hertz
KOMPRESSOREN

COMMUNICATION

Modbus is a communication protocol which is wide supported and opensource.

Novadays almost all the controller manufacturers supports Modbus communication protocol

Logik 33S, Logik 26S and Logik 9 support modbus RTU protocol over RS485 serial line

COMMUNICATION

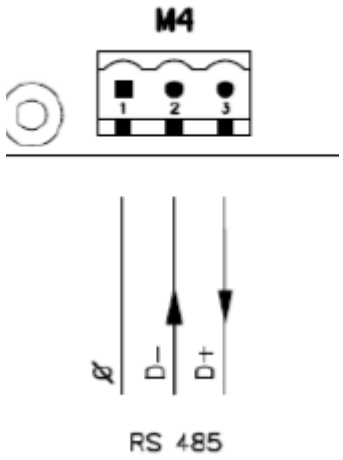
Modbus RTU

- Communications between controllers under Master / Slave
- Stand alone communications

Modbus TCP

- Can be supported by using ethernet serial gateway

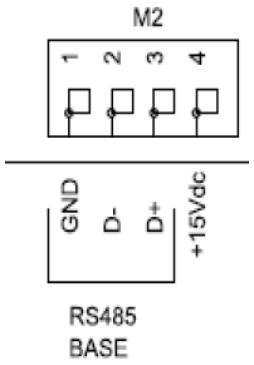
LOGIK9



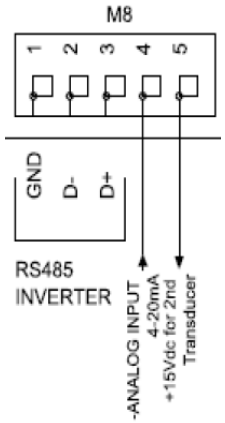
- 1 serial communication (RS485)
- Logik9 can communicate under the functions :

1. Stand alone
2. Master / Slave
3. Multiunit

LOGIK26S

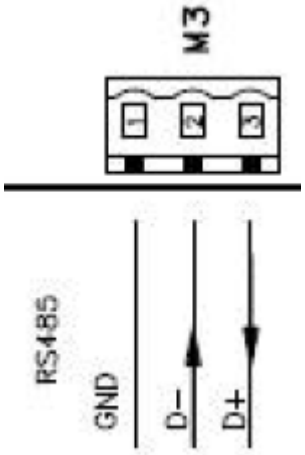


- 1st RS485 port
- Stand alone
- Master / Slave
- Multiunit

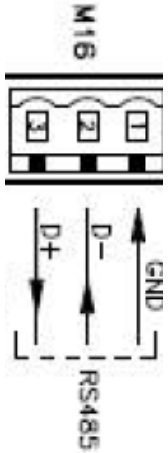


- 2nd RS485 port
- Driver Communication
- Stand alone

If 2nd serial port is not used for communication with driver, then this port is also avaiable for the stand alone communication



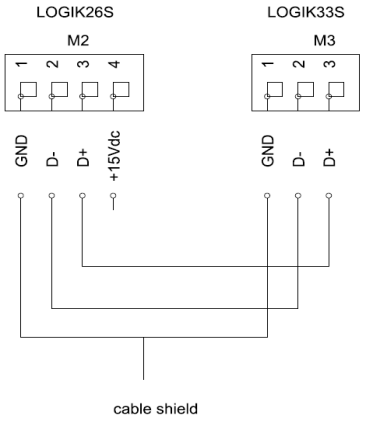
- 1st RS485 port
- Stand alone
- Master / Slave
- Multiunit

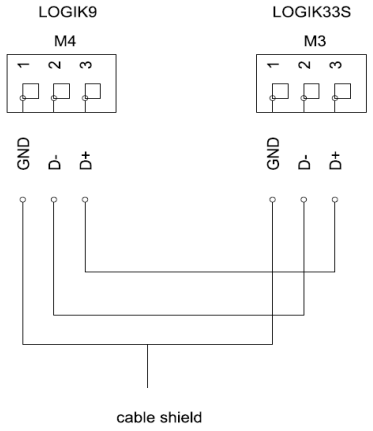


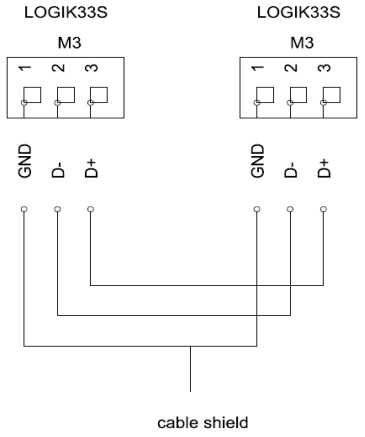
- 2nd RS485 port
- Driver Communication
- Stand alone

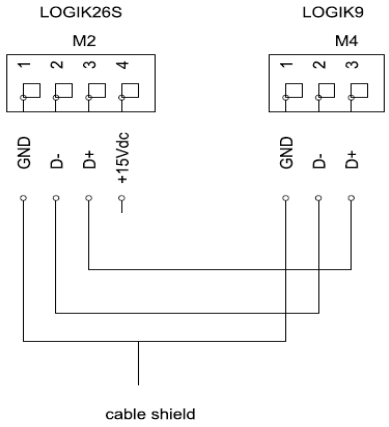
If 2nd serial port is not used for communication with driver, then this port is also avaiable for the stand alone communication

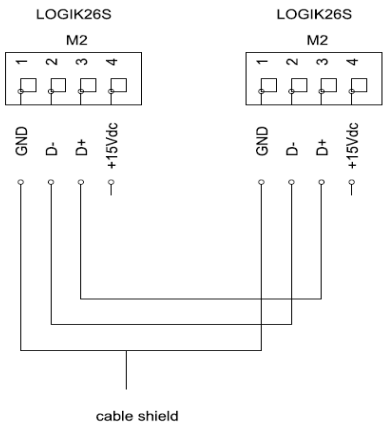
MASTER / SLAVE CONNECTIONS

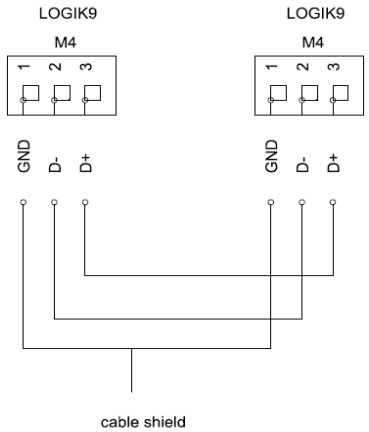




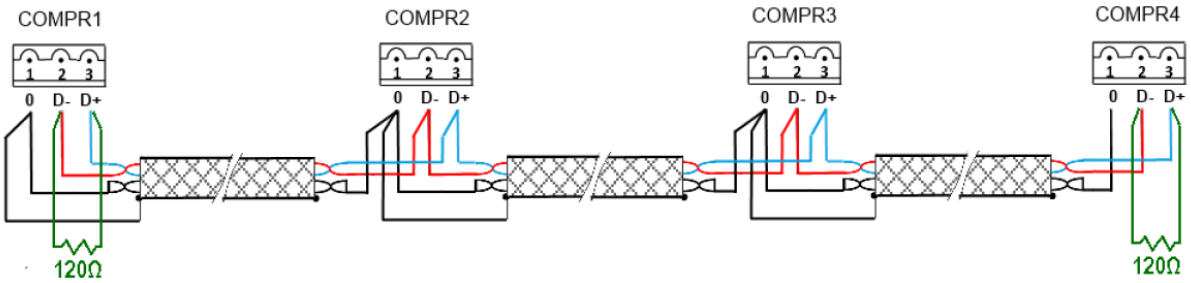








MASTER / SLAVE CONNECTIONS



Serial connection notes

- The cable must have shield and AWG twisted pair cable
- Shields must be connected from one side to the ground
- The cable lenght must not be longer than 100 meters
- Pole must not be reverted

MASTER / SLAVE – PARAMETERS
LOGIK9

P05 : Slave Start Pressure
[password level – 1**]**
Value : 2,8-0,2 ÷ P04-0,2

T06 : Master / Slave Rotation
[password level – 1**]**
Value : 0 ÷ 200 h

T07 : Slave Timer
[password level – 1**]**
Value : 1 ÷ 99 min.

con : Connection
[password level – 1**]**
[0] : Single
[1] : Master / Slave
[2] : Multiunit Slave

nc : Compressor Number
[password level – 1**]**
Value : 0 ÷ 32

MASTER / SLAVE – PARAMETERS
LOGIK26S

C07 : Multiunit operation
[password level – 2**]**
[0] : Stand alone
[1] : Master / Slave
[2] : Master / Slave new
[3] : Multiunit Slave

C07.1 : Timer Master / Slave
[password level – 2**]**
Value : 0÷200 hour

C07.2 : Timer Slave
[password level – 2**]**
Value : 0÷99 min.

C07.4 : Inverter Twin
[password level – 2**]**
[0] : YES
[1] : NO

C08 : Compressor Nr
[password level – 1**]**
Value : 1÷32

WP5 : Slave start pressure
[password level – 1**]**
Value : 2,0 ÷ (WP4-0.2)

MASTER / SLAVE – PARAMETERS
LOGIK33S

S07 : Multiunit operation
[password level – 2**]**
[0] : Stand alone
[1] : Master / Slave
[2] : Master / Slave Logik33S range
[3] : Multiunit Slave
[4] : Multiunit Master Smart Mode
[5] : Multiunit Master Equil Mode
[6] : Multiunit Master Priority Mode

S07-2 : Rotation Time
[password level – 2,3**]**
Value : 0÷200 hour

S07-3 : Start Timer Slave
[password level – 2,3**]**
Value : 0÷99 min.

S07-4 : Inverter Twin
[password level – 2,3**]**
Value : YES / NO

R03 : Compressor Number
[password level – 2,3**]**
Value : 1÷32

WP5 : Start P. Slave
[password level – 2,3**]**
Value : 2,8 ÷ (WP4-0.2) Bar

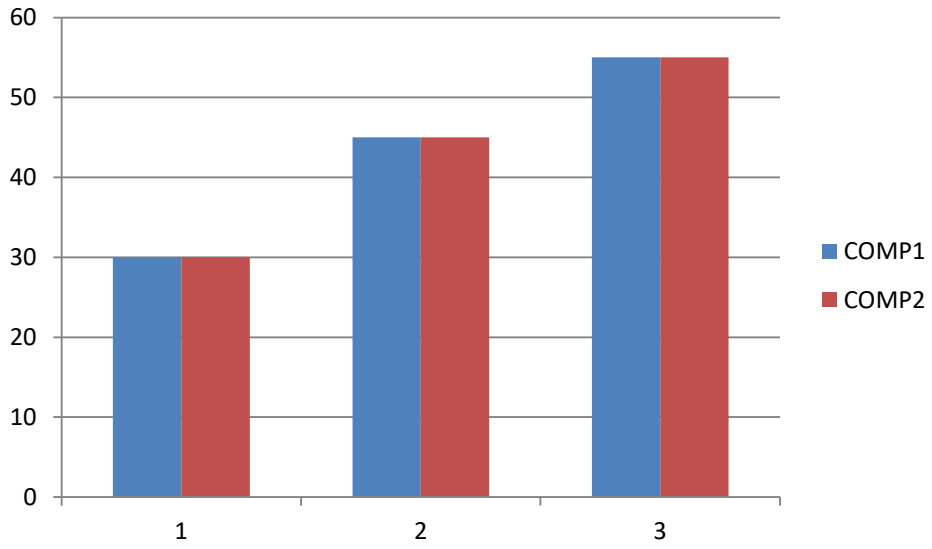
MASTER / SLAVE – NOTES

- When common parameters (Master/Slave, Working Pressure) are changed, Master controller automatically updates slave parameters as well.
- Only two compressors can be connected under Master / Slave function.
- While compressors are working under Master / Slave, it is not possible to read informations externally via communication line.

