ITELCO INDUSTRY

Chiller unit

VLS-VLH-VLC

R 410 A

VLS-VLH-VLC CHILLER - 4 COMPRESSORS

1 GENERAL INFORMATION

1.1 INTRODUCTION

This document contains the information and the operating instructions for VLS-VLH-VLC 4 compressors & electronic control.
This information is for the after-sales service and the production operators, for the end-of-line testing.

1.2 MAIN CHARACTERISTICS

– Microprocessor control
– User-friendly keyboard
– Proportional and integral control of the return water temperature (RWT)
– Hysteresis control of the leaving water temperature (LWT)
– Access code to enter the Manufacturer's Level
– Access code to enter the Assistance Level
– Alarm buzzer and LED
– Backlighted LCD
– Closed-loop condensing pressure control
– Pump-Down logic (start-stop)
– Rotation of the compressor operation
– Oil return function
– Night mode (or Low Noise) control
– Counting of the pump/compressors' hours of operation
– Display of discharge pressure values
– History of stored alarms (option)
– Programming of different setpoints with 4 ranges of time/setpoint.

The following accessories can be also connected:
– Real Time Clock Memory Card: alarm history and programming of different setpoints with ranges of time
– Serial Communication RS485 Card; to connect the ***Chiller Control*** to a BMS network
– Remote Display Terminal
– Wire Remote Control
– Phase monitor kit

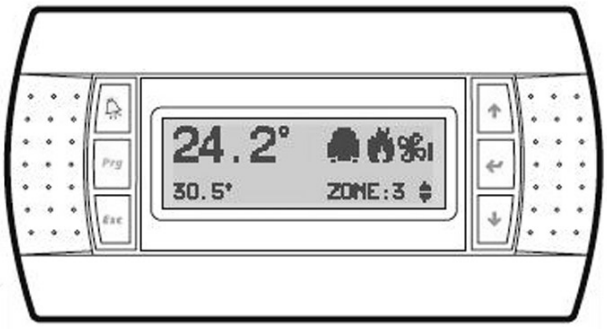
2 CONTROL OF VLS-VLH-VLC WITH 4 COMPRESSORS THE *CHILLER CONTROL* SYSTEM

The VLS-VLH machines with 4 scroll compressors are provided with a microprocessor card which is fully programmed by default for the control of a chiller of cold only type with 2 circuits, 2 compressors per circuit, a high-pressure transducer per circuit. The control system consists of:

2.1 KEYBOARD & DISPLAY TERMINAL

2.1.1 GENERAL INFORMATION

The figure shows the terminal with the front door open.
It is provided with a LCD 4 lines x 20 columns, keyboard and microprocessor-controlled LED's, so as to allow the programming of the control parameters (setpoint, differential bands, alarm thresholds) and the main operations to be carried out by the user.



2.1.2 TERMINAL & KEY BOARD DESCRIPTION

The terminal makes it possible to carry out the following operations:
– the initial configuration of the machine
– the change of all the main operating parameters
– the display of the detected alarms and their acoustic signalling by a "buzzer"
– the display of all the measured quantities

The terminal and the card are connected by a 6-way phone cable.
The connection of the **terminal** to the **basic card** is not essential for the normal operation of the controller.

Prg Access to the “display mask” of the machine status.

Utente
Costruttore
Manutenzione
In/Out

Setpoint
Versione
Fasce orarie

Esc **Esc** key: allows you to move from one mask to another.

Alarm key: used to display the alarms, to reset them in manual
Press it one to display the mask of the activated alarm, press it again to reset the alarm signal.

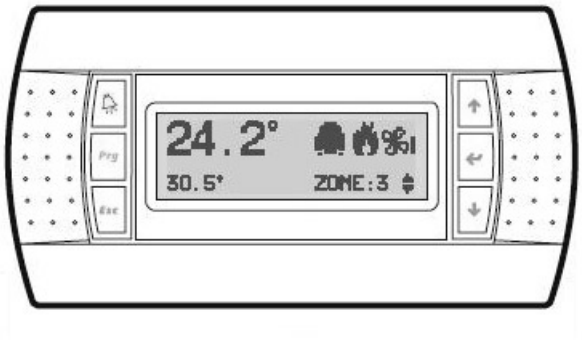
Prg Esc **Prg-Esc** keys: Pressing these keys at the same time,allows you to turn the unit on/off.

Up-Down keys: allows you to set the control parameters' values and to move from one mask to another (not backlighted).

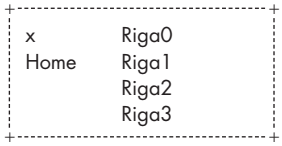
Enter key: used to move the cursor inside the masks and to save the values of the set parameters.

Alarm-Enter keys:Press these keys at the same time to enter the "storical alarm“ after 1’ come back at status machine menu’.

2.2 DISPLAY



The display is an LCD 4 lines x 20 columns. The quantities and the information about the operation of the unit are alternated in the form of subsequent screens, named.



2.3 KEYBOARD

2.3.1 ARROWS KEY - UP/DOWN/ENTER

If the cursor is in the top left-hand corner (Home), press the UP/DOWN keys to access the subsequent masks associated to the selected branch. If a mask includes some value setting fields and you press the ENTER key, the cursor will reach these fields.

Once you have reached the quantity setting field, you can modify any value (within the expected limits) by pressing the UP/DOWN keys.

After you have selected the desired value, press the ENTER key again to store it.

2.3.2 ALARMS 

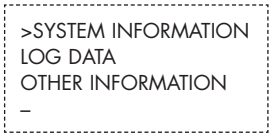
Code	Alarm unit description	Comp Status	Ventil. Status	Pump Status	Aut/Man Reset	Delay	Notes
AL00	Automatic alarm	on	on	on	Aut	0	
AL01	Efficiency alarm CPS	Off	Off	Off	Man	30 sec	
AL02	Flow meter alarm	Off	Off	Off	Man	Parameter	
AL03	Sys 1 High pressure "manual reset"	Off Sys 1	Run	Run	Man	No	
AL04	Sys 2 High pressure "manual reset"	Off Sys 2	Run	Run	Man	No	
AL07	Failure of sensor B3 Sys 1 DP1	Run	Max	Run	Auto	10 sec	
AL08	Failure of sensor B4 Sys 2 DP2	Run	Max	Run	Auto	10 sec	
AL09	Failure of sensor B5 Tair	Run	Max	Run	Auto	10 sec	
AL10	Failure of sensor B6 T LAN	Off	Off	Run	Auto	10 sec	
AL11	Failure of sensor B7 Tin	Off	Off	Run	Auto	10 sec	
AL.12	Failure of sensor B8 Tout	Off	Off	Run	Auto	10 sec	
AL13	Failure of sensor B1 Tcoil1	Run	Run	Run	Auto	10 sec	defrost every 40'
AL14	Failure of sensor B2 Tcoil2	Run	Run	Run	Auto	10 sec	defrost every 40'
AL15	Failure of sensor B3 TANDEM 1	Run	Max	Run	Auto	10 sec	
AL16	Failure of sensor B4 TANDEM 2	Run	Max	Run	Auto	10 sec	
AL17	Maintenance of compressor 1	Run	Run	Run	Man	No	
AL18	Maintenance of compressor 2	Run	Run	Run	Man	No	
AL19	Maintenance of compressor 3	Run	Run	Run	Man	No	
AL20	Maintenance of compressor 4	Run	Run	Run	Man	No	
AL21	Pump maintenance alarm	Off	Off	Off	Man	No	
AL22	Failure of clock card	Run	Run	Run	Man	No	
AL23	Thermal switch, compressor 1	Off Comp. 1	Run	Run	Man	No	
AL23A	Thermal switch, compressor 1	Off Comp. 1	Run	Run	Auto	1 time auto VLS 3 time auto VLH	
AL24	Thermal switch, compressor 2	Off Comp. 2	Run	Run	Man	No	
AL24A	Thermal switch, compressor 2	Off Comp. 2	Run	Run	Auto	1 time auto VLS 3 time auto VLH	
AL25	Thermal switch, compressor 3	Off Comp. 3	Run	Run	Man	No	
AL25A	Thermal switch, compressor 3	Off Comp. 3	Run	Run	Auto	1 time auto VLS 3 time auto VLH	
AL26	Thermal switch, compressor 4	Off Comp. 4	Run	Run	Man	No	
AL26A	Thermal switch, compressor 4	Off Comp. 4	Run	Run	Auto	1 time auto VLS 3 time auto VLH	
AL27	Sys 1 Low pressure	Off Sys 1	Run	Run	Man	Parameter	
AL27A	Sys 1 Low pressure	Off Sys 1	Run	Run	Auto	3 time auto	
AL28	Sys 2 Low pressure	Off Sys 2	Run	Run	Man	Parameter	
AL28A	Sys 2 Low pressure	Off Sys 2	Run	Run	Auto	3 time auto	
AL29	Thermal switch, fans	Off	Off	Run	Man	No	
AL29A	Thermal switch, fans A	Off	Off	Run	Auto	1 time auto	
AL30	Sys 1 Antifreeze alarm	Off Sys 1	Off	Run	Man	No	
AL30A	Sys 1 Antifreeze alarm	Off Sys 1	Off	Run	Auto	1 time auto	
AL32	Espansion off line	Run	Run	Run	Auto	No	
AL33	Eprom failure	Off	Off	Off	Man	No	

