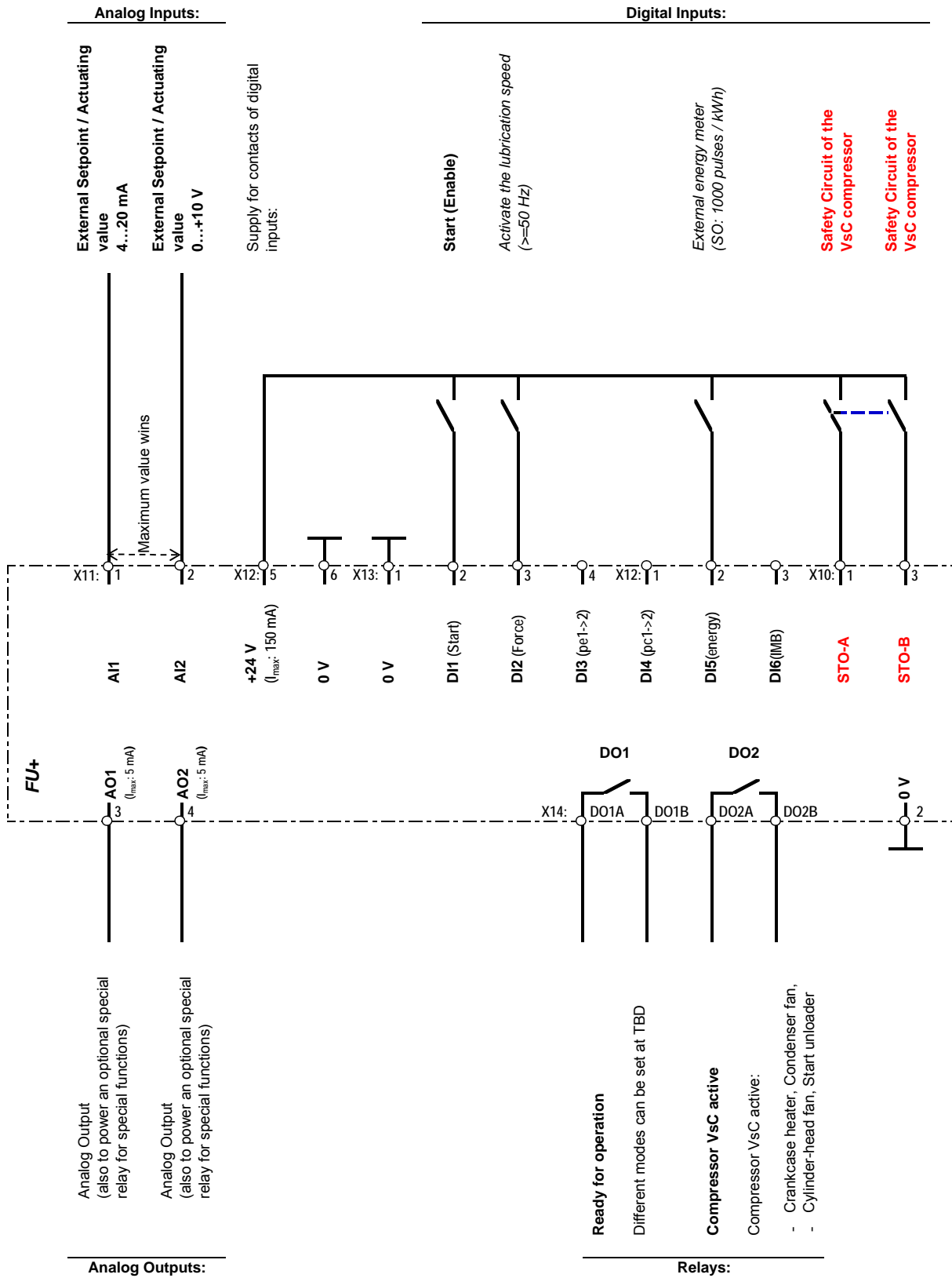
Various other configurations are possible, please enquire

Power terminals

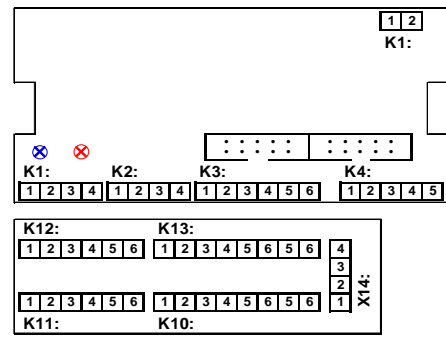
Terminal / Designation	Signal / Function	Explanation	Further information
PE	Protective Earth connection 1 to supply	- Observe all safety and EMC requirements	7.7.1
L1	Three phases of voltage supply	- Ensure that supply voltage agrees with data on name plate	7.7.1
L2			
L3			
PE	Protective Earth connection 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