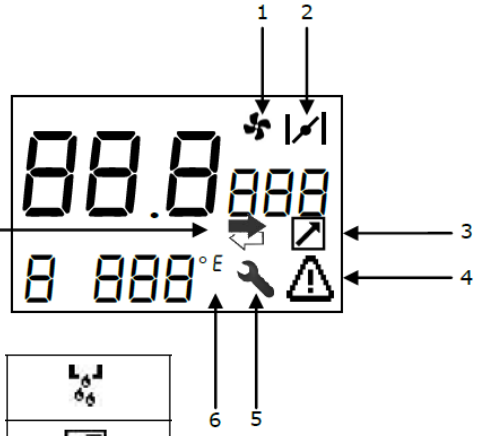
MASTER / SLAVE – NOTES

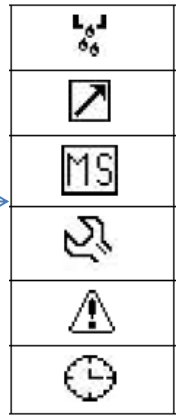
- For Logik26S and Logik33S, inverter twin functionality under master / slave algortim, makes both VSD compressor modulate together.
- Regarding functionality can be used between two same type controller like

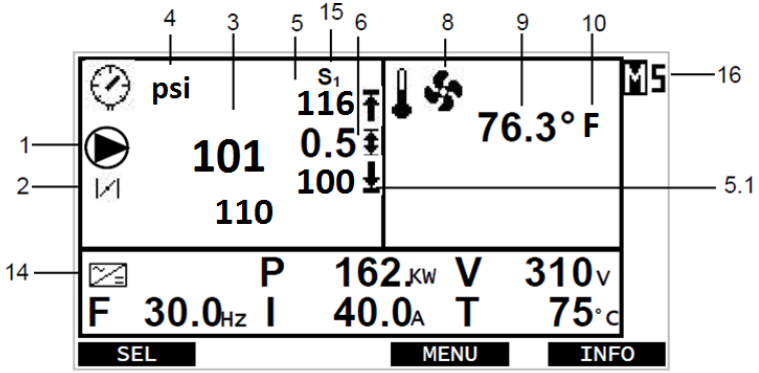
Logik26S – Logik26S or Logik33S – Logik33S



MASTER / SLAVE – ICONS

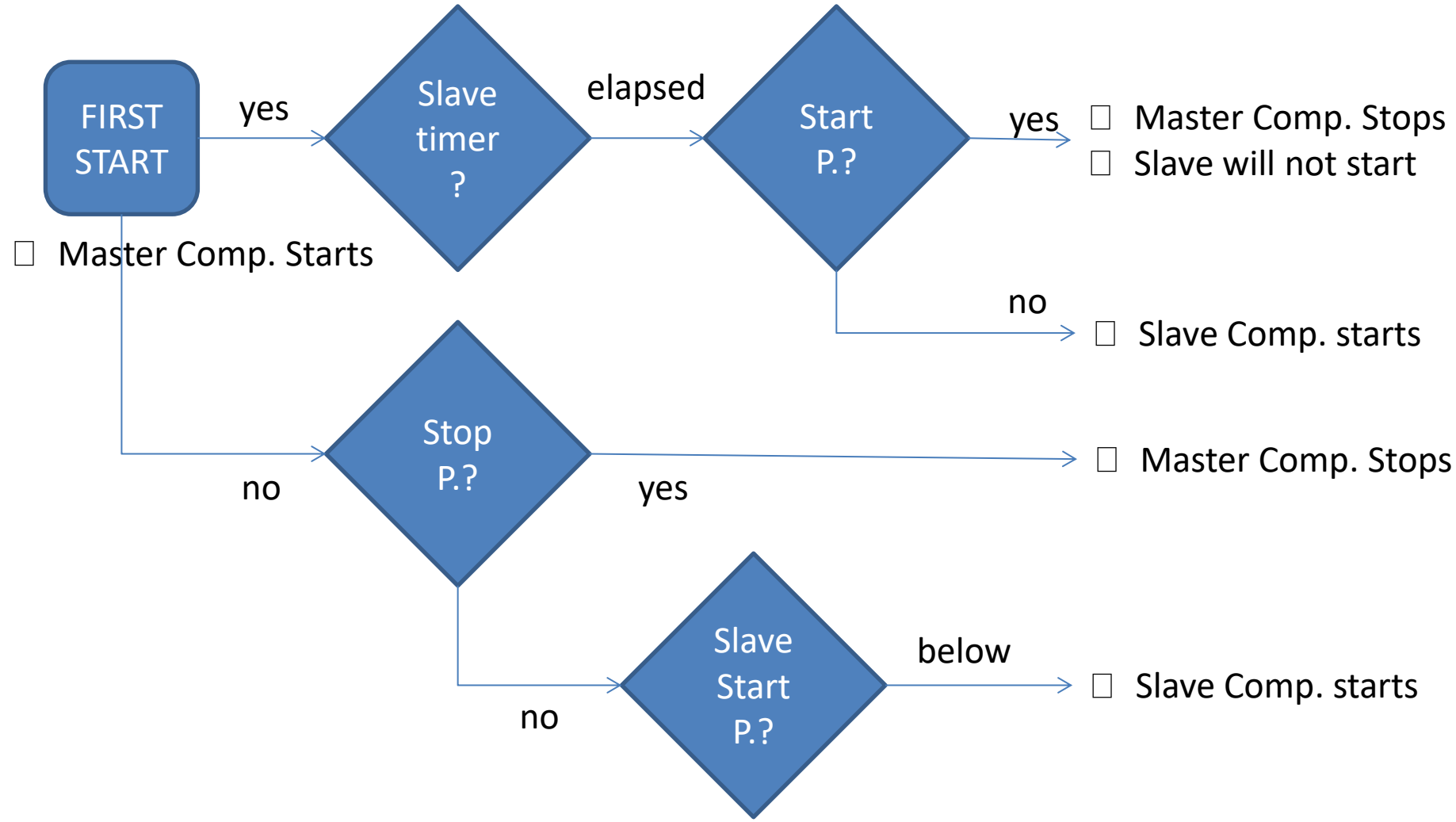






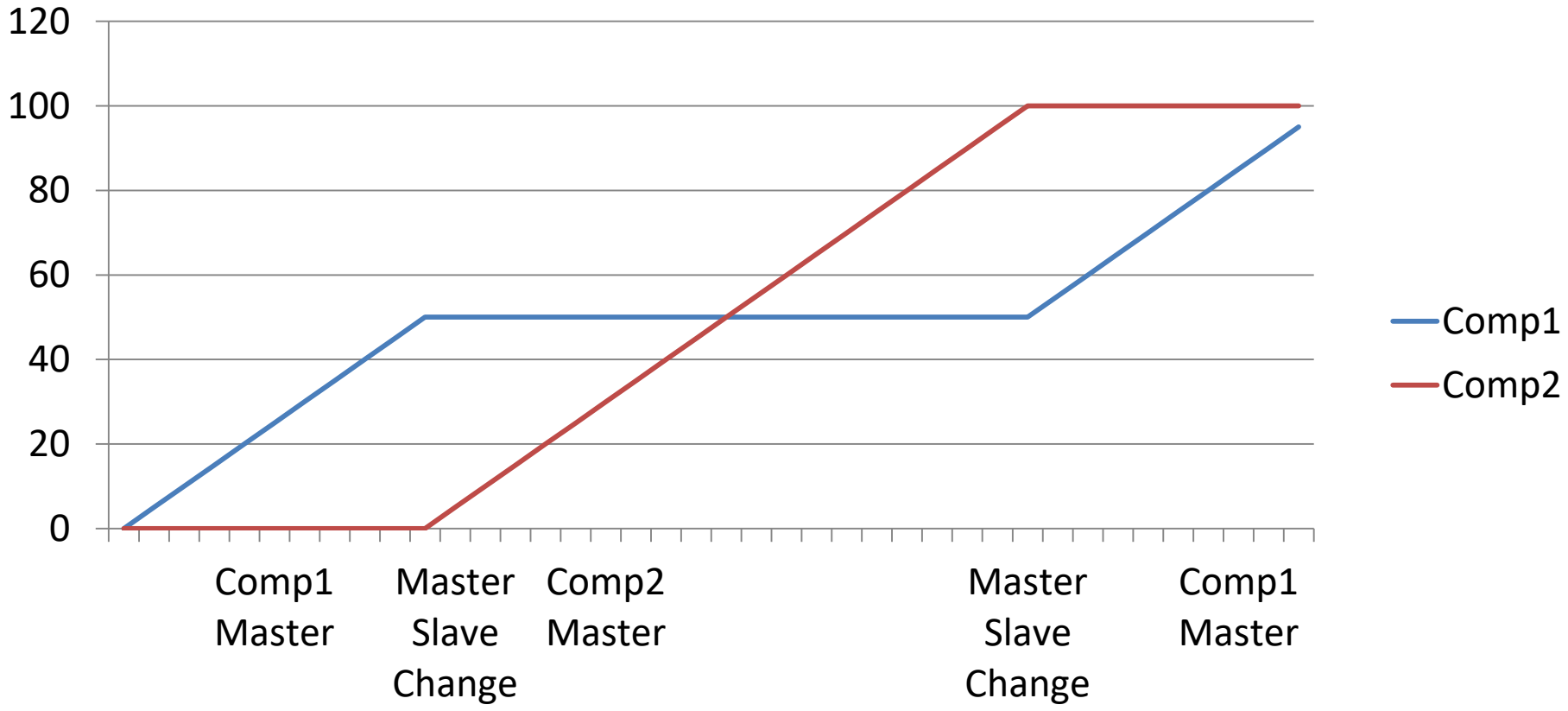
MASTER / SLAVE – PRESSURE CONTROL

- Master compressor pressure reading is the system pressure reading



MASTER / SLAVE – BALANCING HOURS

- Master Slave rotation time indicates working hour difference of two compressor when Master Slave change process is required
- For instance, if we accept the rotation time set as 50 working hours, then ;



What is the Multiunit System?

The multiunit system allows to control a group of the compressors according to demanded and flexible scenarios.

There are 3 different function can be implemented by using multiunit system

1. Balance Hours Mode :
Balancing working hours of the compressor plant

2. Priority Mode
End user can give working priortiy for each compressor/s in the compressor plant

3. Smart Mode
Multiunit controller calculates the air consumption and controls the plant accordingly

MULTIUNIT - CONTROLLERS

LOGIK33S

5 compressors

LOGIK200

12 compressors

LOGIK103

4 compressors

MULTIUNIT – LOGIK33S

Logik33S as Multiunit Master

Logik33S

Logik9

Logik33S

Logik26S

....