Code	Alarm driver description	CIRC 1 - EEV 1 Status	CIRC 2 - EEV 2 Status	Notes
AL34	Eprom failure driver 1	Off	Run	Man
AL35	Eprom failure driver 2	Run	Off	Man
AL36	Cable motor EVV driver 1	Off	On	Man
AL37	Cable motor EVV driver 2	On	Off	Man
AL38	Timeout MOP driver 1	0%	–	Auto
AL39	Timeout MOP driver 2	–	0%	Auto
AL40	Timeout LOP driver 1	100%	–	Auto
AL41	Timeout LOP driver 2	–	100%	Auto
AL42	Low SH driver 1	Run	Run	Auto
AL43	Low SH driver 2	Run	Run	Auto
AL44	Valve open driver 1	Off	Run	Auto
AL45	Valve open driver 2	Run	Off	Auto
AL46	High SH driver 1	Run	Run	Auto
AL47	High SH driver 2	Run	Run	Auto
AL48	Sensor 1 driver 1	Off	Run	Auto
AL49	Sensor 1 driver 2	Run	Off	Auto
AL50	Sensor 2 driver 1	Off	Run	Auto
AL51	Sensor 2 driver 2	Run	Off	Auto
AL52	Sensor 3 driver 1	Off	Run	Auto
AL53	Sensor 3 driver 2	Run	Off	Auto
AL54	GaAhead driver 1	Run	Run	Auto
AL55	GaAhead driver 2	Run	Run	Auto
AL56	Lan driver 1 disconnected	Off	Run	Auto
AL57	Lan driver 2 disconnected	Run	Off	Auto
AL58	Auto set up driver 1	Off	Run	Auto
AL59	Auto set up driver 2	Run	Off	Auto

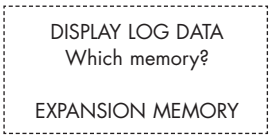
2.3.3 Advanced alarm history file

This is a special function that can be enabled by using a memory expansion board and from a list of variables that has been loaded together with the software. This function will enable the user to record and display some readouts of pre-established parameters at regular intervals or to download the file on a Pc and to display the history file in the Excel format.

To display the advanced history file, press the Alarm and Enter keys at the same time until the mask of the advanced history file appears.

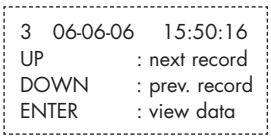


Select the Log Data item and press Enter to confirm. The following mask will require you to select the type of memory you wish to access, i.e. the internal one or the additional one. The additional memory is selected by default. Then press Enter.



Here below select the Log file you wish to display since you can have more than one Log file on the same expansion memory.

After having selected the Log file you wish, the following mask will require you to select the record you wish to display. The latest record will be displayed by default, but you can select an earlier record by using the arrow keys and by pressing the Enter key to confirm.



2.3.4 MAINTENANCE LEVEL

Press the "Prg" key to access the **Maintenance**" masks:

Parameter		Type	Min. Value	Max. Value	Default
N° 0000 **AL 000** **h 00:00** **00/00/00** Setpoint 00,0 °C RWT 00,0 °C					
SYS 1 – comp. 1.	**000000 h**				
SYS 1 – comp. 2.	000000 h				
SYS 2 – comp. 1.	000000 h				
SYS 2 – comp. 2.	000000 h				
Pump	000000 h				
Insert the password 0000					
Offset probe					
T in		°C	-3	3	0
T out		°C	-3	3	0
T P Lan		°C	-3	3	0
T coil 1		°C	-3	3	0
T coil 2		°C	-3	3	0
DP 1		bar	-3	3	0
DP 2		bar	-3	3	0
T.tandem Sys 1		°C	-3	3	0
T.tandem Sys 2		°C	-3	3	0
Maintenance					
Alarm threshold		N (Hours (010x1000)	0	100	10
Reset hours					
Pump		flag	N=NO	Y=YES	N
Compressors		flag	N=NO	Y=YES	N
Disabile compressors					
Driver 1 Manual manAge					
EEV Modality		flag	AUTO	MAN	AUTO
Step		flag	0	2625	
EEV position		flag	0	2625	
Driver 2 Manual manAge					
EEV Modality		flag	AUTO	MAN	AUTO
Step		flag	0	2625	
EEV position		flag	0	2625	
Driver 1 status Nessuna anomalia					
Driver 2 status Nessuna anomalia					
Offset probe driver 1					
S1		bar	-3	3	0
S3		°C	-3	3	0
Offset probe driver 2					
S1		bar	-3	3	0
S3		°C	-3	3	0

2.3.5 PRINTING KEY (NO AVAILABLE)

2.3.6 I/O (INPUT/OUTPUT)

Acronym	Description
Tin	Entering water temperature
Tout	Leaving water temperature
TPLAN	Water temperature plant (Option)
Tair	External air temperature
Tcoil #1	Sensor coil SYS 1 (only HP)
Tcoil #2	Sensor coil SYS 2 (only HP)
DP minore (see note)	
DP #1	Sys 1: discharge pressure transducer
DP #2	Sys 2: discharge pressure transducer
INVERTER FAN %	% FAN SPEED
TEMPERATURE TANDEM SYS #1	Discharge temp tandem sys1
TEMPERATURE TANDEM SYS #2	Discharge temp tandem sys2
DIGITAL INPUT	Input del pCO1
DIGITAL INPUT EXPANSION	Input expansion
DIGITAL OUPUT	
ANALOG OUTPUT	
FAN INVERTER	0-10V to the FSC
Threshold alarm high SH	
Driver 1 Cool EEV Valve position Power required	EEV circuit 1 Status
Driver 2 Cool EEV Valve position Power required	EEV circuit 2 Status
Driver 1 SH Evap.temp Suction temp.	Circuit 1 SH value
Driver 2 SH Evap.temp Suction temp.	Circuit 2 SH value
Driver 1 Evap.pressure Evap.temp Suction temp.	Drive value circuit 1
Driver 2 Evap.pressure Evap.temp Suction temp.	Drive value circuit 2
Ver. Driver 1 Ver. Driver 2	SOFT WARE VERSION EEV 1 SOFT WARE VERSION EEV 2

(Note)

DP roule

IF Tair < 0 °C the fan speed % depend by the minimum value between DP1- DP2

IF Tair > 0 °C the fan speed % depend by the maximum value between DP1- DP2

2.3.7 ANALOG/DIGITAL DESCRIPTION

Analog input pCO1	
n°	Description
B1	Low pressure transducer #1
B2	Low pressure transducer #2
B3	High pressure transducer #1
B4	High pressure transducer #2
B5	Air temperature
B6	T pLAN
B7	Water inlet temperature
B8	Outlet water temperature

Digital output pCO1	
n°	Description
NO1	Compressor #1 circuit #1
NO2	Compressor #2 circuit #1
NO3	Solenoid liquid valve circuit #1
NO4	Compressor #1 circuit #2
NO5	Compressor #2 circuit #2
NO6	Solenoid liquid valve circuit #2
NO7	Antifreezing heater
NO8	Reversing valve
NO9	Fan step 1
NO10	Fan step 2
NO11	Pump
NO12	Alarm circuit # 1
NO13	Alarm circuit # 2

Digital input pCO1	
n°	Description
ID1	Remote On/Off
ID2	Cool/Heat
ID3	Fan thermal
ID4	Compressor thermal #1
ID5	Compressor thermal #2
ID6	Compressor thermal #3
ID7	Compressor thermal #4
ID8	Flow switch
ID9	Step 1
ID10	Step 2
ID11	Step 3
ID12	Step 4
ID13H	High pressure switch # 1 (230V)
ID14H	High pressure switch # 2 (230V)

Analog output pCO1	
n°	Description
Y1	Inverter fan
Y2	
Y3	
Y4	

Analog input t LAN pCOE	
B1	Defrost temperature #1
B2	Defrost temperature #2
B3	Tandem 1 discharge temperature (150 °C)
B4	Tandem 2 discharge temperature (150 °C)

Digital input PCOE t LAN	
ID1	High temperature tandem. 1
ID2	High temperature tandem. 2
ID3	Second Set – Point selection
ID4	

2.3.8 USER LEVEL - SETPOINT

Press the PRG key to enter the Setpoint level, which can be accessed by the user. The parameters that can be set are listed below, together with the limit values and the default values (standard factory set-up).

User parameters	Control mode	Min. Value	Max. Value	Default
Sys #1	–	OFF	ON	OFF
Sys #2	–	OFF	ON	OFF
Unit managment		Cooling	Heating	
Cooling Setpoint	Return	mCS+2	20	10
	Outlet	mCS	20	8
Heating Setpoint	Return	20	MHS-5	40
	Outlet	20	MHS	40
Glycole Setpoint	Return	–15	20	10
	Outlet	–15	20	8
Proportional Band	Return	1	10	5
Neutral Band	Outlet	1	6	2
Language selection	—	ITA / ENG / GER / SPA / FRA		ITA

Where mCS = min. cold limit for the setpoint (see At this level you can select the language of opera-tion Service level) (English or Italian).
French, German and Spanish are Where MHS = max. heat limit for the setpoint (see available with other eproms. Service level)

When the machine is turned on, every single circuit is activated through the SYSTEM # ON/OFF parameters (SET key).