CONTROL SECTION

Control connections with External Control 4...20 mA or 0...+10 V



VsC: Variable-speed Compressor
(also used as a Fixed-speed Compressor in some connections)



Terminal position:

CONTROL SECTION

Terminal List for control functions with External Control 4...20 mA or 0...+10 V

Terminal / Designation		Signal / Function	Explanation	Further information
X13.1	0 V	Ground for analog signals		
X11.1	AI1	Analog Input: External controller, Speed 4...20 mA 4...20 mA: fmin ... fmax <3.5 mA: Fault	- Alternative usage (largest wins)	
X13.2	AI2	Analog Input: External controller, Speed 0...+10 V 0...+10 V: fmin ... fmax	- Alternative usage (largest wins)	
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		
X13.2	DI1	Digital Input: Start (Enable) +24 V: Start 0 V: Controlled stop	- Must be used:	
X13.3	DI2	<i>Digital Input:</i> <i>Activate Lubrication Speed (50 Hz)</i> +24 V: Lubrication speed 0 V: Normal operation	- Optional use	
X13.4	DI3	<i>Digital Input:</i> <i>Activate Setpoint pe2</i> +24 V: Setpoint pe2 0 V: No action	- Optional use	
X12.1	DI4	<i>Digital Input:</i> <i>Activate Setpoint pc2</i> +24 V: Setpoint pc2 0 V: No action	- Optional use	
X12.2	DI5	<i>Digital Input:</i> <i>Pulses from Energy Meter</i> +24 V: Pulse 0 V: Not activated	- Optional use	
X12.3	DI6	Digital Input: Identification Module B (>=50 Hz) +24 V: IMB Coding (mark) 0 V: IMB Coding (space)	- Must be used: - Connect to Basic Module 1, terminal tbd	
X10.1	STO-A	Digital Input: Not Safe Torque Off, Channel A (>=50 Hz) +24 V: Operation Enable 0 V: Safe Stop	- Must be used: - Enable from contact pair of safety relay - Active if Channel B simultaneously activated - Load: 3.3 kΩ, 7.3 mA	
X10.2	0 V	Ground for Safe Torque Off	- Must be used	
X10.3	STO-B	Digital Input: Not Safe Torque Off, Channel B (>=50 Hz) +24 V: Operation Enable 0 V: Safe Stop	- Must be used: - Enable from contact pair of safety relay - Active if Channel A simultaneously activated - Load: 3.3 kΩ, 7.3 mA	
X14: DO1A / DO1B	DO1	Relay Output: "Ready" (without fault) Closed: Ready (no fault) Open: No supply, fault or alarm	- Ready (no fault): - Function depends on the following setting SPECIAL ADJUSTMENTS _ DATA Dt1 - Max load: AC 230 V / 250 VA	
X14: DO2A / DO2B	DO2	Relay Output: - Single compressor: - VsC1 Operating Closed: Operation / Activate Open: Stop, Deactivated	- To control auxiliaries such as: Crankcase heater, Condenser fan, Start unloader - Max load: AC 230 V / 250 VA	
X11.3	AO1	Analog Output with alternative functionality: Frequency 0...+10 V: 0.0 ... 100.00 %	- Function depends on the following setting: SPECIAL ADJUSTMENTS _ Dt8 - Max load: 5 mA	
X11.4	AO2	Analog Output with alternative functionality: Hot-gas Bypass control 0...+10 V: 0.0 ... 100.00 %	Function depends on the following setting: SPECIAL ADJUSTMENTS _ Dt8 - Max load: 5 mA	

VsC: Variable-speed Compressor
FsC: Fixed-speed Compressor
CC: Capacity Control

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

Control and Safety Circuits

Safety Requirements

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 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: **OFF** Controlled STOP of the compressor or compressor rack
- Right position: **AUTO** AUTOMATIC controlled operation
- Left position: **MAN** 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 signaled 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.