RS485 line
Modbus Rtu Protocol

Up to 5 (1 is master) units can be controlled

MULTIUNIT – LOGIK33S - PARAMETERS

Code	Message	Values	Default
M01	Slave number	1 ÷ 4	1
R02	Air flow	100 ÷ 99990 L/min	7200
R03	Compressor #.	1 ÷ 5	1
M02	Air tank capacity	100 ÷ 99990 L	1000
M03	Compressor 1st start	0 ÷ 5	0
M04	Power on	0 ÷ 99 min	5
M05	Emergency unit	0 ÷ 5	0
M05.1	Start pressure	2.8 ÷ (P. Set-0.2)	6,7
M06	Delay start	0 ÷ 30 sec.	0
M07	Delay stop	0 ÷ 30 sec.	0
V01	VSD Modulating	1 ÷ 5	1
V02	VSD Min.%	0 ÷ 80%	0
V03	VSD Max.%	50 ÷ 100%	100
V04	VSD % delay	5 ÷ 300 sec.	60
V05	Capacity avg.	1 ÷ 99 min.	5
M08	Allign hours	NO / YES	NO
M09	Balance hours	0 ÷ 200	100
M10	Priority		
M10.1	Compr1	0..5	0
M10.2	Compr2	0..5	0
M10.3	Compr3	0..5	0
M10.4	Compr4	0..5	0
M10.5	Compr5	0..5	0

MULTIUNIT – LOGIK33S - PARAMETERS

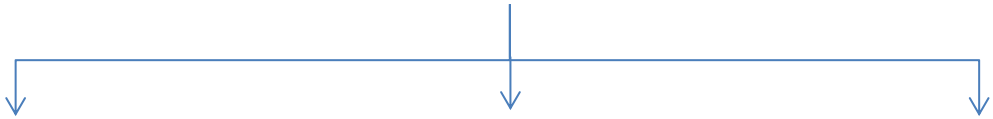
M01 : SLAVE NUMBER
Exculindg itself, how many compressors are connected as multiunit slave ?.

R02 : AIR FLOW
Nominal air flow for multiunit master controlled compressor. This parameter required only for **Smart Mode**

R03 : COMPRESSOR NUMBER
The compressor number for master controlled unit. Generally left as «1»

M02 : TANK CAPACITY
Capacity of the air tank must be enter. This parameter is required for **Smart Mode.**

M03 : COMPRESSOR 1ST START
The comp. number that is wanted to start first must be entered. «0» means multiunit master will select according to multiunit working algorithm.



BALANCING HOURS
The compressor with less working hours will start

SMART MODE
According to pressure trend and consumption, proper comp. selected by master will start to work

PRIORITY MODE
The compressor that has highest priority will start to work

MULTIUNIT – LOGIK33S - PARAMETERS

M04 : POWER ON
When the system is started how long master will wait to start next comp. to support?.

M05 : EMERGENCY UNIT
If any compressor number is selected, that compressor will be excluded from the system and will only work when pressure drops emergency start pressure or there is general stopping alarm for the overall system.

M05.1 : START PRESSURE
Start pressure for emergency unit if it is set and different than «0»

M06 : DELAY START
Start delay timer when next compressor is needed.

M07 : DELAY STOP
Stop delay timer when one of the compressor need to be stopped.

V01 : VSD MODULATING
If there are more than 1 VSD compressor in the system, the total amount of VSD compressors can modulate at the same time can be decided by this parameter.

MULTIUNIT – LOGIK33S - PARAMETERS

V02 : VSD MIN. %
The minimum percentage while VSD compressors are modulating together. When working percentage reached to this value, one of the working VSD comp. will stop according to working algorithm.

V03 : VSD MAX. %
The maximum percentage that one VSD compressor can work at most. When this percentage is reached next VSD comp. will start to work according to working algorithm.

PERCENTAGE CALCULATION :
COMP1 : Min freq = 30 and Max freq = 133
COMP2 : Min freq = 35 and Max freq = 101

Then

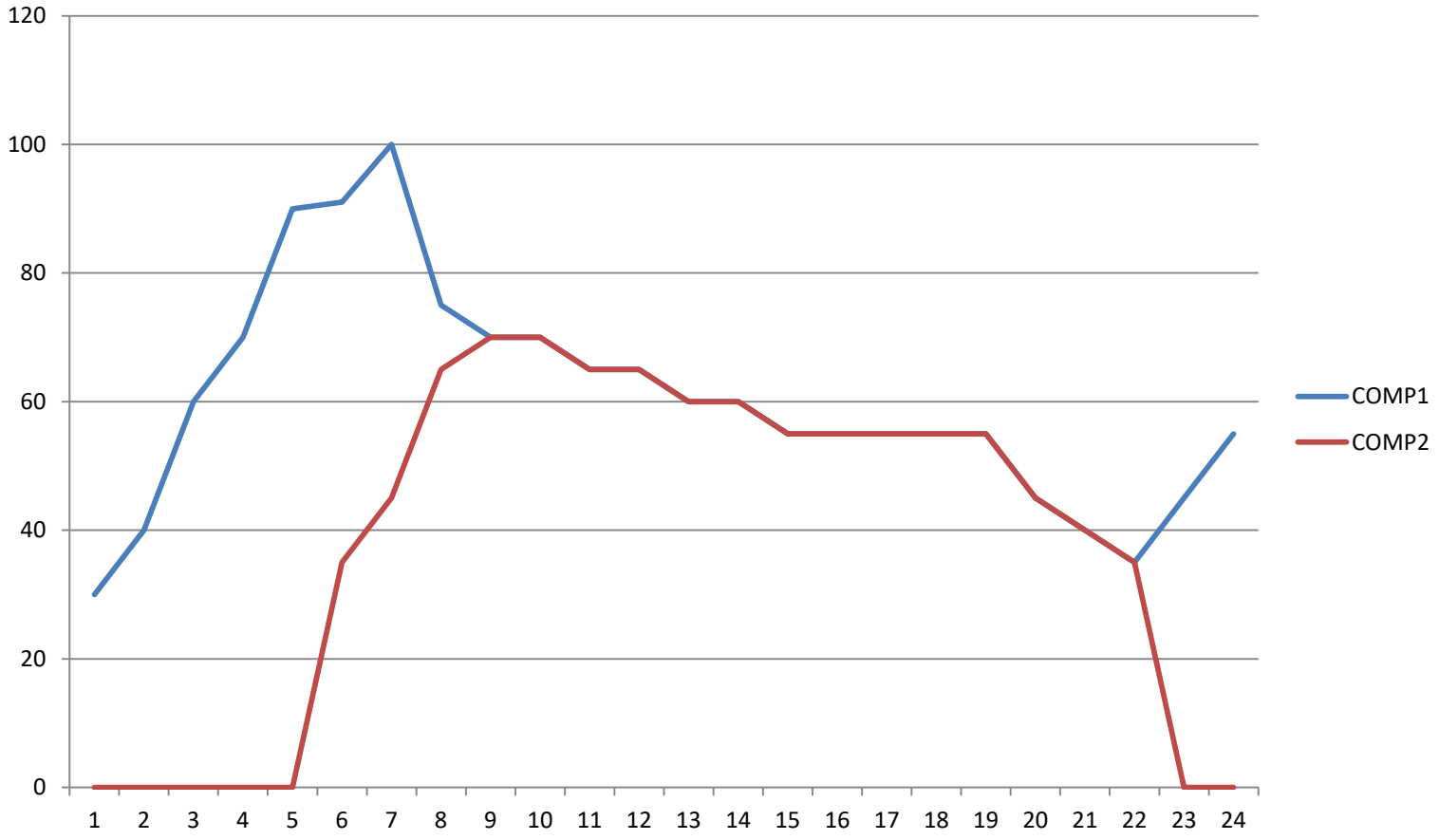
COMP1 : MIN % = 23 and MAX % = 100
COMP2 : MIN % = 35 and MAX % = 100

In this case V02 parameter must not be lower than 35, otherwise, Comp2 will never stops when its master comp. in the system.

MULTIUNIT – LOGIK33S - PARAMETERS

COMP1 : MIN % = 23 and MAX % = 100
COMP2 : MIN % = 35 and MAX % = 100

V01 : 2 V02 : 35 V03 : 90



MULTIUNIT – LOGIK33S - PARAMETERS

V04 : STOP MIN % DELAY
The time delay for the compressors stop when min percentage is reached.

V05 : CAPACITY AVERAGE
The time interval to calculate capacity average in order to make more reliable system.

M08 : ALIGN HOURS
For balancing hours algorithm where compressors have different working hours, this parameter can be set as YES in order to make balancing hour from the beginning.

M09 : BALANCE HOURS
The hour setting that compressor will switch their master conditions in the system. Again this parameter will be visualized when balacing hours algorithm is selected.

M10 : PRIORITY
The priority set section for the compressors connected to the multiunit system. Each compressor can have different priority number whereas they can be set to same priority as well. When same priority is set for more than 1 compressor system selects less aged one to start when it is needed.

This parameter will be visualized when priority is selected as working algorithm.