2.3.9 SERVICE LEVEL

Press the "**Prg**" key (correct password 1234) to access the Service Level:

Parameters	Type	Min. Value	Max. Value	Default	
Min. time stop compressor	Sec	10	600	90	
Min.running time compressor	Sec	10	180	90	
Time betw. On same compr.	Sec	10	999	450	
Loading time Between comp.	Sec	10	999	20	
LWT Unloading time compressor	Sec	10	999	20	
ChillerNet	Flag	N=NO	Y=YES	N	
Water temperature control mode	Flag	RWT - P RWT P+I	LWT	RWT P	
RWT P+I	Sec	0	999	600	
LWT Stop Comp					
Cooling	°C	-20	+20	4,5	
Heating	°C	+20	+60	55	
Heat set. comp.	Flag	N=NO	Y=YES	N	
Set point	°C	-999,9	999,9	5.0	
Diff.	°C	-999,9	999,9	10.0	
Max.	°C	-999,9	999,9	5.0	

Parameters	Type	Min. Value	Max. Value	Default	
Cool set.comp.	Flag	N=NO	Y=YES	N	
Set point	°C	-999,9	999,9	24.0	
Diff.	°C	-999,9	999,9	10.0	
Max.	°C	-999,9	999,9	2.0	
Auto restart	Flag	N=NO	Y=YES	N	
Glycole	Flag	N=NO	Y=YES	N	
Enable rotation	Flag	N=NO	Y=YES	YES	
Clock 32 Kbyte	Flag	N=NO	Y=YES	N	
Pump management					
Remote logic Stand-by	Flag	N=NO	Y=YES	N	
Delay stop	hour	1	24	12h	
	Sec	0	60	20	
Flowswitch/Interbloc delay time alarm					
running	Sec	0	99	1	
Start-up	Sec	0	99	10	
Low pressure					
Delay time	Sec	0	99	40	
Fan termal relè alarm					
Delay time	Sec	0	10	2	
Antifreeze					
Limit	°C	-15	10	4	
Diff.	°C	0	99	2	
Antifreeze heater					
Setpoint	°C	-15	10	5	
Diff.	°C	0	99	2	
Condensation type control **(note 2)**	Flag	STEP	FSC	STD: **STEP** LAK: **FSC**	
Delay start fans	Sec	-10	10	0	
LS (low speed) only if STEP					
Setpoint (with peer fans)	°C	-20	0	-10	
Setpoint (with odd fans)	°C	-20	0	-20	
Diff.	°C	0	99	45	
LS (low speed) only if STEP					
HP1	bar	16	28	34	
LP1	bar	10	16	21	
DPSET (only if FSC)	bar	10	24	28	
MINDP **(only if FSC)**	bar	1	25	18	
MIN Speed **(only if FSC)**	Vdc	0	10	0	
MAX Speed **(only if FSC)**	Vdc	0	10	10	
Condensation					
MDP	bar	18	28	37	
High	bar	18	28	40	
Fan step heating					
with odd fans Low	°C	0	99	15	
with peer fans Low	°C	0	99	20	
High	°C	0	99	30	

Parameters	Type	Min. Value	Max. Value	Default	
Defrost mangement					
Start	bar	-20	20	5,5	
Stop	°C	-20	20	10	
Start time	Min	0	99	40	
Max time	Min	1	10	5	
Off tandem	Sec	N=NO	Y=YES	N	
Pump down					
Enable	Flag	N=NO	Y=YES	Y-VLS N-VLH	
Max time	Sec	5	90	10	
Min.cooling setpoint (mCS)	°C	5	12	6	
Max. heating setpoint (MHS)	°C	30	55	45	
Efficiency value	bar	0.0	3.0	0	
Serial Card	Flag	N=NO	Y=YES	N	
On/off remote enabled	Flag	N=NO	Y=YES	N	
Cool/heat remote enabled	Flag	N=NO	Y=YES	N	
Night mode	Flag	N=NO	Y=YES	N	
DPOFFSET	bar	0	8	2	
Cool mode					
TMAX	°C	-20	50	30	
DELTA-V	Volt	0.0	5.0	5	
Heat mode					
T MIN	°C	-20	30	-2	
DELTA V	Volt	0	5	5	
Min.twin air temp.					
Set point	°C	- 20 °C	99,9	- 20°C	
Diff.	°C	0	99,9	0,5	
Set point					
Min.T air	°C	- 20 °C	99,9	00.0	
Low pressure alarme managment					
Eph		0	1	0,5	
LOL		0	1	0,4	
Press key ENTER for reset history	Press the ENTER key to erase the alarm history memory				
Press the key ENTER for default values	**Press the ENTER key to go back default value** **Warning: Carry out this operation whenever the eprom is changed**				
Insert the new service password	1234				

Note 2: Set this parameter to **FSC only if the speed controller is available,** otherwise set it to **STEP.**

2.3.10 MANUFACTURER LEVEL

Press the "**Prg**" key (correct password 4939) to access the Manufacturer Level:
The parameters are available only in Italian.

User parameters	Type	Min. Value	Max. Value	Default
Enter password Manifactured Exact password	0000	0	9999	4939
Unit	Flag	Chiller Heat pump Condensing unit		VLS: **Chiller** VLH: **Heat pump** VLC: **Condensing unit**
Number of compressor per circuit LWT sensor Log	N°	1	2	2
Driver number	N°	1	2	2
Expansion enable	Flag	N=NO	Y=YES	Y=YES
Enable sensor				B1:N B2:N B3:Y B4:Y B5:Y B6:N B7:Y B8:Y
Expansion Enable sensor				B1:Y B2:Y B3:N B4:N
Sensor air	NTC-pt 1000-PTC NTC			
Sensor water in	NTC-pt 1000-PTC NTC			
Sensor water out	NTC-pt 1000-PTC NTC			
Sensor defrost 1-2	NTC-pt 1000-PTC NTC			
Analog inputs	Range 0-5 V			
High pressure DP		Start 0 Bar	End 45 Bar	
Liquid solenoid valve	Flag	N=NO	Y=YES	N
Cycle rev. valve	Flag	NA	NC	NA
Hour autoreset numbers				
LP 1 alarm	N°	0	99	3
LP 2 alarm	N°	0	99	3
Term.comp 1	N°	0	99	1 VLS-VLC 3 VLH
Term.comp 2	N°	0	99	1 VLS-VLC 3 VLH
Term.comp 3	N°	0	99	1 VLS-VLC 3 VLH
Term.comp 4	N°	0	99	1 VLS-VLC 3 VLH
Term.fan	N°	0	99	1
Antifreezing	N°	0	99	0
T air range Transduce type	°C			0
	diff			0
Klixon reset tandem discharge time				
SYS 1	min	0	99	3 '
SYS 2	min	0	99	3 '
Gas Type R410c				
Only Cooling version				
Max TIN				
threshold	°C	0	99	25
diff	°C	0	99	1
Push the ENTER key to the driver configuration				
Push the ENTER key to initialize the unit	Warning Carry out this operation whenever download new software			
Set the new manufacturer's password.....	0000			

DRIVER CONFIGURATION EXPANSION VALVE

Configuration type	Type	Min. Value	Max. Value	Default
Type EVD		EVD 400 PLAN	EVD 400 TLAN	400 TLAN
Sensor type EVD			Sheat NTC – P (RAZ) NTC>S3 P (RAZ) >S1 PT 1000-P NTC-NTC	Sheat NTC –P (RAZ)
Type valve 2625 step			ALCO EX 5 ALCO EX 6 ALCO EX 7 ALCO EX8 SPORLAN 0.5-20 TONS SPORLAN 25-30 TONS SPORLAN 50-250 TONS CAREL EV2 **P CAREL EV2 **A DANFOSS ETS 25 AST-g DANFOSS ETS 50 AST-g DANFOSS ETS 100 AST-g	**VLS 504 TO 704** Danfoss ETS 25 AST-g **VLS 804 TO 1204** Danfoss ETS 50 AST-g
Refrigerant			R 22 R 744 R 717 R 600 R 290 R 507c R 410 a R 407 c R 404 a R 134 a	**R 410 a**
Conf. valve				
Step min		0	8100	0
Step max		0	8100	0
Step closure		0	8100	0
Conf. valve				
Extra open		Y	Y	N
Extra closing		Y	Y	N
Conf. valve				
Amp mov.	mA	0	1000	0
Amp stop	mA	0	1000	0
Conf. valve				
Frequence	HZ	32	501	32
Duty cycle	%	0	100	0
Step in stand by EEV				
EEV position		0	2625	0
	%	0	100	0
Limit sensor S1				
Min	Bar	-9,9	99,9	0
Max	Bar	0	99,9	15
Delay alarms				
Low SH	sec	0	3600	0
High SH	min	0	500	0
LOP	sec	0	3600	0
MOP	sec	0	3600	0
Sensor	sec	0	999	10

DRIVER CONFIGURATION EXPANSION VALVE

Configuration type	Type	Min. Value	Max. Value	Default
CH-Proportional	°C	2	50	10 ETS 25 25 ETS 50
CH Integral time	sec	0	999	30 ETS 25 60 ETS 50
CH SH set	°C			5
CH Low SH	°C	- 4	21	2
HP % open EEV	%	0	100	60%
HP-Proportional	°C	0	99,9	20 ETS 25 10 ETS 50
HP integral time	sec	0	999	70 ETS 25 90 ETS 50
HP - set SH	°C	2	50	5,5
HP low SH	°C	-4	21	4,5
DF % open EEV	%	0	100	60%
DF-Proportional		0	99,9	20
DF integral time	sec	0	999	60
DF - set SH	°C	2	50	5
DF - low SH	°C	-4	21	3
SH dead band	°C	0	9,9	0,3
Derivation time	sec	0	99,9	20
Low SH integral time	sec	0	30	1
LOP integral time	sec	0	25,5	0
MOP integral time	sec	0	25,5	10
LOP integral time	sec	0	500	60
Proportional dynamic control		Y	N	Y
Blockage control EEV	sec	0	999	0
High condensation temperature alarm	°C	0	99,9	0
Integration time temperature condensation	sec	0	25,5	0
Start Open percentage	%	0	100	60%
Unit compressor		Scroll Screw		Scroll
Capacity		N0/steeps		NO/STEEPS
Evaporator type				
Cooling				exchanger/pipes
Heat pump				exchanger/pipes
Minimum saturation temperature				
Cooling	°C	-50	90	-10
Heating	°C	-50	90	-25
Defrost	°C	-50	90	-25
Maximum saturation temperature				
Cooling	°C	-50	90	15
Heating	°C	-50	90	15
Defrost	°C	-50	90	10
Threshold alarm high SH	°C	0	100	30

3 CONDENSING VERSION

1. Disables the Tin and Tout B7 and B8 water probes
2. Access the manufacturer menu 4939, in the following mask set up the type of unit: Chiller → Heatpump → **CONDENSING**

```
Chiller Unit .....
Number compressors
per circuit .....2
Number driver     2
```

```
CONDENSING Unit .....
Number compressors
per circuit .....2
Number driver     2
```

4 COPY FROM A PROGRAMMING KEY TO PCO1

The programming key will enable the operator to copy an application programme from a pCO1 or to a pCO1, with all the values setup at the time of copying.