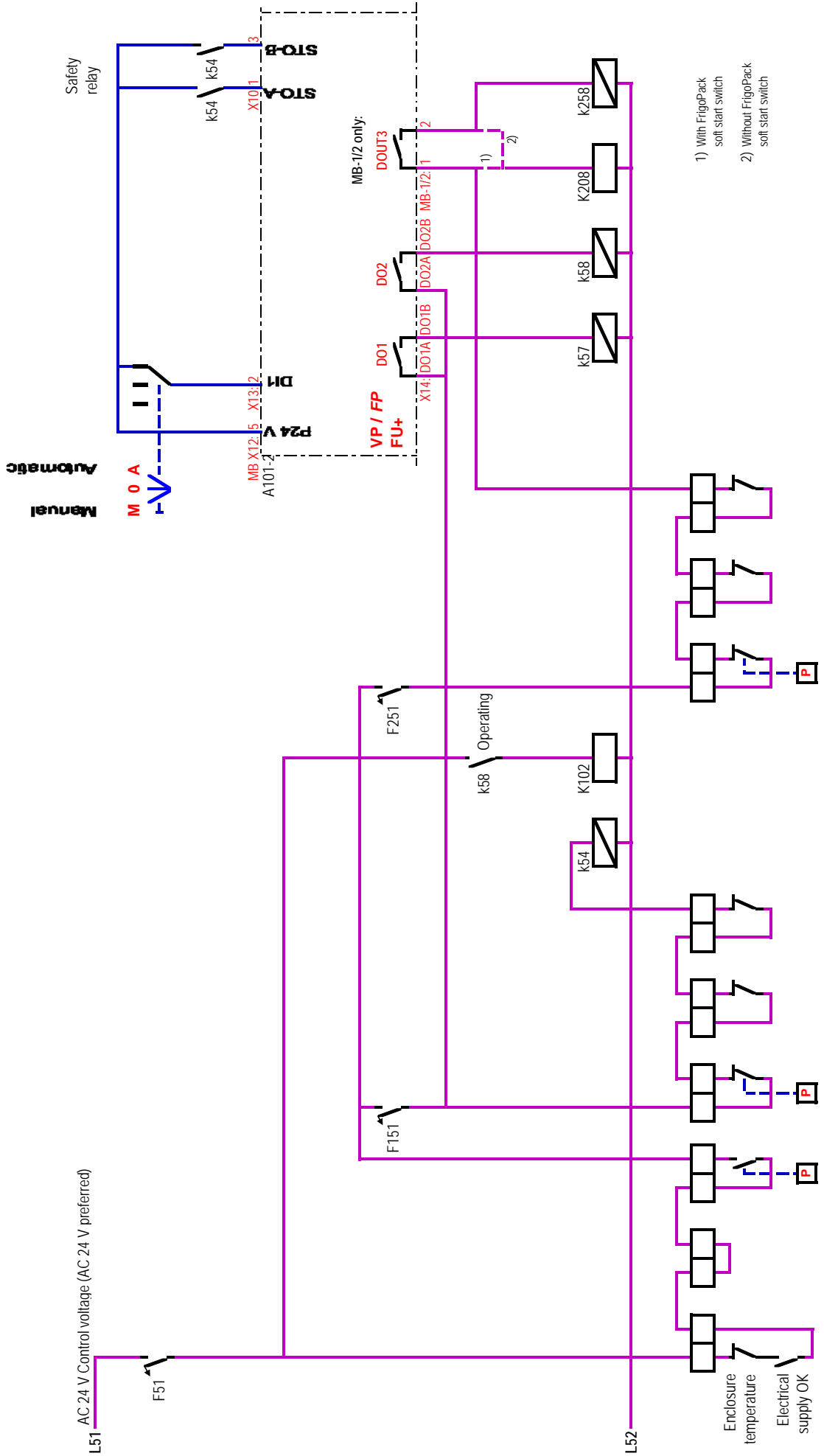
Example of suitable safety and control circuits

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

Standard 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



1) With FrigoPack soft start switch
2) Without FrigoPack soft start switch

°C, Electrical safety	External safety	Suction pressure	High pressure	Lubrication	Motor temp.	Safety relay	Safety contactor	High pressure	Lubrication	Motor temp.	Relay Ready	Relay Operating	Motor Contactor
Compressor rack	Compressor rack	Sicherheit: Verdichter veränderbarer Drehzahl 1 (VsC1)	Sicherheit: Fixed-speed Compressor 2 (F-sC2)			Ready and Operation: Variable-speed Compressor 1 (VsC1)	Operation: Fixed-speed Compressor 2 (F-sC2)						

CONTROL SECTION

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 1):

OPERATOR:

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

TECHNICIAN:

For refrigeration-trained and authorized persons (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 1):

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® 4.7: No upper module fitted.
Operation with an external controller.
The control input can be alternatively
4 ... 20 mA at AI1 or 0 ... +10 V at AI2.
If both are applied then largest input wins control over the refrigeration inverter

Pressure transmitters:

This refrigeration application is designed 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-SENSOR-LP7	- pc: 0...30 bar (0.0...101.5 psig) A REFR-P-SENSOR-HP30
--	--

BITZER-Standard ratiometric absolute pressure transmitters and

- pe: 0.0 ... 13.79 bara (0.0...200.0 psia)	- pc: 0.324...35.487 bara (14.7 ... 514.7 psig)
--	--

Pressure transmitters alone:

34731401	34731402
----------	----------

Cable 6.6 m:

34411553	34411553
----------	----------

Kit: 2x Transmitters + cables, Module BM-2:

34797201	
----------------	--

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 isolating 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) X10:1&3
- Remove Start Command: 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 discharge-pressure transmitter is used, then verify that the red LED near terminals BM-1: 3 & 4 for the discharge pressure lights. If not, then check that the wiring
- Measure the pressures with a refrigeration pressure gauge. Verify that the pressure indicated at parameters 03:pe____VsC_pc_PRESS agree with these external measurements.