MULTIUNIT – LOGIK200

Logik200 Multiunit Controller

RS232-RS485
Converter

RS485 line
Modbus Rtu Protocol

Logik9

Logik33S

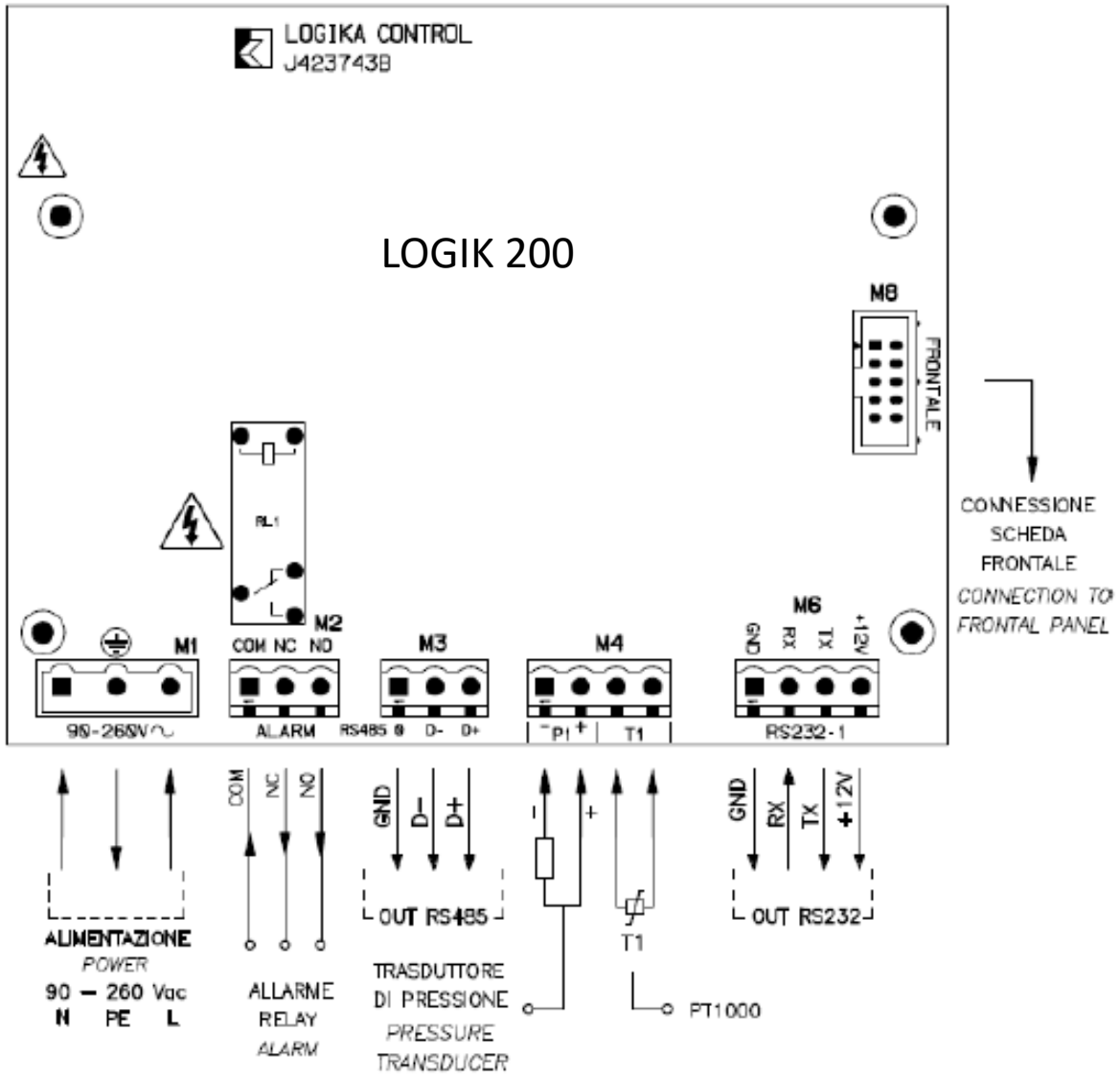
Logik26S

Slave unit

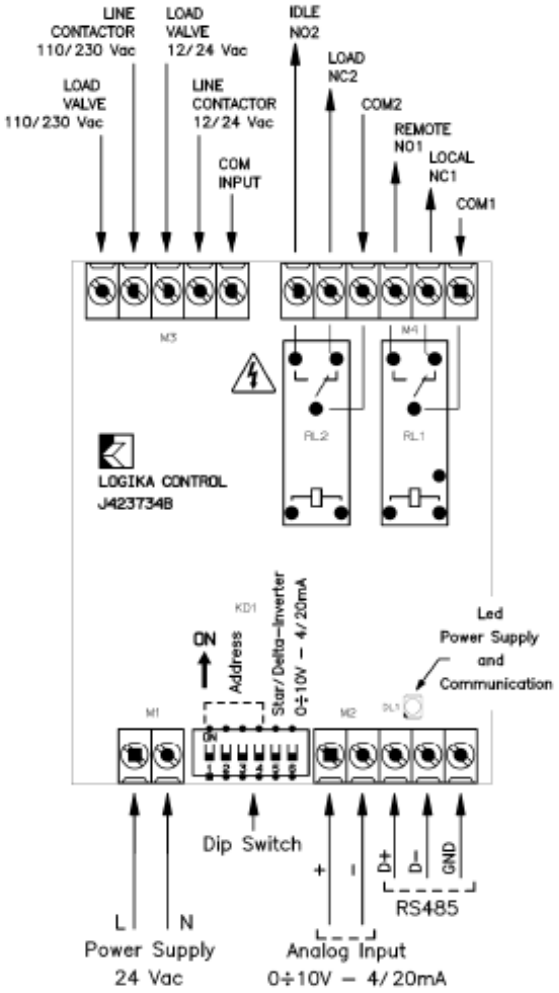
Other Brand Comp.

Up to 12 units can be controlled

MULTIUNIT – LOGIK200 & LOGIK SLAVE CONNECTIONS



MULTIUNIT – LOGIK200 & LOGIK SLAVE CONNECTIONS



LOGIK SLAVE

Dip1-4: address Slave module

DIP1	DIP2	DIP3	DIP4	Indirizzo
ON	OFF	OFF	OFF	1
OFF	ON	OFF	OFF	2
ON	ON	OFF	OFF	3
OFF	OFF	ON	OFF	4
ON	OFF	ON	OFF	5
OFF	ON	ON	OFF	6
ON	ON	ON	OFF	7
OFF	OFF	OFF	ON	8
ON	OFF	OFF	ON	9
OFF	ON	OFF	ON	10
ON	ON	OFF	ON	11
OFF	OFF	ON	ON	12

Dip5: compressor type

DIP5	Type
OFF	Star/Delta
ON	Variable speed (inverter)

Dip6: analogue input

DIP6	Type
OFF	Input 0/10V
ON	Input 4/20mA

MULTIUNIT – LOGIK200 PARAMETERS

S00 : COMPRESSORS NUMBER

S01 : OPERATING PRINCIPLE
- SMART
- BALANCE HOURS
- PRIORITY

S02 : TANK CAPACITY

S03 : COMP. START DELAY

S04 : COMP. STOP DELAY

S05 : POWER ON COMP.

S06 : DELAY START 2ND COMP.

S07 : STAND BY COMP.

S08 : BASE COMPRESSOR

S09 : ALIGN HOURS

S10 : MAX. DIFFERENCE

S11 : AUTO RESTART

S12 : SAFETY TIME

S13 : AVERAGE FLOW CALCULATION

S14 : ENERGY CALCULATION

S15 : COMPANY TITLE

S16 : MIN INV. PERCENTAGE

S17 : MAX INV. PERCENTAGE

S18 : MAX WORKING COMP.

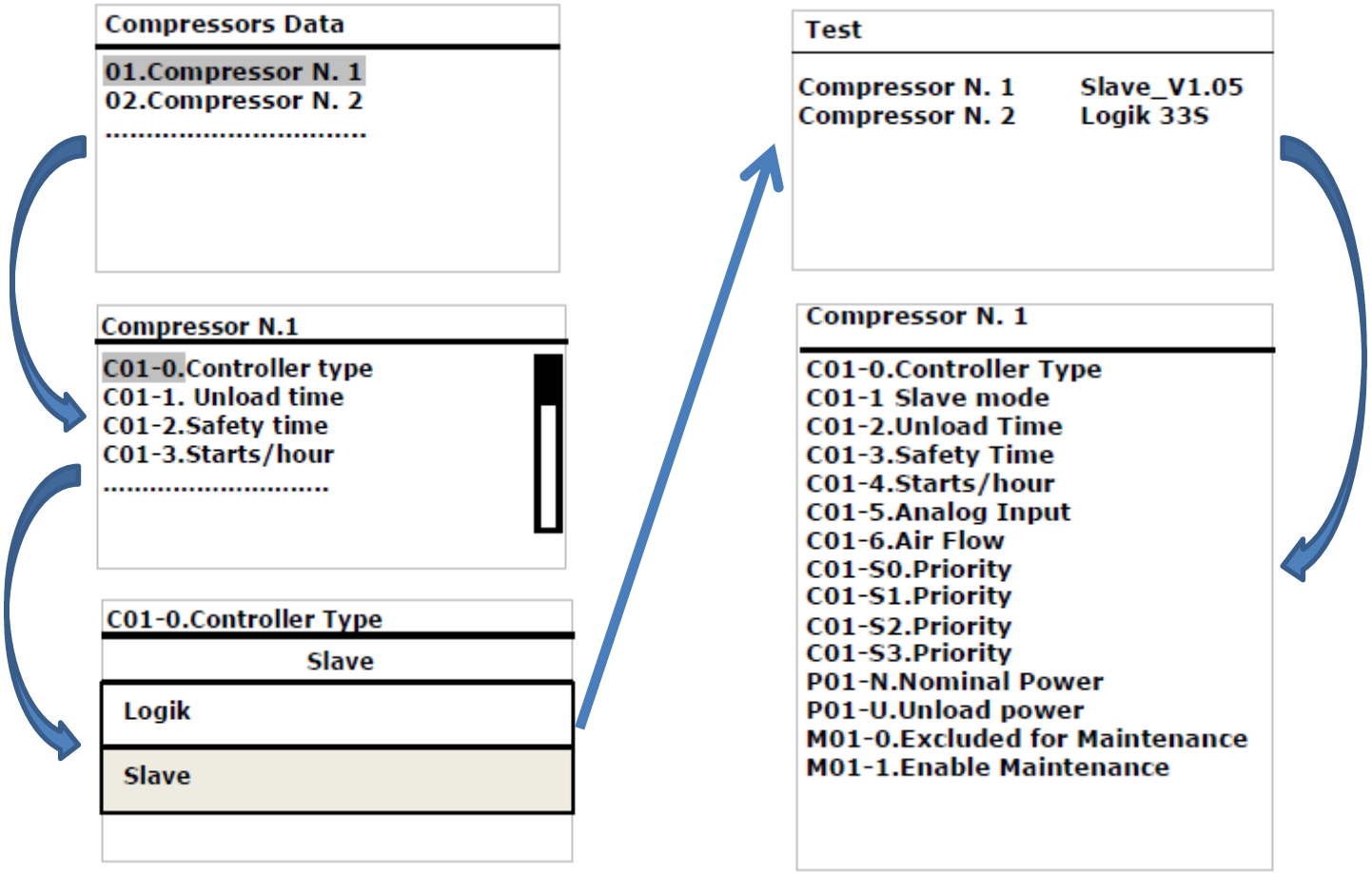
S19 : ALL INVERTER MODULATE

S20 : DELAY FOR MIN PERCENTAGE

S21 : DELAY FOR MAX PERCENTAGE

S22 : MAX. MODULATING COMPRESSOR

MULTIUNIT – LOGIK200 SCREENS

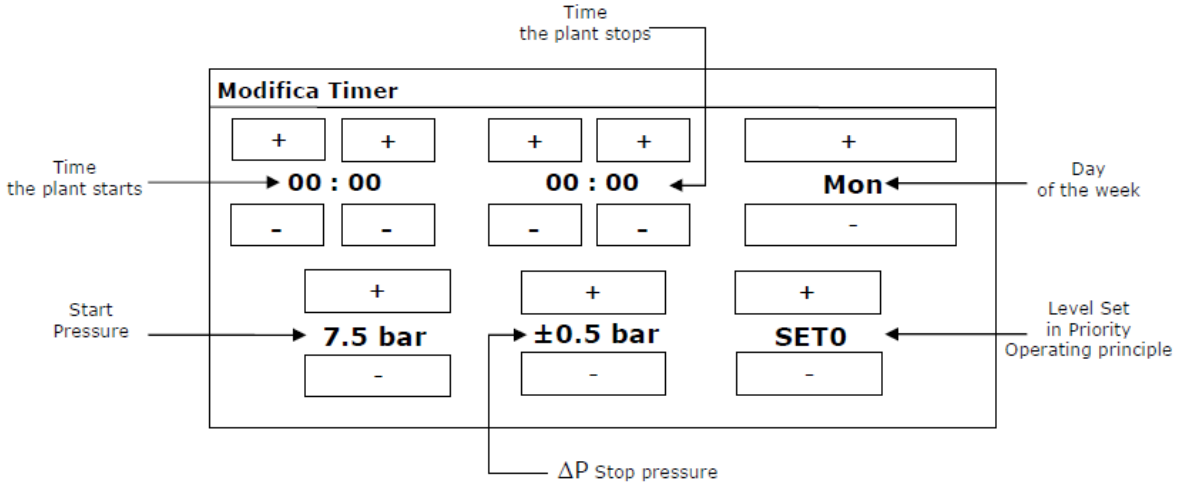


MULTIUNIT – LOGIK200 SCREENS

Pressures
WP1.Top Range
WP2.High Pressure
WP3. Stop Pressure
WP4. Start Pressure
WP5.Low Pressure
WP6.Offset

Temperatures
WT1.High Temperature
WT2.Warn. High Temperature
WT3.Low Temperature
WT4.Offset