To copy an application programme from or to a key.

– Disconnect the machine
– Connect the pCO1 key with the board by means of a jack
– Supply the machine and wait for the arrow symbols to stop blinking
– Press the MODE key on the key to decide whether the application programme must be copied on the pCO1 board (arrow up on) or on the key (arrow down on) and press the START key
– Wait for the process to come to an end, which will be signalled by a 2-second intermittent sound.

Procedure after Pico1 change

1. Check if address board is already fitted on pCO board, if not add it (look at "clock" labelled socket on pCO) and set only dip1 to ON.
2. Check if terminal display is addressed with (dip1,2,3,4 = ON).
3. Replace the eprom with a new one.
4. Power on the control pressing in the same time both arrow keys and enter until.

```
Display address
Setting.....: 32
I/O Board address:–
```

Use ARROWS and to set the address at 00.

```
Display address
Setting.....: 00
I/O Board address:–
```

Power off the machine.

Press the keys Alarm and arrow up at the same time and hold them down. Power on the machine. Hold the keys down until the pCO1 addressing mask appears. Set the address to a value from 1 to 8.

```
pLAN address:    1
UP:          increase
DOWN:        decrease
ENTER:       save & exit
```

Power off the machine.

Repeat the procedure intended to address the terminal by assigning 32 as an address. Press Enter. Type the pCO1 address you have just set and press Enter.

```
Terminal config

Press ENTER
to continue
```

In the following mask, please confirm address 32 once again and define it as PR. In the other fields set NONE and press ENTER until you are required to save the setup.

Select YES and press Enter.

Check the addresses and press ENTER:

```
P:01  ADR   Priv/Shared
Trm1  32    Pr
Trm2  None  –
Trm3  None  – Ok? Yes
```

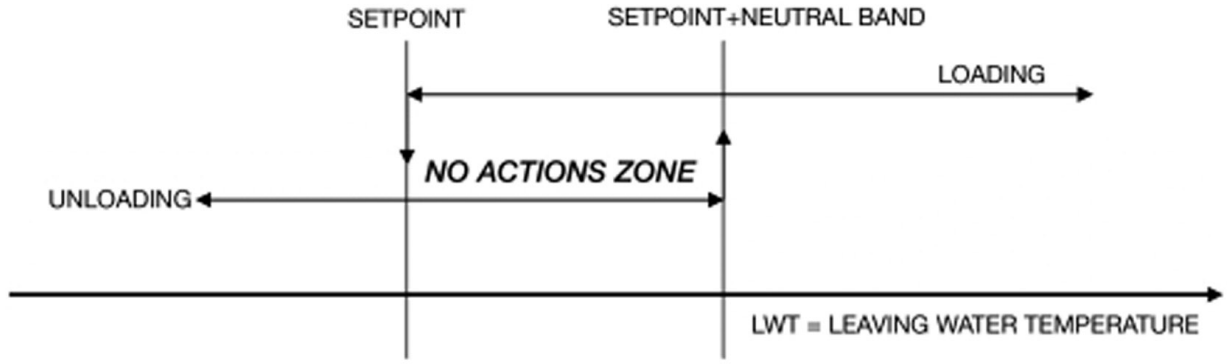
5 COMPRESSORS LEAVING LIQUID CONTROL (COOLING MODE)

If Leaving Control mode is selected, the leaving mixed water temperature LWT will be controlled between the setpoint and the setpoint + Neutral Band. The SetPoint High Limit is the Setpoint plus the Neutral Band. The SetPoint Low Limit is the Setpoint.

If the mixed leaving water temperature LWT is above the SetPoint High Limit, the compressors will be energized one by one separated by the Time between Start and Start different compressors.

If the LWT falls below the SetPoint High Limit and greater than the SetPoint Low Limit, temp is in the Neutral Band. No actions is occurring. No load and no unloading.

If the LWT falls below the SetPoint one compressor is switched off. Until the LWT is below the Setpoint, compressors are unloaded according to the Unload time parameter value.



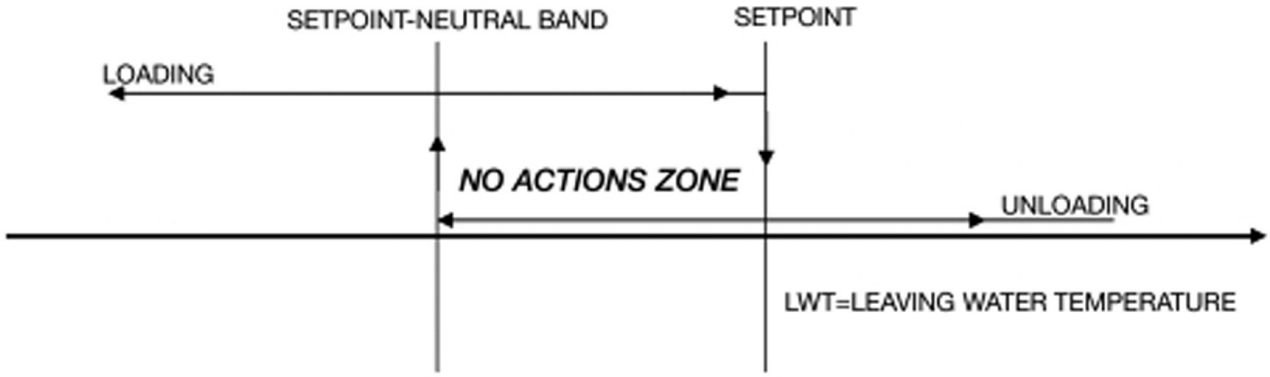
6 COMPRESSORS LEAVING LIQUID CONTROL (HEATING MODE)

If Leaving Control mode is selected, the leaving mixed water temperature LWT will be controlled between the setpoint and the setpoint - Neutral Band. The SetPoint High Limit is the Setpoint. The SetPoint Low Limit is the Setpoint – Neutral Band.

If the mixed leaving water temperature LWT is below the SetPoint Low Limit, the compressors will be energized one by one separated by the Time between Start and Start different compressors.

If the LWT is between the SetPoint Low Limit and the SetPoint High Limit, temp is in the Neutral Band. No actions is occurring. No load and no unloading.

If the LWT is above the SetPoint High Limit one compressor is switched off. Until the LWT is above the Setpoint High Limit, compressors are unloaded according to the Unload time parameter value.



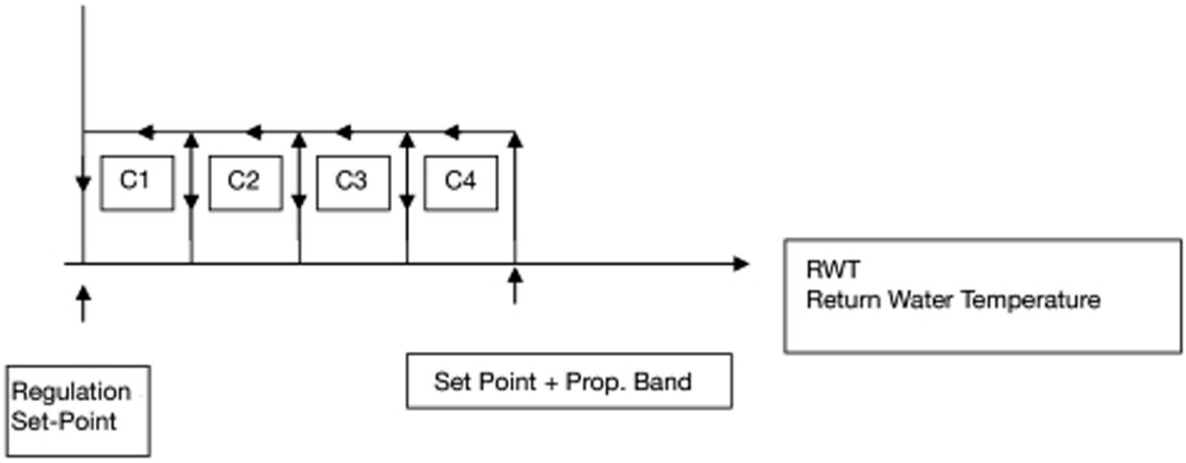
7 COMPRESSORS RETURN LIQUID CONTROL (COOLING MODE)

If Return Control Mode is selected, the return water temperature RWT is controlled between the Setpoint and the Setpoint + Proportional Band. We call this zone: the Loading Zone.

All stages, 2 or 4 compressors, are placed in the proportional band, dividing it in the number of the compressors.

If the RWT is above the Sepoint, control starts to load each stages. The higher is the RWT, the more compressors will be loaded, according to the compressor activity logic, timer and rules described.

Example: regulation diagram for machines with max. 4 compressors:



All the unit compressors will be proportionally positioned in the band called Loading Zone.

8 COMPRESSORS RETURN LIQUID CONTROL (HEATING MODE)

The compressors are loaded in the same proportional way used in Return Control in Cooling.