Recommended basic commissioning steps:

- Set the Refrigerant at the following parameter:
FIRST SETUP _ | SD-MC:Data Select _ |
 <1:Refrigerant _
 as described in detail on pages 6,7
- Set the Compressor at the following parameter:
FIRST SETUP _ | SD-MC:Data Select _ |
 <2:VFsc Manufacturer _
 <3:VFsc Type _
 <4:VFsc Cylinders _
 <5:Supply Voltage _
 <6:VFsc Compressor _
 as described in detail on pages 6,7
- Reset to the following starting position (VERY IMPORTANT) :
FIRST SETUP _ | SD-MC:Data Select _ |
 <0:Selection disabld

MULTI-FUNCTIONAL SPECIAL KEYS "1" & "0"

Further information tbd

Timed Operation:	Key:	Action:	Amount:
		<ul style="list-style-type: none"> ➔ Increase speed in LOCAL: +1 Hz Reset Inhibit Timer: ➔ SD FIRST-TIME SETUP setup mode (page 6,7): Next set of data. 	
		<ul style="list-style-type: none"> ➔ Reduce speed in LOCAL: -1 Hz Reset trip: ➔ SD FIRST-TIME SETUP setup mode (page 6,7): Previous set of data. 	
		<ul style="list-style-type: none"> ➔ Increase speed in LOCAL: +5 Hz 	
		<ul style="list-style-type: none"> ➔ Reduce speed in LOCAL: -5 Hz <p>Stop and LOCAL reset on reaching fmin Restart will occur automatically when the inhibit time is expired Retains floc 60 s after switching to AUTOMATIC, otherwise revert to floc = fmin</p>	
		<ul style="list-style-type: none"> Stop and LOCAL reset: 	0 Hz
	 + 	<ul style="list-style-type: none"> Start LOCAL operation: fmin With Digital Input DI2, 50 Hz Set LOCAL frequency: 	
		Set LOCAL test ramp:	1 Hz ↑↓ / 2 s
		<ul style="list-style-type: none"> ➔ Modify evaporating temperature setpoints to correspond to: 31:ted SETPOINT 1 _ (see page 2). 	
		➔➔ Reset values:	Refer to SPECIALS SpJ on page 5:

FIRST-TIME POWER UP

OVERVIEW OF MENUS AND INDEX

		Page
	Run Wizard?	1
REFRIGERATION INVERTER MENUS	OPERATION —	Main refrigeration operating parameters (observation only) 1
	REFRIGERATION SETUP —	Refrigeration setup parameters 2
	COMPRESSOR SETUP —	Compressor setup parameters 3
	SPECIAL ADJUSTMENTS —	Three submenus of special adjustments 4/5
		Parameters for optimizing performance and setting mode of operation ..4
		Further parameters for optimizing performance and setting mode of operation ..4
		Parameters for special functionality ..5
	FIRST SETUP —	Refrigerant and Compressor from data on the SD-MC card 6
		Time and Date, Language, Units, Installation Name 6
		Setting-up step by step 6
	FAULTS / WARNINGS —	Faults, Warnings and last 10 Trips with time occurred 8
		Trip Message, Possible Cause, Hints for Fault Finding, Remedies 9
	COMMUNICATION —	Communication protocols 10
		Ethernet ..10
		RS485 Modbus RTU ..10
	Ethernet Modbus ..10	
DIAGNOSTICS —	Diagnostics, monitoring values and serial numbers 10	

POWER SECTION	Power connections:	12-13
	- Single compressor (basic connection)	..12
	- Single compressor with bypass for emergency operation	..12
	- Variable-speed compressor with second larger compressor with Capacity Control	..12
	- Two compressors, each with bypass and swopping	..13
	- Three compressors, two Fixed-speed Compressors with swopping	..13
	Power Terminals	13
CONTROL SECTION	Control connections with External Control 4...20 mA or 0...+10 V	14, 15
	Control and Safety circuits	16-17
FIRST TIME POWER UP	Important information	18-19
MENU MAP AND INDEX	To find important information (this page)	20

Manufacturer	Agent / Partner	Customer	Installation	Name, Date
KIMO RHVAC Controls Ltd German Branch Hüttendorfer Weg 60 D-90768 Fürth, Germany www.frigokimo.com				