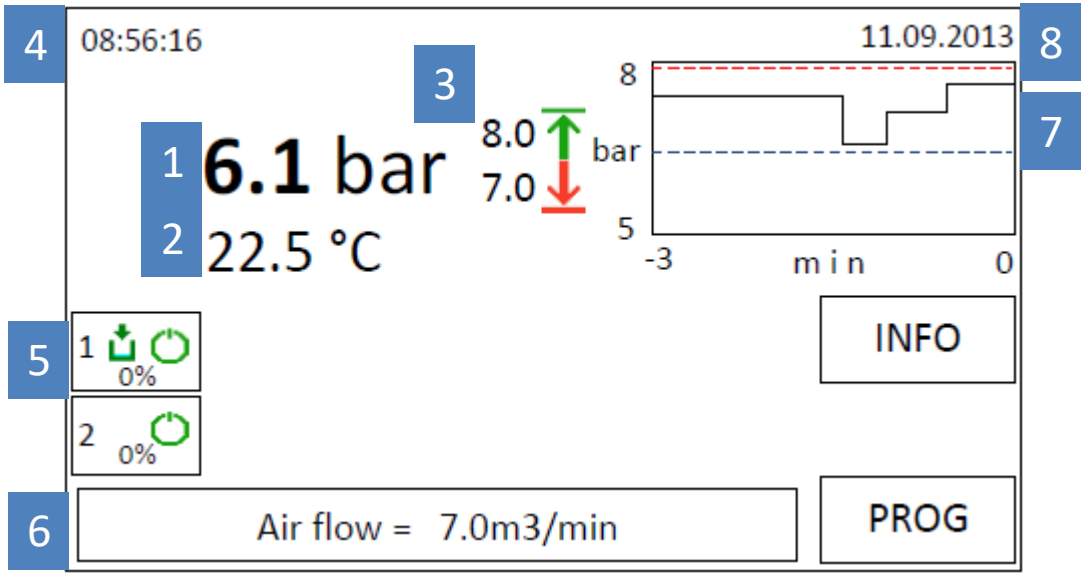
MULTIUNIT – LOGIK200
WEEKLY TIMER



Day interval can be selected as well as single day selection

- Mon / Fri
- Sat / Sun

MULTIUNIT – LOGIK200
VISUALIZATION

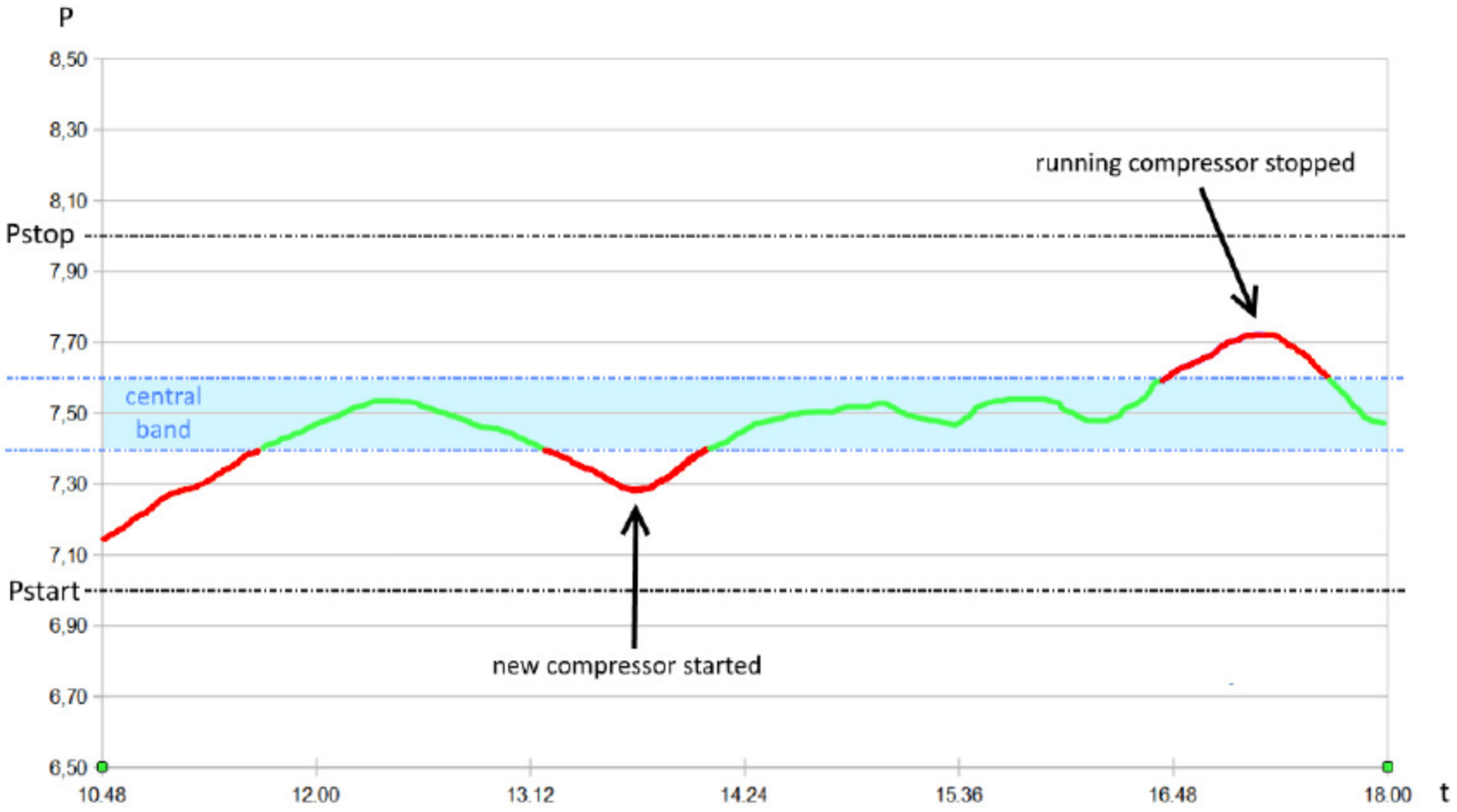


1. Working pressure
2. Working Temp.
3. Start & Stop Press. Levels

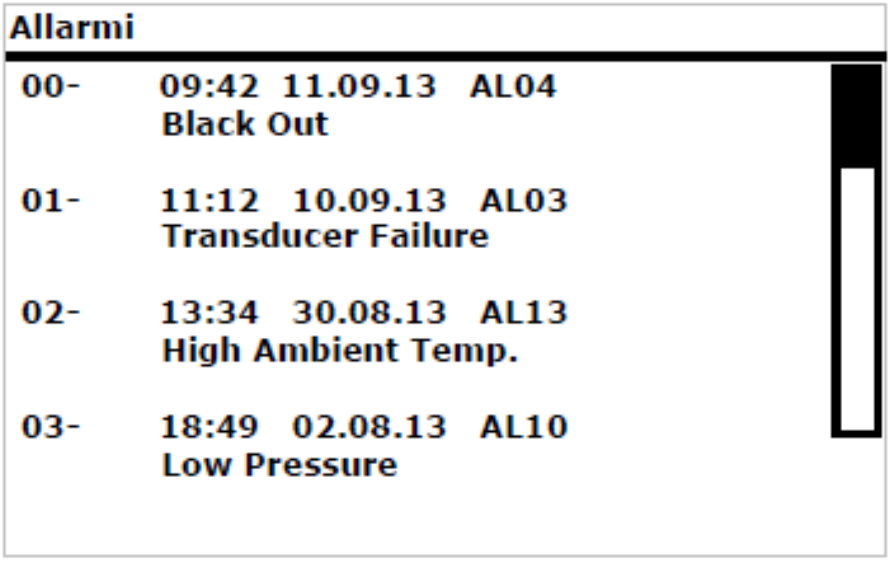
4 – 8 Date and Time

5. Comp. List
6. Average Air Flow
7. Pressure Trend

MULTIUNIT – LOGIK200
TREND AND PRESSURE CONTROL



MULTIUNIT – LOGIK200
ALARMS



- Logik200 lists last 20 alarms occured in the system
- Alarms are related with the communication and Logik200

MULTIUNIT – LOGIK200
ALARMS

Code	Message	Notes
AL01	Setting data lost: default values uploaded	
AL02	High pressure	Working pressure > set WP2
AL03	Transducer failure	
AL04	Black out	Power off and manual restart
AL05	I/O board communication	No communication between I/O board-control panel
AL.Cnn.0	Compr.nn no answer	No communication to compressor nn
AL.Cnn.1	Compr.nn generic failure	Line contactor compressor nn not activated
AL.Cnn.2	Compr.nn max. starts hour	Reached max. starts/hour

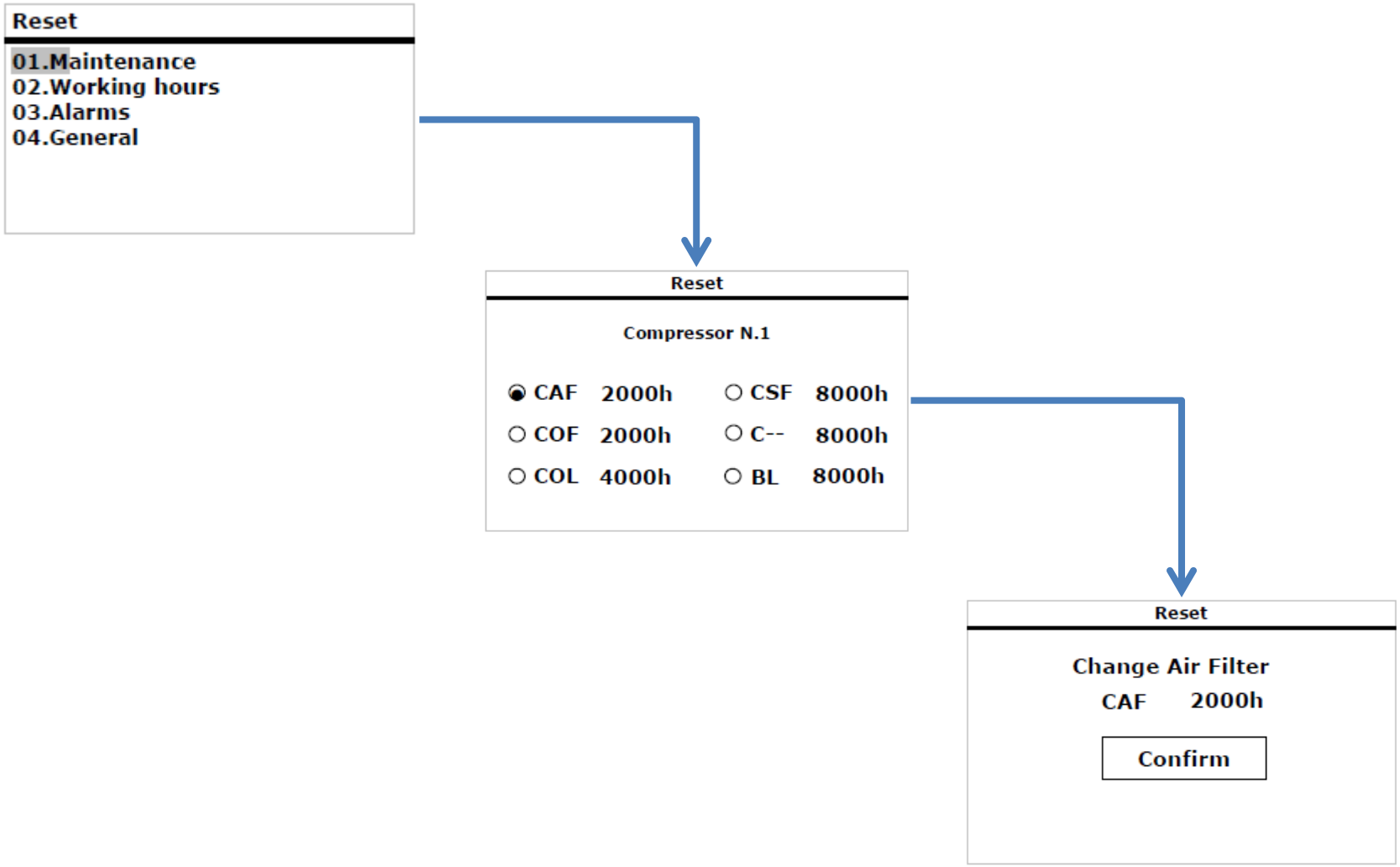
MULTIUNIT – LOGIK200
ALARMS

Code	Message	Notes
AL10	Low pressure	Working pressure < set WP5
AL11	Timekeeper failure	Weekly timer are disabled
AL12	Temperature probe failure	
AL13	High ambient temperature	Ambient temperature > set T1
AL14	High ambient temperature	Ambient temperature > set T2
AL15	Low ambient temperature	Ambient temperature < set T3
AL16	GMT/DST	Automatic change time