The difference is that the loading zone is between Set Point – Proportional Band and Set Point.

9 CONDENSER FAN CONTROL (IN COOLING MODE WITH FAN SPEED CONTROL)

Parameter used: Minimum Fan Speed, Max Fan Speed, Discharge Pressure Set (DPSET), Max Discharge Pressure, MINDP, Condensation type Control (STEP or FSC).

Control uses one digital output to power on one fans relay and an analogue output 0-10Vdc to drive a Fan Speed Controller (FSC). The fans try to maintain a constant condenser pressure equal to the programmed set point by varying fan speed.

As soon as the first compressor starts, the fan relay will turn on, and it will stay on until the all compressors turn off. For the first 10 seconds the fans will begin at an output level proportional to the ambient temperature. The hotter it is out, the faster the fans will start. Below is a chart showing the correlation.

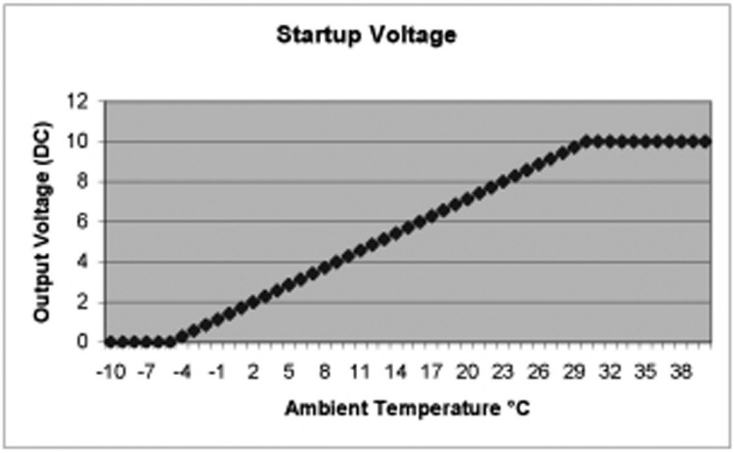


Table 1 – Startup Fan Values

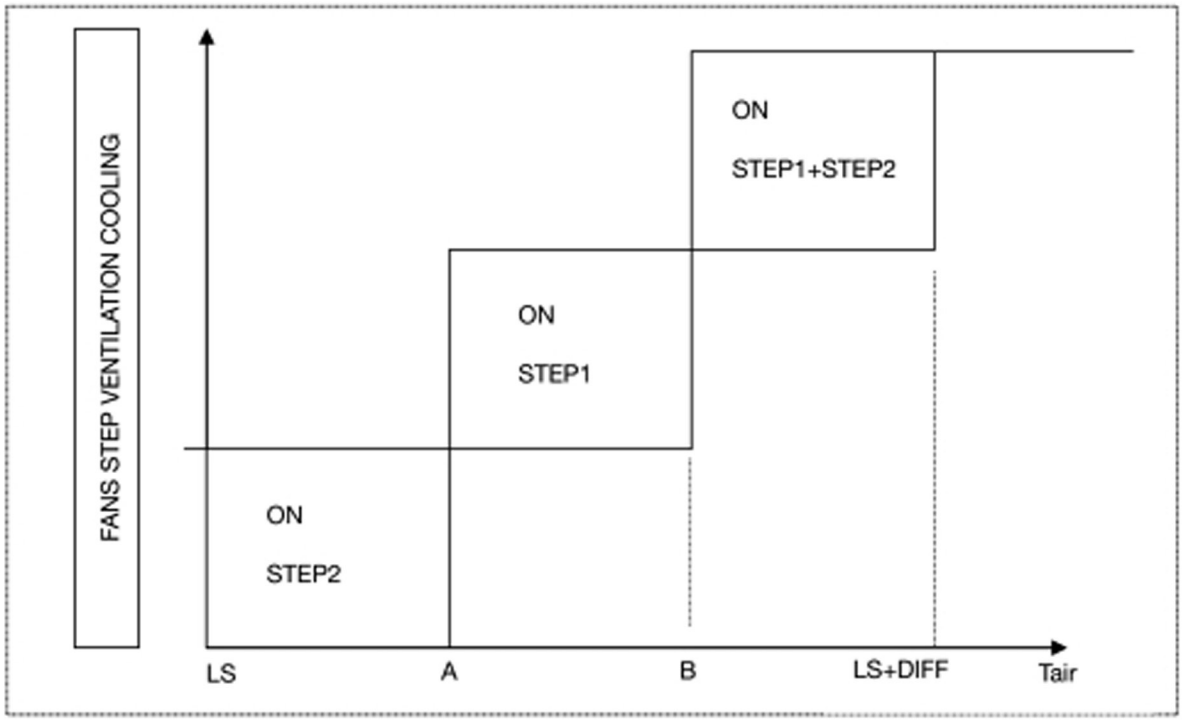
There is one high pressure transducer each system. If only one compressor is running, the fans control to its discharge pressure. If two compressors are running, the fans control the pressure of the 1st system started, or the one which is running at 100% capacity if the other one is running at lower capacity as long as neither pressure exceeds the maximum discharge pressure.

Once on, the fan speed is recalculated every second according to the below basic rules:

If DPSET-1 < DP < DPSET+1 then no change in AO
If (DPSET+1 < DP < DPSET+2) AND (DP IS NOT DECREASING) then AO = AO + 1%
If (DP > DPSET + 2) AND (DP IS NOT DECREASING) then AO = AO + 5%
If (DPSET-2 < DP < DPSET-1) AND (DP IS NOT INCREASING) then AO = AO -1%
If (DPSET-2 < DP < 10.5) AND (DP IS NOT INCREASING) then AO = AO -2%
If (DP < MINDP) then AO = AO - 2%
To check if DP is increasing or decreasing, value DDP = ± 0.2 bar/sec is used.

10 CONDENSER FAN CONTROL (COOLING MODE) IN STEP

The fan step control is managed by the parameters LP1-HP1-LS-Diff
The fans start under sensor air (B4) control OAT
During the fans running :
If DP>HP1 one step is load independent by OAT value
If DP<LP1 unloaded the step
DP is the leader between the two transducers



LS - Default = Peer fans -10°C Odd fans -20°C
DIFF - Default = Peer/Odd 45°C
HP1 - Default = 21 bar (R410C) 14 bar (R134A)
LP1 - Default = 13 bar (R410C) 7 bar (R134A)

11 CONSENSER FAN CONTROL IN HEATING MODE WITH FSC

Two parameters used: Low Air Temp Heating and High Air Temp Heating.

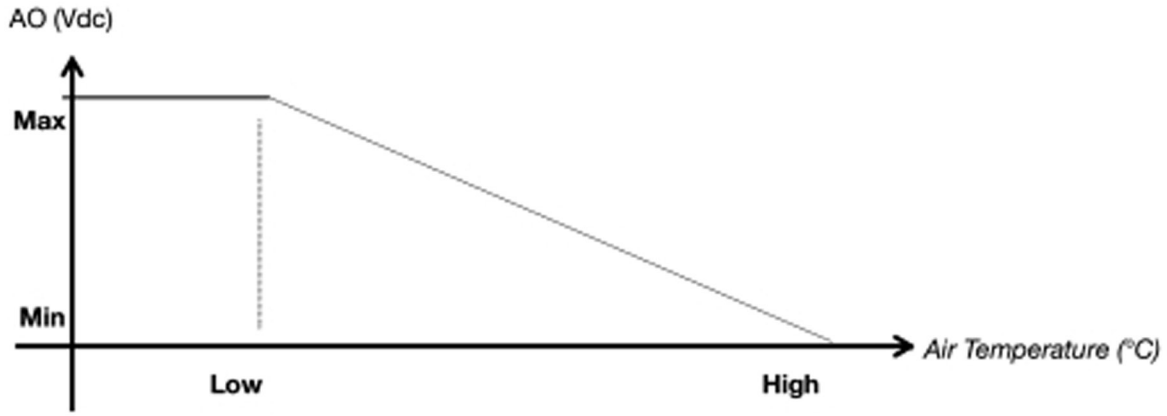
If the Tair probe is installed, fan control in heat pump mode is always based on ambient temperature and not pressure. At unit startup, the fans will run for 3 seconds at max speed before the compressor starts.

After startup, the fans will run according to the following rule:

If Tair < Low Air Temp Heating then AO = Max Fan Speed

If Low Air Temp Cooling < Tair < High Air Temp Cooling then AO from Max to Min with linear progression

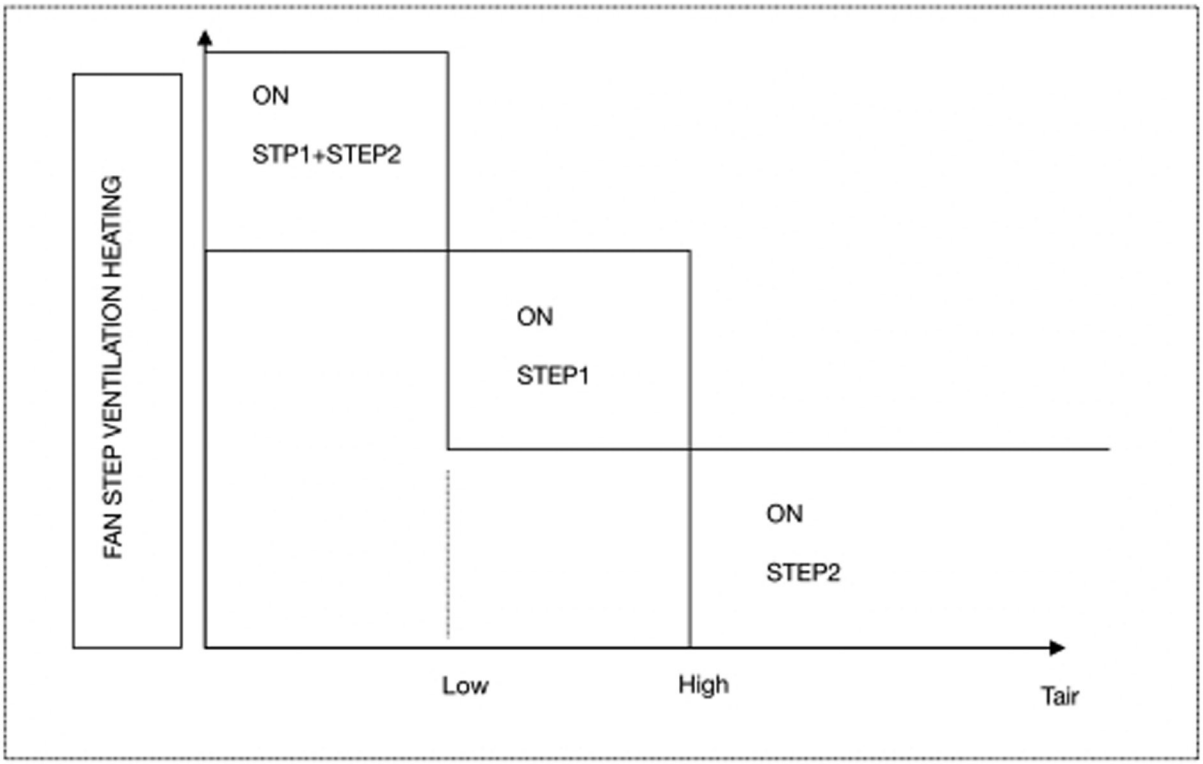
If Tair > High Air Temp Heating then AO = Min Fan Speed



If Air Temp Probe (B4) isn't installed, the Analogue Output is forced to the 10 Vdc value. The Fan relay is energized whenever at least one compressor is running.

If High pressure transducer are installed, during the defrost cycle, the fans will turn on at 20 Bar and run at 50%. AO = 5 Vdc. The fans will stay on until the higher discharge pressure drops to 15 Bar, and then they will turn off.

12 CONDENSER FAN CONTROL (HEATING MODE) IN STEP



LOW – Default = Odd fans 15°C Peer fans 20°C
HIGH – Default = Peer/Odd fans 30°C

13 NIGHT MANAGEMENT (OR LOW NOISE OPTION)

The parameter is defined at the Service level: "Night Mode". If set to SI, the DPSET is modified as follows:

DPSET night = DPSET+DPOFFSET from PM hours to AM hours

Where: DPOFFSET = parameter in bars at Service Level.

It is the correction of the pressure target of the condensation control with speed controller.

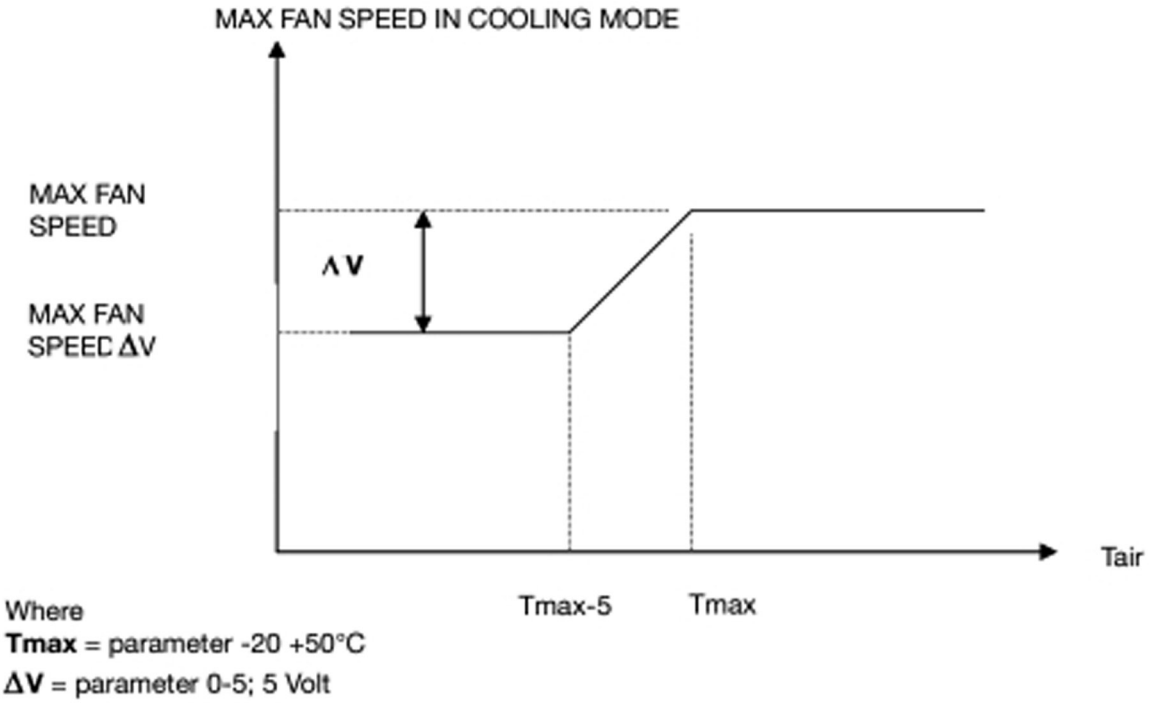
PM and AM = parameters that can be set with a mask with the CLOCK key, if enabled:

PM = night mode start

AM = night mode end

MAX FAN SPEED IN COOLING IN NIGHT MODE:

MaxFanSpeed is no longer a fixed parameter, but is a function of B4, air temperature



Where
Tmax = parameter -20 +50°C
ΔV = parameter 0-5; 5 Volt

The analogue output value AO, is always between the Min Fan Speed and the Max Fan Speed. Whenever one of the two high pressure measures by the transducer reaches the MDP Value, soon the fan must run at max speed, until that high pressure value falls again to the 90% of the Max High Pressure Value.

14 COMPRESSORS CAPACITY CONTROL

Parameters used: Disch Pressure Limit, (HI) Max Disch Pressure. (MDP)

If high pressure transducer are installed and if the unit is a 4 compressors unit, the compressors capacity control is active.

If, at any time while the system is full loaded (2 comps running), the high pressure value reaches the setted Disch Pressure Limit default value 26 bar, the last system compressor loaded is soon unloaded.

Second compressor of the system will be allowed to run only when System High Pressure value falls below the Max Discharge Pressure default value 24 bar.

15 OIL RECOVERY FUNCTION

If one of the tandem (System1-2) running at 50% (only one compressor running) more than 40' the control will force the tandem at 100% for 5 minuts.

If the air inlet temperature is < of the minimum tandem temperature

In COOLING mode the two circuit run with all the compressors for 30', after one compressor for circuit will be stop for 3', passed 3' the two compressors will be restart

In HEATING mode the two circuit run with all the compressors for 30', after one compressor for circuit will be stop for 3', passed 3' the two compressors will be restart

If the air inlet temperature is > of the minimum tandem temperature

In COOLING/HEATING the two circuit with all the compressors uninterruptedly

16 PUMP CONTROL

Parameters used in Pump management mask: Remote logic, Stand-by, Delay Stop.

Pump always starts 30 seconds before the first compressor is loaded and stops always a parameter Pump Delay Time value in seconds after the unit is stopped locally or by remote start/stop digital input.

If the parameter "Pump Remote Logic" is in YES, if the unit is stopped by the remote Start/Stop digital input, the pump continues to run. It only stops if the unit is locally stopped by panel.

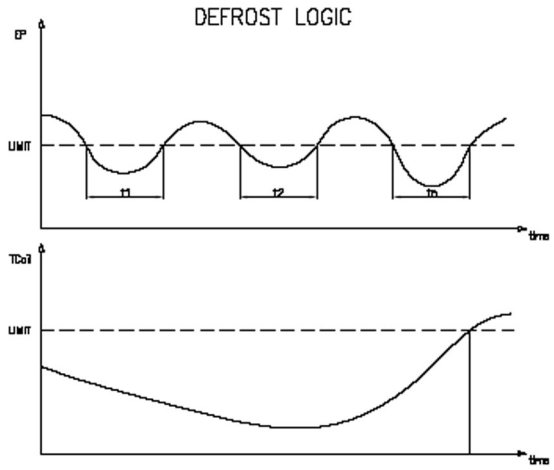
17 PUMP-DOWN LOGIC – LIQUID LINE EEV CONTROL

Pump Down during start-up of the first compressor of each system and during stop of the last compressor of each system.

Parameters used: Pump-Down Max Time, Pump-Down Enable, Liquid Line Solenoid Valve Enable. All the following logic is valid only if Liquid Line Valve are selected as present in Factory Level, and if Pump-Down is enable in Service Level.

18 DEFROST CYCLE (HEAT PUMPS ONLY)

Defrosting of a circuit with time/temperature control:



1) EP < LIMIT
   WHEN t1+t2+...+tn> tmax –> DEFROST

2) WHEN FIRST Tcoil > Tcoil LIMIT
   –> CIRCUIT PART LOADED

3) WHEN SECOND CIRCUIT Tcoil > Tcoil LIMIT
   –> END DEFROST CYCLE

Parameters used: Defrost start Evap press; Defrost stop temp, defrost Delay time, defrost Max time, Reversing Off Time. Moreover cycle reversion during normal operation (changing from summer to winter mode or back) always follow compressors switch off.

If one of the two Evap press sensor values fall below the Defrost start Evap press, a timer starts. The timer is increased while the EP value is under the Defrost start value. When the timer (t1 + t2 + t3 + …) reaches the defrost start time value, the defrost cycle starts for both system.