MULTIUNIT – LOGIK200
WARNINGS

Code	Message	Notes
AL.Cnn.3	Compr.nn	Timer CAF compressor nn over
AL.Cnn.4	Compr.nn	Timer COF compressor nn over
AL.Cnn.5	Compr.nn	Timer CSF compressor nn over
AL.Cnn.6	Compr.nn	Timer C-- compressor nn over
AL.Cnn.7	Compr.nn	Timer C-h compressor nn over
AL.Cnn.8	Compr.nn	Timer BL compressor nn over

MULTIUNIT – LOGIK200
RESET



MULTIUNIT – LOGIK103

Relay Connection

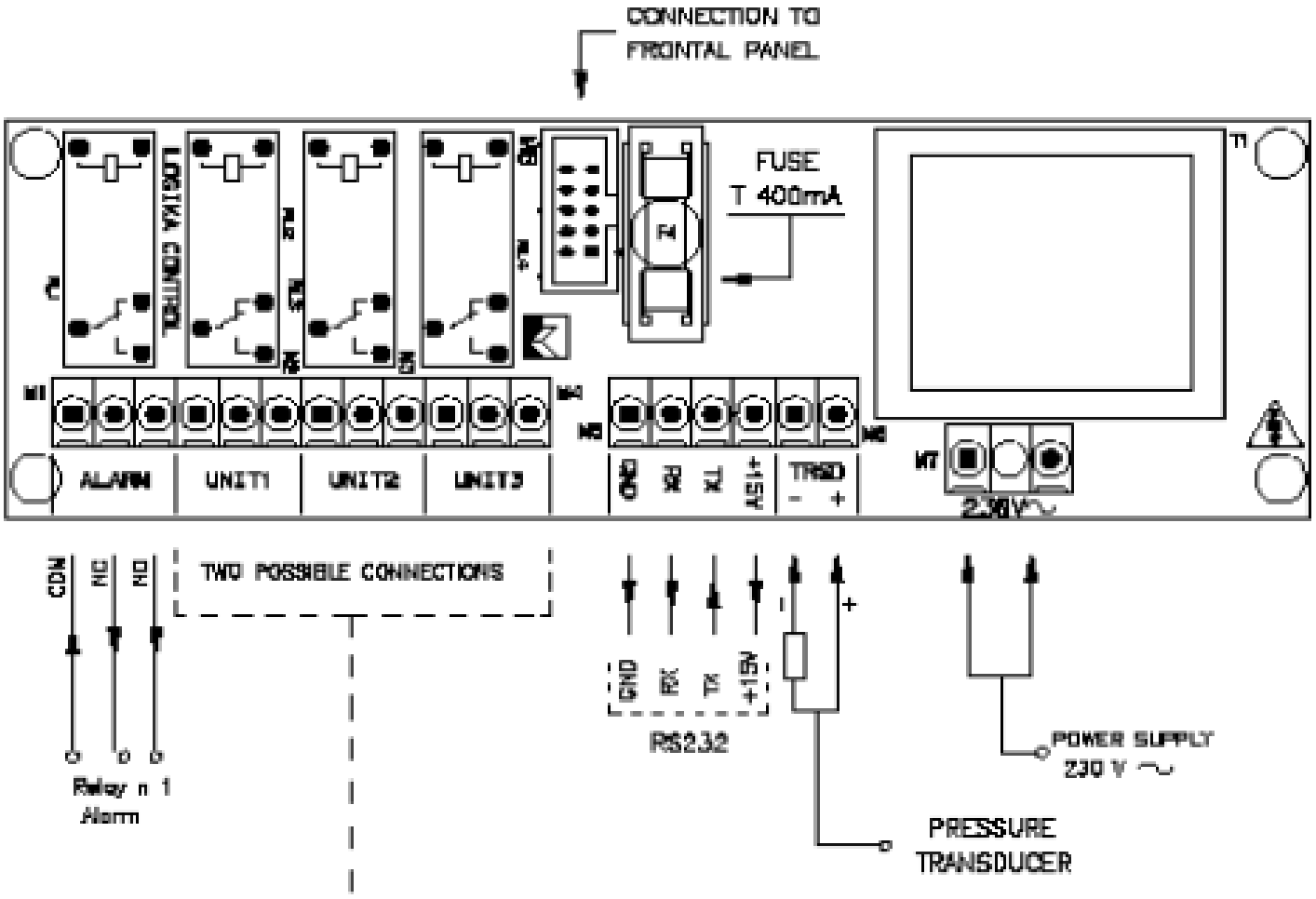
Logik9

Logik33S

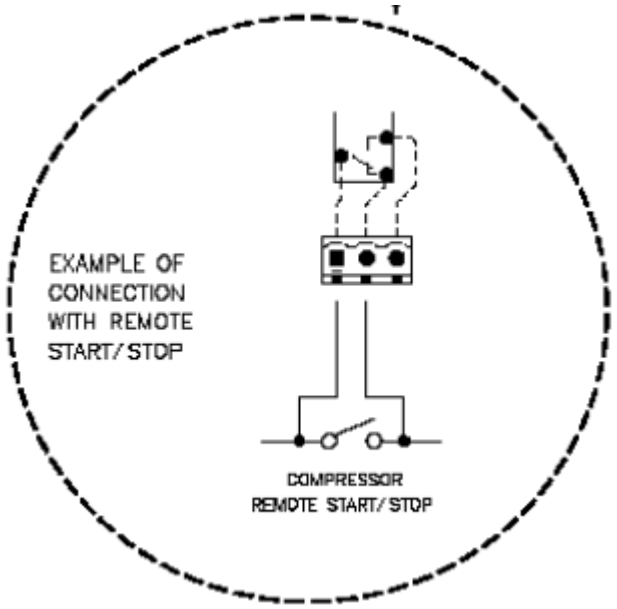
Logik26S

Other Brand Comp.

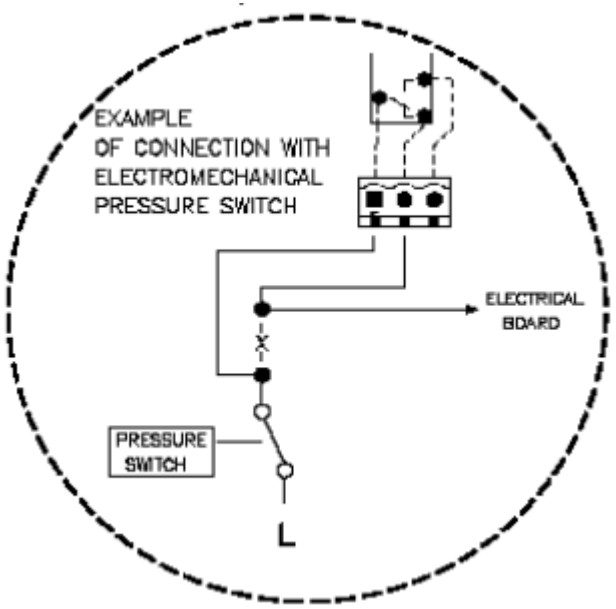
MULTIUNIT – LOGIK103
CONNECTIONS



MULTIUNIT – LOGIK103
CONNECTIONS

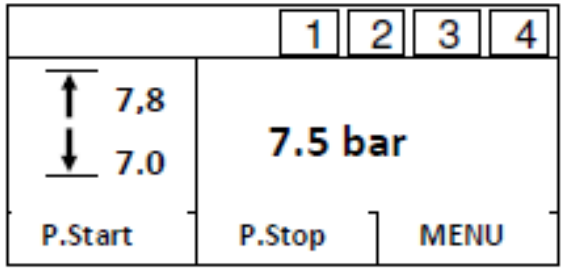


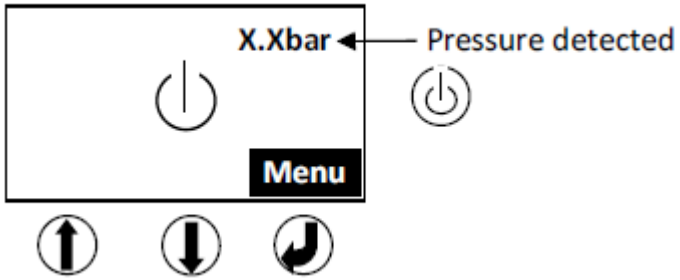
Connection with Remote Start /Stop



Connection with Pressure Switch

MULTIUNIT – LOGIK103
VISUALIZATION



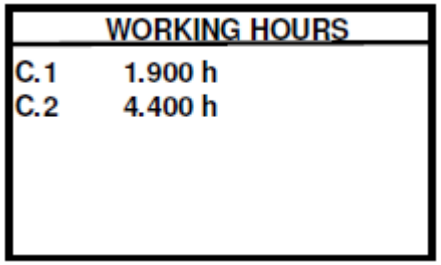


- Timer controlled start / stop
- 1 — Comp1 stop
- 1 — Comp1 start
- 1 (blinking) — Comp1 unload
- 1 — Out of service
- P2 — Second Pressure level is enabled
- Alarm
- Maintenance warning

MULTIUNIT – LOGIK103
PROGRAMMING

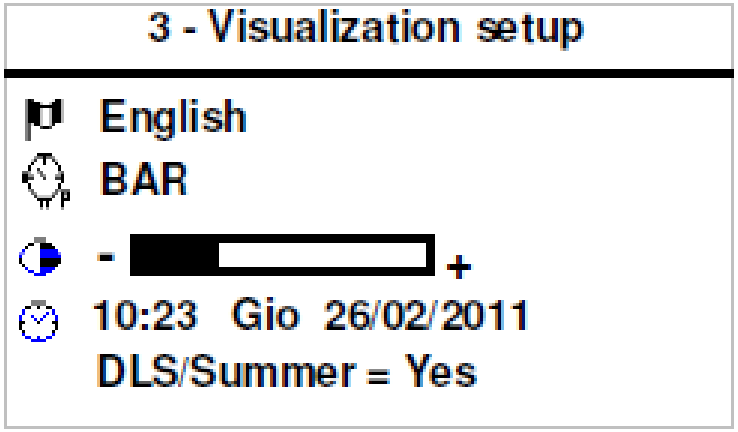
1 – Info
2 – Password-Change password
3 – Visualization setup
4 – Plant setup
5 – Pressures
6 – Weekly Timer
7 – Maintenance
8 – Alarms
9 – GSM Unit
10 – Reset

- INFO



Code	Meaning
M1- C.1-2-3-4	Change air filter
M2- C.1-2-3-4	Change oil filter
M3- C.1-2-3-4	Change separator filter
M4- C.1-2-3-4	Change oil
M5- C.1-2-3-4	Check compressor

- VISUALIZATION



MULTIUNIT – LOGIK103 PROGRAMMING

- PLANT SETUP

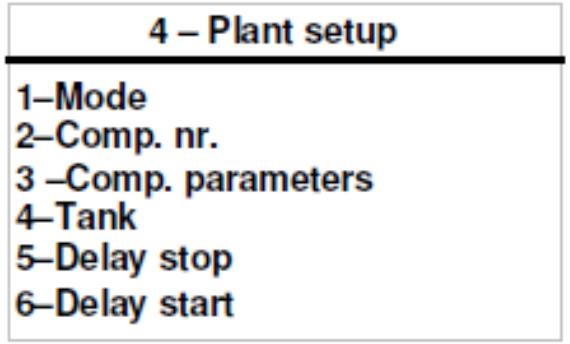
4 – Plant setup
1–Mode
2–Comp. nr.
3 –Comp. parameters
4–Tank
5–Delay stop
6–Delay start

4-3-Comp. parameters
Comp. nr.1
Comp. nr.2
Comp. nr.3
Comp. nr.4

- Air flow
- Priority
- Priority set
- Loading time
- Unload time
- Safety time
- Max. Load time
- Reset time
- Starts Hour
- Working Hours

MULTIUNIT – LOGIK103 PROGRAMMING

- PLANT SETUP



4 - Tank

5 - Delay Stop

6 - Delay Start

7 - Power on

8 - Restart

9 – Balance Hours

10 – Reserv Comp.