During defrost cycle, fans are stopped, all compressors run (if one or more are in off, they must be powered), reverse valve is powered.

During defrost Tcoil increases. There are two coils temp sensor, one each coil. When one of the coil reaches a setted limit then this tandem is part loaded to 50% but unit is still in defrost. When also second coil temp reaches the limit, then defrost cycle ends.

During defrost cycle, if the discharge pressure in one of the two systems, reaches an high dangerous value, fans must run at max speed. So, if discharge pressure transducer are attached, if one of the two high pressure values reaches the Max Discharge Pressure value (see MDP) the fans contactor is energized and the analogue output is forced to 5Vdc.

Defrost cycle stops when both the Tcoil values rises up to the Defrost Stop Temp value, anyway if the Defrost Max Time has elapsed.

When defrost cycle is ended, the reverse valve is unpowered and fans are powered again, according to fans rule logic.

The following table details possible unit faults, their probable cause and suggested remedies, for any other problems not immediately recognisable and/or technical assistance, call an authorised Technical Service Center.

19 VLS-VLH-VLC TROUBLE SHOOTING

The following table details possible unit faults, their probable cause and suggested remedies, for any other problems not immediately recognisable and/or technical assistance, call an authorised Technical Service Center.

Faulty	Probable cause	Remedy
AL01 Efficiency alarm CPS	Gas circuit empty Wrong compressors rotation	To charge the circuit To check the electrical connection
AL30 Antifreezing MANUAL RESET	Low water flow Wrong pump Water filter dirty Dirty exchanger High circuit pressure drop	To check the pump To check the pump size To clean the filter To clean the exchanger To check the plant pressure drop
AL30a Antifreezing Only with "AUTO RESET"	Low water flow Wrong pump Water filter dirty Dirty exchanger High circuit pressure drop	To check the pump To check the pump size To clean the filter To clean the exchanger To check the plant pressure drop
AL02 Flow meter	Water pump stop Water pump blocked Pump thermal contact open Flow switch blocked	To check the pump To release the pump To reset the thermal contact and to check the scale To release the flow switch
AL27 Sys 1 Low pressure MANUAL RESET	Espansion valve broken Gas circuit empty Gas leak High temperature water inlet Solenoid valve not open Solenoid valve not open	To replace the espansion valve To charge the circuit To find and repair the leak To check the plant thermal load To check the electrical connection To check Pump Down setting
AL27a Sys 1 Low pressure Only with "AUTO RESET"	Espansion valve broken Gas circuit empty Gas leak High temperature water inlet Solenoid valve not open	To replace the espansion valve To charge the circuit To find and repair the leak To check the plant thermal load To check the electrical connection
AL28 Sys 2 Low pressure MANUAL RESET	Espansion valve broken Gas circuit empty Gas leak High temperature water inlet Solenoid valve not open Solenoid valve not open	To replace the espansion valve To charge the circuit To find and repair the leak To check the plant thermal load To check the electrical connection To check Pump Down setting
AL28a Sys 2 Low pressure Only with "AUTO RESET"	Espansion valve broken Gas circuit empty Gas leak High temperature water inlet Solenoid valve not open Solenoid valve not open	To replace the espansion valve To charge the circuit To find and repair the leak To check the plant thermal load To check the electrical connection To check Pump Down setting
AL02 Sys 1 High pressure MANUAL RESET	<u>COOL</u> Fan stop Low ventilation Fan thermal contact open High gas charge Coil dirty Coil obstruct Faulty high pressure transducer <u>HEAT</u> Low water flow Wrong pump Dirty filter Dirty exchanger High circuit pressure drop	 To check the fan To check the fan speed To reset the contact To check the gas charge To clean the coil To check the installation position To replace the transducer To check the pump To check the pump size To clean the filter To clean the exchanger To check the plant pressure drop

Faulty	Probable cause	Remedy
AL03 Sys 2 High pressure MANUAL RESET	COOL Fan stop Low ventilation Fan thermal contact open High gas charge Coil dirty Coil obstruct Faulty high pressure transducer HEAT Low water flow Wrong pump Dirty filter Dirty exchanger High circuit pressure drop	 To check the fan To check the fan speed To reset the contact To check the gas charge To clean the coil To check the installation position To replace the transducer To check the pump To check the pump size To clean the filter To clean the exchanger To check the plant pressure drop
AL23 Thermal switch compressor 1 MANUAL RESET	Motor compressor faulty Compressor thermal contact open Wrong charge Wrong electrical cable connection & phase missing	To check the compressor motor To reset the thermal contact To check the gas charge To check the electrical connection, to tighten the terminal block screws
AL23a Thermal switch compressor 1 Only with "AUTO RESET"	Motor compressor faulty Compressor thermal contact open Wrong charge Wrong electrical cable connection & phase missing	To check the compressor motor To reset the thermal contact To check the gas charge To check the electrical connection, to tighten the terminal block screws
AL24 Thermal switch compressor 2 MANUAL RESET	Motor compressor faulty Compressor thermal contact open Wrong charge Wrong electrical cable connection & phase missing	To check the compressor motor To reset the thermal contact To check the gas charge To check the electrical connection, to tighten the terminal block screws
AL24a Thermal switch compressor 2 Only with "AUTO RESET"	Motor compressor faulty Compressor thermal contact open Wrong charge Wrong electrical cable connection & phase missing	To check the compressor motor To reset the thermal contact To check the gas charge To check the electrical connection, to tighten the terminal block screws
AL25 Thermal switch compressor 3 MANUAL RESET	Motor compressor faulty Compressor thermal contact open Wrong charge Wrong electrical cable connection & phase missing	To check the compressor motor To reset the thermal contact To check the gas charge To check the electrical connection, to tighten the terminal block screws
AL25a Thermal switch compressor 3 Only with "AUTO RESET"	Motor compressor faulty Compressor thermal contact open Wrong charge Wrong electrical cable connection & phase missing	To check the compressor motor To reset the thermal contact To check the gas charge To check the electrical connection, to tighten the terminal block screws
AL26 Thermal switch compressor 4 MANUAL RESET	Motor compressor faulty Compressor thermal contact open Wrong charge Wrong electrical cable connection & phase missing	To check the compressor motor To reset the thermal contact To check the gas charge To check the electrical connection, to tighten the terminal block screws
AL26a Thermal switch compressor 4 Only with "AUTO RESET"	Motor compressor faulty Compressor thermal contact open Wrong charge Wrong electrical cable connection & phase missing	To check the compressor motor To reset the thermal contact To check the gas charge To check the electrical connection, to tighten the terminal block screws
AL29 Thermal switch fans MANUAL RESET	Fan stop Fan thermal contact open Fan blocked Wrong electrical cable connection & phase missing	To check the motor To reset the thermal contact and to check the scale To release the fan To check the electrical connection, to tighten the terminal block screws

Faulty	Probable cause	Remedy
AL29a Thermal switch fans Only with "AUTO RESET"	Fan stop Fan thermal contact open Fan blocked Wrong electrical cable connection & phase missing	To check the motor To reset the thermal contact and to check the scale To release the fan To check the electrical connection, to tighten the terminal block screws
AL11 Failure sensor B7 Entering water temperature	Faulty sensor Cut cable Sensor not connected Water inside the sensor	To replace the sensor To replace cable To check the electrical connection To check the insulation
AL12 Failure sensor B8 Outlet water temperature	Faulty sensor Cut cable Sensor not connected Water inside the sensor	To replace the sensor To replace cable To check the electrical connection To check the insulation
AL10 Failure sensor B6 temperature LAN	Faulty sensor Cut cable Sensor not connected Water inside the sensor	To replace the sensor To replace cable To check the electrical connection To check the insulation
AL09 Failure sensor B5 Outdoor air temperature	Faulty sensor Cut cable Sensor not connected Water inside the sensor	To replace the sensor To replace cable To check the electrical connection To check the insulation
AL13 Failure sensor B1 Coil 1 temperature	Faulty sensor Cut cable Sensor not connected Water inside the sensor	To replace the sensor To replace cable To check the electrical connection To check the insulation
AL14 Failure sensor B2 Coil 2 temperature	Faulty sensor Cut cable Sensor not connected Water inside the sensor	To replace the sensor To replace cable To check the electrical connection To check the insulation
AL07 Failure sensor B3 Transducer High pressure Circuit 1	High pressure transducer damaged Cut cable Water inside the transducer Connector loose	To replace the transducer To check the cable To check the insulation To tighten the connector screws
AL08 Failure sensor B4 Transducer High pressure Circuit 2	High pressure transducer damaged Cut cable Water inside the transducer Connector loose	To replace the transducer To check the cable To check the insulation To tighten the connector screws
AL17 Compressor 1 Maintenance	Exceeded hours of operation compressor 1	To do maintenance
AL18 Compressor 2 Maintenance	Exceeded hours of operation compressor 2	To do maintenance
AL19 Compressor 3 Maintenance	Exceeded hours of operation compressor 3	To do maintenance
AL20 Compressor 4 Maintenance	Exceeded hours of operation compressor 4	To do maintenance
AL21 Pump Maintenance	Exceeded hours of operation pump	To do maintenance
AL32 Espansion off line	Espansion faulty	To replace the clock To insert the clock card in the support
AL33 Eprom failure	Eprom faulty	To replace the program

20 LIST OF ITELCO-INDUSTRY APPLICATION SUPERVISOR VARIABLES FOR PCO1 APPLICATION CHILLER: VLS – VLH – VLC

Index	Meaning	Read/Write	Type
1	Heating operation	Read	Digital
2	Cooling operation	Read	Digital
3	Compressor #1 sys #1	Read	Digital
4	Compressor #2 sys #1	Read	Digital
5	Solenoide valve sys #1	Read	Digital
6	Compressor #1 sys #2	Read	Digital
7	Compressor #2 sys #2	Read	Digital
8	Solenoide valve sys #2	Read	Digital
9	Fan	Read	Digital
10	Heater	Read	Digital
11	4 - way valve	Read	Digital
12	Alarm sys #1	Read	Digital
13	Alarm sys #2	Read	Digital
14	Pump	Read	Digital
15	RWT/LWT Control temperature	Read/Write	Digital
16	Automatic restart	Read/Write	Digital
17	Glicole enable	Read/Write	Digital
18	Compressors rotation enable	Read/Write	Digital
19	Remote enable pump	Read/Write	Digital
20	Pump down enable	Read/Write	Digital
21	Daily zone enable	Read/Write	Digital
22	Sys #1disable	Read/Write	Digital
23	Sys #2 disable	Read/Write	Digital
24	Chiller/heatpump enable	Read/Write	Digital
25	Sensor B1 enable	Read/Write	Digital
26	Sensor B2 enable	Read	Digital
27	Sensor B3 enable	Read	Digital
28	Sensor B4 enable	Read	Digital
29	Sensor B5 enable	Read	Digital
30	Sensor B6 enable	Read	Digital
31	Sensor B7 enable	Read/Write	Digital
32	Sensor B8 enable	Read/Write	Digital
33	Unit on	Read	Digital
34	On/Off by supervisor	Read/Write	Digital
35	Compressor #1 disable	Read/Write	Digital
36	Compressor #2 disable	Read/Write	Digital
37	Compressor #3 disable	Read/Write	Digital
38	Compressor #4 disable	Read/Write	Digital
39	Alarm eff	Read	Digital
40	Antifreezing circuit #1	Read	Digital
41	Antifreezing circuit #2	Read	Digital
42	Low pressure circuit #1	Read	Digital
43	Low pressure circuit #2	Read	Digital

Index	Meaning	Read/Write	Type
44	High pressure circuit #1	Read	Digital
45	High pressure circuit #2	Read	Digital
46	Thermal compressor #1	Read	Digital
47	Thermal compressor #2	Read	Digital
48	Thermal compressor #3	Read	Digital
49	Thermal compressor #4	Read	Digital
50	Fan thermal	Read	Digital
51	Faulty probe B1	Read	Digital
52	Faulty probe B2	Read	Digital
53	Faulty probe B3	Read	Digital
54	Faulty probe B4	Read	Digital
55	Faulty probe B5	Read	Digital
56	Faulty probe B6	Read	Digital
57	Faulty probe B7	Read	Digital
58	Faulty probe B8	Read	Digital
59	Compressor Maintenance #1	Read	Digital
60	Compressor Maintenance #2	Read	Digital
61	Compressor Maintenance #3	Read	Digital
62	Compressor Maintenance #4	Read	Digital
63	Flow switch alarm	Read	Digital
64	Remote on/off enable	Read/Write	Digital
65	Fan 2 speed	Read	Digital
66	Fan inverter enable	Read/Write	Digital
67	Night mode enable	Read/Write	Digital
68	Chillernet enable	Read/Write	Digital
69	Heat/Cool selection	Read/Write	Digital

Index	Meaning	Read/Write	Type
1	Sys #1 state	Read	Integer
2	Sys #2 state	Read	Integer
3	Machine state	Read	Integer
4	Minimum time stop	Read	Integer
5	Minimum time start	Read	Integer
6	Minimum time stop compressor	Read/Write	Integer
7	Delay time between the compressors	Read/Write	Integer
8	(LWT) Stop compressor	Read/Write	Integer
9	Stand-by time pump	Read/Write	Integer
10	Pump delay time stop	Read/Write	Integer
11	Delay time flow switch running	Read/Write	Integer
12	Delay time flow switch Start/up	Read/Write	Integer
13	Delay alarm low pressure	Read/Write	Integer
14	Delay time start defrost	Read/Write	Integer
15	Max time defrost	Read/Write	Integer
16	Delay time stop compressor during defrost	Read/Write	Integer
17	Pump-down maximum time	Read/Write	Integer
18	Time zone hour #1	Read/Write	Integer
19	Time zone hour #2	Read/Write	Integer
20	Time zone hour #3	Read/Write	Integer
21	Time zone minute #1	Read/Write	Integer
22	Time zone minute #2	Read/Write	Integer
23	Time zone minute #3	Read/Write	Integer
24			
25	Pump hours (segment 1)	Read/Write	Integer
26	Pump hours (segment 2)	Read/Write	Integer
27	Compressor #1 (segment 1)	Read/Write	Integer
28	Compressor #1 (segment 2)	Read/Write	Integer
29	Compressor #2 (segment 1)	Read/Write	Integer
30	Compressor #2 (segment 2)	Read/Write	Integer
31	Compressor #3 (segment 1)	Read/Write	Integer
32	Compressor #3 (segment 2)	Read/Write	Integer
33	Compressor #4 (segment 1)	Read/Write	Integer
34	Compressor #4 (segment 2)	Read/Write	Integer
35	Fan start delay	Read/Write	Integer
36	Integration time regulation P+I	Read/Write	Integer
37	Night mode hour start	Read/Write	Integer
38	Night mode minute start	Read/Write	Integer
39	Night mode stop hour	Read/Write	Integer
40	Night mode stop minute	Read/Write	Integer
41	DELTA-V cooling (night mode)	Read/Write	Integer
42	DELTA-V heating (night mode)	Read/Write	Integer

Index	Meaning	Read/Write	Type
1	Water inlet temperature RWT	Read	Analog
2	Outlet water temperature circuit #1 (LWT)	Read	Analog
3	Outlet water temperature circuit #2 (LWT)	Read	Analog
4	Outdoor air temperature (OAT)	Read	Analog
5	Defrost temperature/Low pressure transducer circuit #1	Read	Analog
6	Defrost temperature/Low pressure transducer circuit #2	Read	Analog
7	High pressure transducer circuit #1	Read	Analog
8	High pressure transducer circuit #2	Read	Analog
9	Regulated temperature	Read	Analog
10	Inverter speed	Read	Analog
11	Soglia freddo stop compressore LWT	Read/Write	Analog
12	Soglia caldo stop compressore LWT	Read/Write	Analog
13	Antifreezing set point	Read/Write	Analog
14	Antifreezing differential	Read/Write	Analog
15	Antifreezing electric heater set point	Read/Write	Analog
16	Antifreezing electric heater differential	Read/Write	Analog
			Analog
17	Inverter set point	Read/Write	Analog
18	Inverter minimum speed	Read/Write	Analog
19	Inverter maximum speed	Read/Write	Analog
20	Compressor maximum capacity	Read/Write	Analog
21	Compressor minimum capacity	Read/Write	Analog
22	High temperature heat	Read/Write	Analog
23	Low temperature heat	Read/Write	Analog
24	Defrost start set point	Read/Write	Analog
25	Defrost stop set point	Read/Write	Analog
26	Cooling set point limit	Read/Write	Analog
27	Coolind set point maximum	Read/Write	Analog
28	Efficiency value	Read/Write	Analog
29	Cooling set point RWT time zone #1	Read/Write	Analog
30	Cooling set point RWT time zone #2	Read/Write	Analog
31	Cooling set point RWT time zone #3	Read/Write	Analog
32	Cooling set point RWT time zone #4	Read/Write	Analog
33	Heat set point RWT time zone #1	Read/Write	Analog
34	Heat set point RWT time zone #2	Read/Write	Analog
35	Heat set point RWT time zone #3	Read/Write	Analog
36	Heat set point RWT time zone #4	Read/Write	Analog
37	Cooling set point LWT time zone #1	Read/Write	Analog
38	Cooling set point LWT time zone #2	Read/Write	Analog
39	Cooling set point LWT time zone #3	Read/Write	Analog
40	Cooling set point LWT time zone #4	Read/Write	Analog
41	Heat set point LWT time zone #1	Read/Write	Analog
42	Heat set point LWT time zone #2	Read/Write	Analog
43	Heat set point LWT time zone #3	Read/Write	Analog
44	Heat set point LWT time zone #4	Read/Write	Analog
45	Glicole Set point RWT time zone #1	Read/Write	Analog

Index	Meaning	Read/Write	Type
46	Glicole Set point RWT time zone #2	Read/Write	Analog
47	Glicole Set point RWT time zone #3	Read/Write	Analog
48	Glicole Set point RWT time zone #4	Read/Write	Analog
49	Glicole Set point LWT time zone #1	Read/Write	Analog
50	Glicole Set point LWT time zone #2	Read/Write	Analog
51	Glicole Set point LWT time zone #3	Read/Write	Analog
52	Glicole Set point LWT time zone #4	Read/Write	Analog
53	Cooling set point RWT	Read/Write	Analog
54	Cooling set point LWT	Read/Write	Analog
55	Heat set point RWT	Read/Write	Analog
56	Heat set point LWT	Read/Write	Analog
57	Glicole Set point RWT	Read/Write	Analog
58	Glicole Set point LWT	Read/Write	Analog
59	Band	Read/Write	Analog
60	Dead band	Read/Write	Analog
61	Setpoint low speed	Read/Write	Analog
62	Differential low speed	Read/Write	Analog
63	MINDP (night mode)	Read/Write	Analog
64	DPOFFSET (night mode)	Read/Write	Analog
65	TMAX (night mode)	Read/Write	Analog
66	TMIN (night mode)	Read/Write	Analog
67	Set point minimum air temperature tandem	Read/Write	Analog
68	Differential minimum air temperature tandem	Read/Write	Analog