11 – Relay Operation

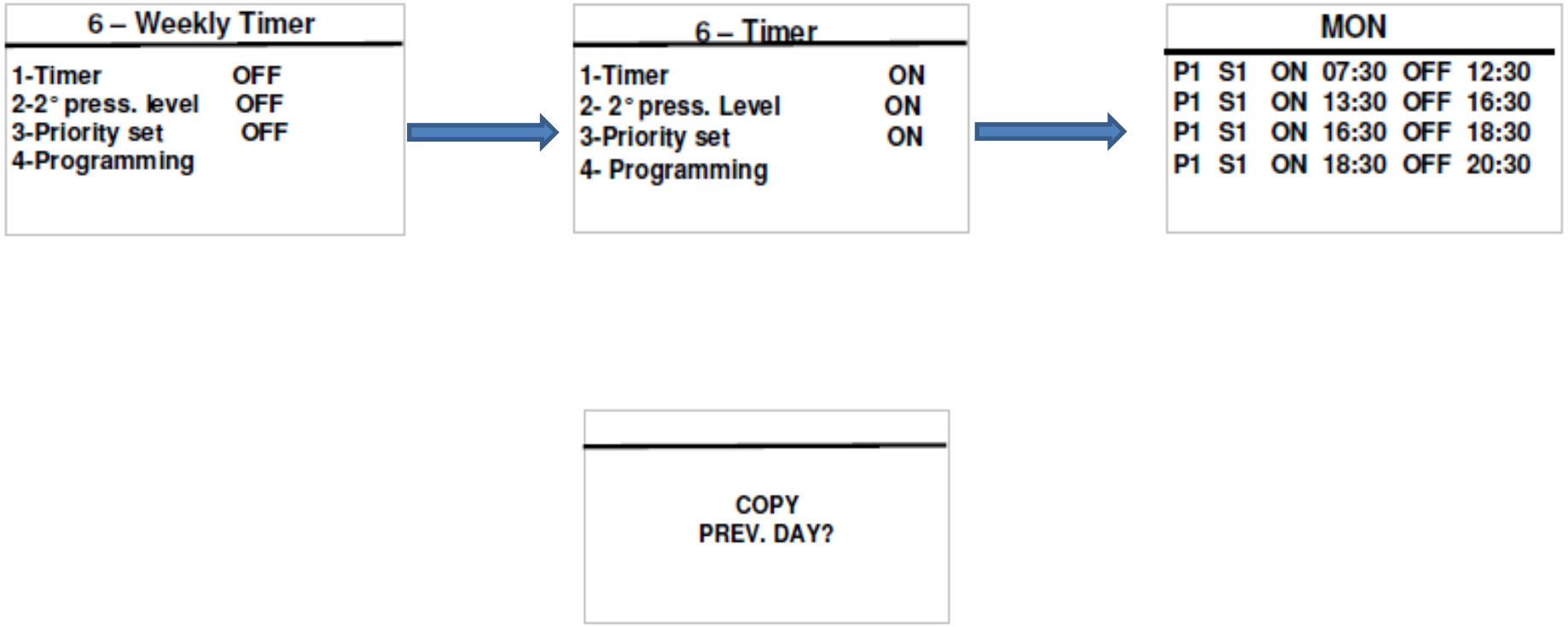
MULTIUNIT – LOGIK103
PROGRAMMING

- PRESSURES

Description	Setting range	Default	Password
P1-Top range transducer	15 ÷ 50	15,0 bar	X
P2-High pressure alarm	(P3+0,5) ÷ (P1-0,5)	10,0 bar	X
P3-Stop pressure	(P4+0,2) ÷ (P2-0,2)	8,0 bar	
P4-Start pressure	3 ÷ (P3-0,2)	7,0 bar	
P5-Offset transducer	-2,0 ÷ +2,0	0 bar	X
P6-Low pressure alarm	(P4-0,5) ÷ 3	6,0 bar	X
P7-P. Stop 2nd level	(P8+0,2) ÷ (P3+0,5)	7,5 bar	
P8-P. Start 2nd level	3 ÷ (P7–0,2)	6,5 bar	

MULTIUNIT – LOGIK103 PROGRAMMING

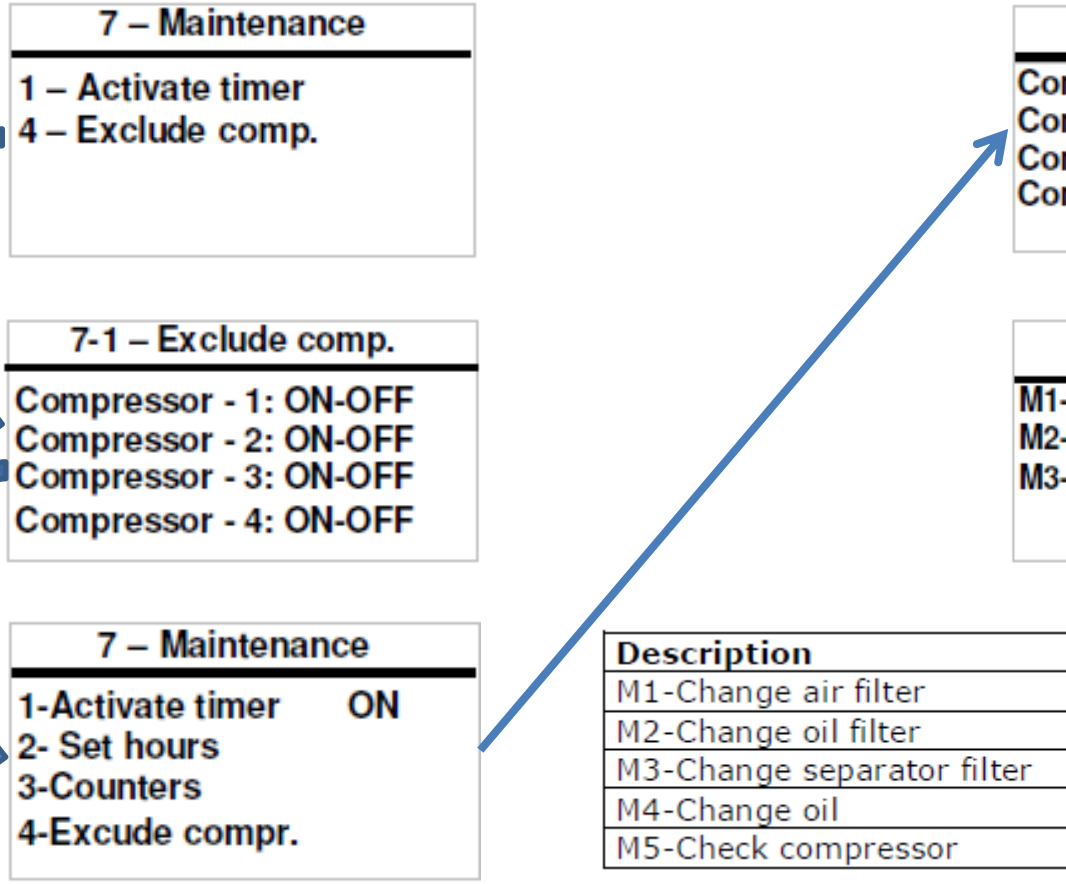
WEEKLY TIMER



By using copy feature, its easy to configure each repeating schedule day

MULTIUNIT – LOGIK103
PROGRAMMING

- MAINTENANCE



Description	Setting range	Deafult
M1-Change air filter	100 ÷ 3.000 h	2.000 h
M2-Change oil filter	100 ÷ 10.000 h	2.000 h
M3-Change separator filter	100 ÷ 10.000 h	4.000 h
M4-Change oil	100 ÷ 10.000 h	8.000 h
M5-Check compressor	100 ÷ 10.000 h	8.000 h

MULTIUNIT – LOGIK103
ALARMS

- SYSTEM SHUT DOWN ALARMS

Code	Cause	Meaning
AL.B.0		Setting data lost
AL.B.1	P. > set P2	High pressure
AL.B.2	P.1	Pressure transducer failure
AL.B.3*	Power Fault	Black-out

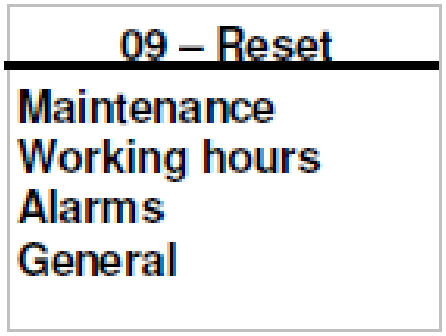
MULTIUNIT – LOGIK103
ALARMS

- COMP. SHUT DOWN ALARMS

Code	Cause	Meaning
AL.W.1	P < set P6	Low pressure
AL.W.2	Time-keeper failure	Start and stop not managed by clock
AL.W.3-x	Starts/hour > set 4.3.7	
AL.W.4-X	Max. load 4.3.9	Max. load time is over

MULTIUNIT – LOGIK103
PROGRAMMING

- RESET



Select comp. number

↓

Select the value need to be reset

↓

Value will blink

↓

Confirm and Resetting will appear on the screen

ETHERNET SERIAL GATEWAY

Ethernet Serial Gateway:

- Cloud based mode : the compressor plant monitoring by using internet connection
- Modbus RTU -> Modbus TCP converter

Serial Ethernet Interface

Modbus RTU / Modbus TCP

Cloud – Server

TCP/IP – WebServer Interface

RS485 line
Modbus Rtu Protocol

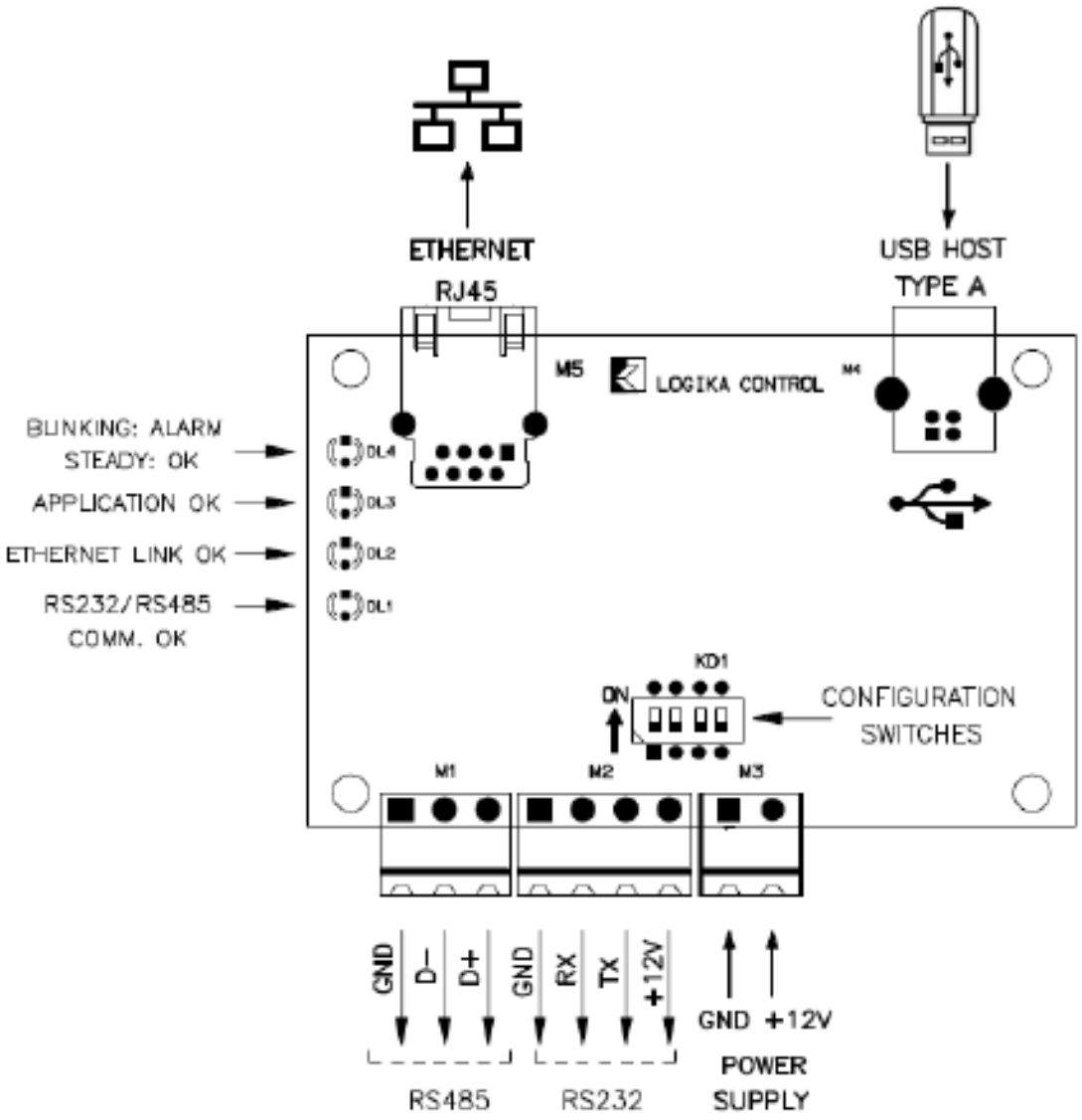
Logik9

Logik33S

Logik26S

12 units can be connected

ETHERNET SERIAL GATEWAY CONNECTIONS

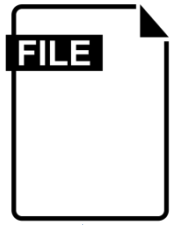


ETHERNET SERIAL GATEWAY CONFIGURATION

config.logika.cloud

Trasponder configuration

CREATE | VİEW



Gateway type ◉ Cloud ○ MODBus

DHCP ◉ OFF ○ ON

IP address

0.0.0.0

Subnet

255.255.255.0

Gateway

0.0.0.0

DNS 1

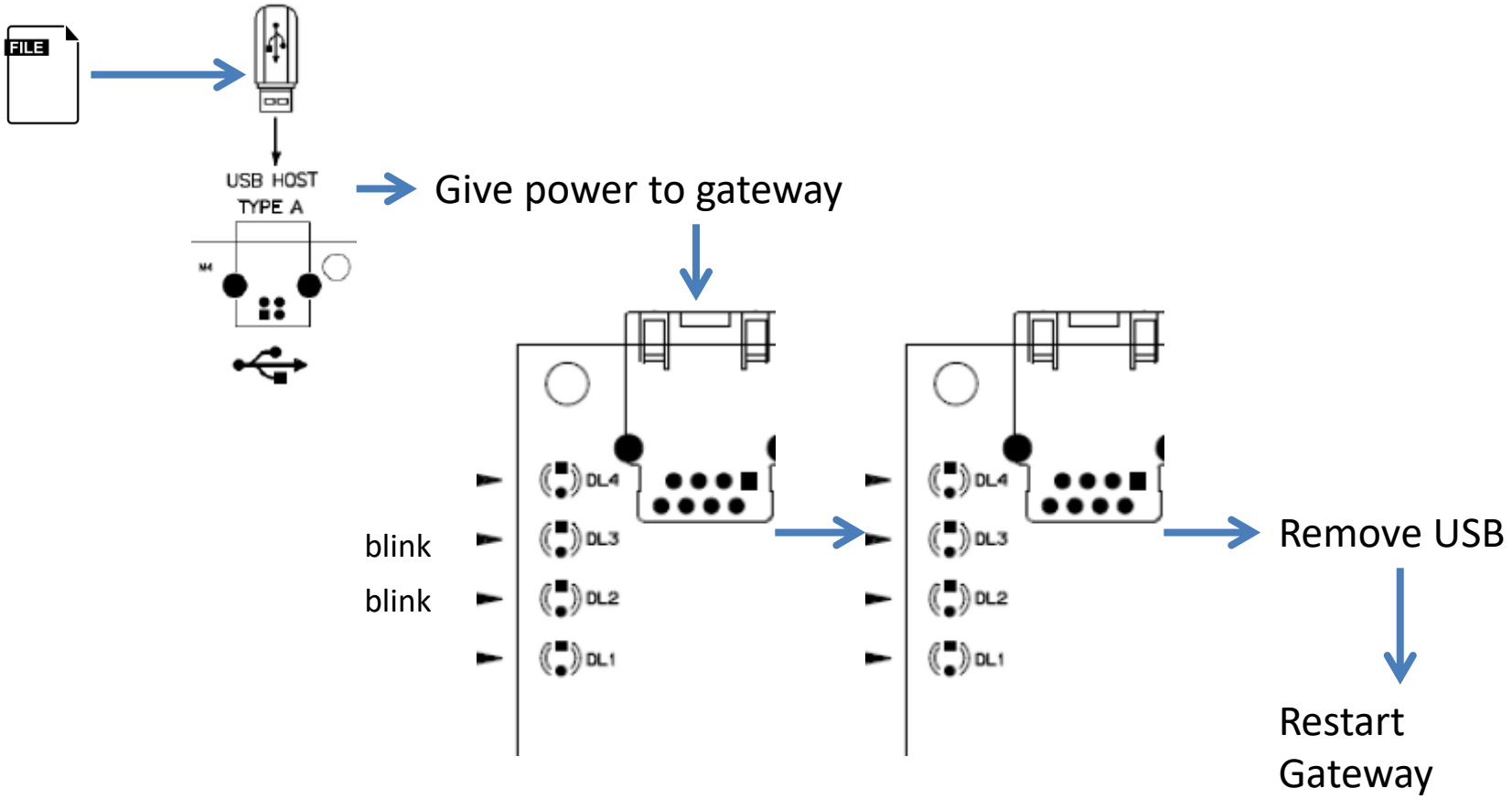
8.8.8.8

DNS 2

8.8.4.4

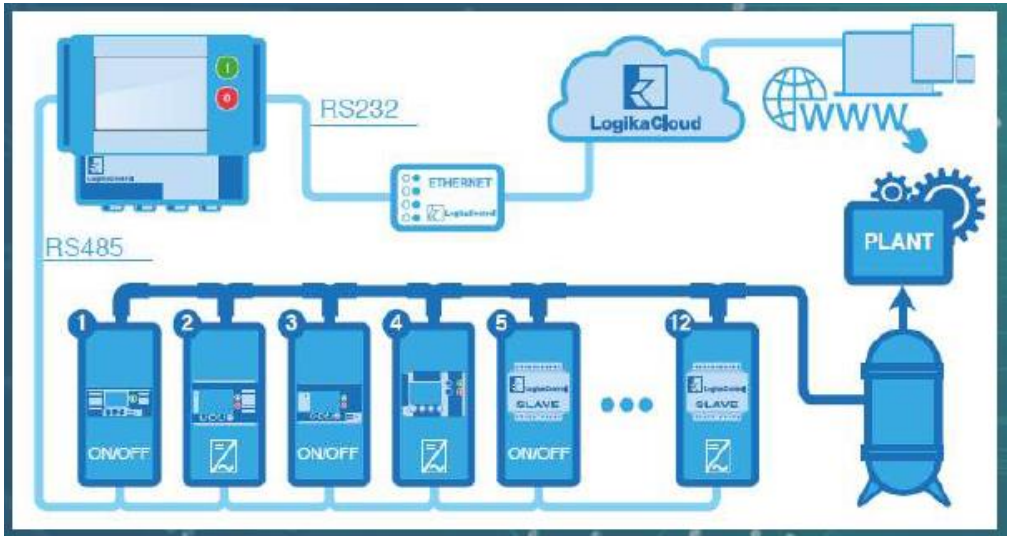
Generate new configuration set

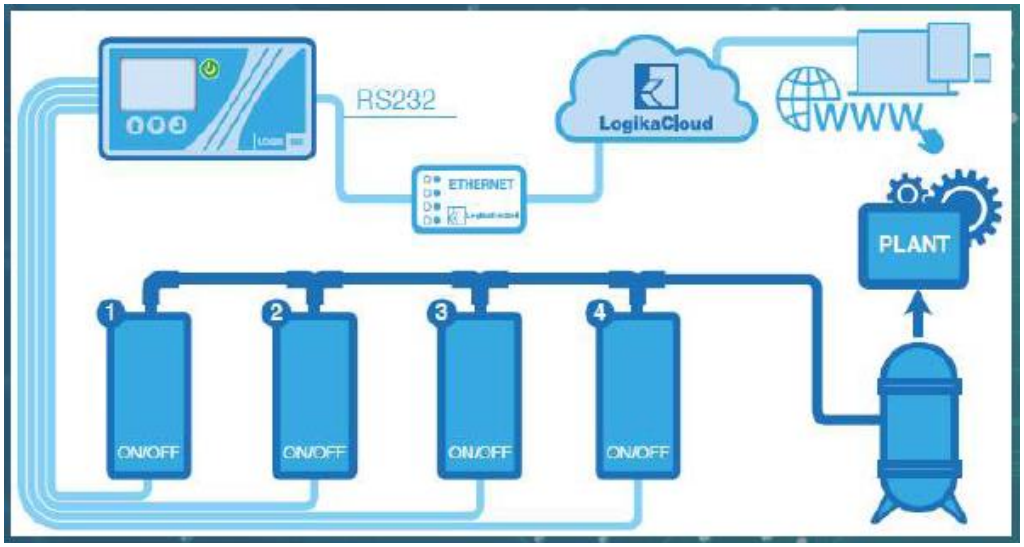
ETHERNET SERIAL GATEWAY CONFIGURATION



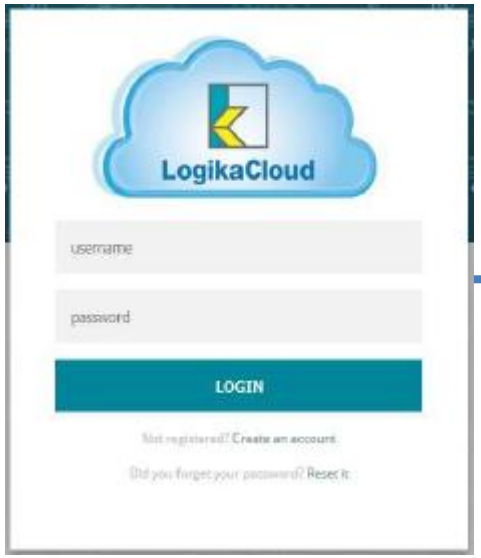
If firmware update fails ,then DL4 led will start to blink continously

ETHERNET SERIAL GATEWAY
WORKING PRINCIPLE

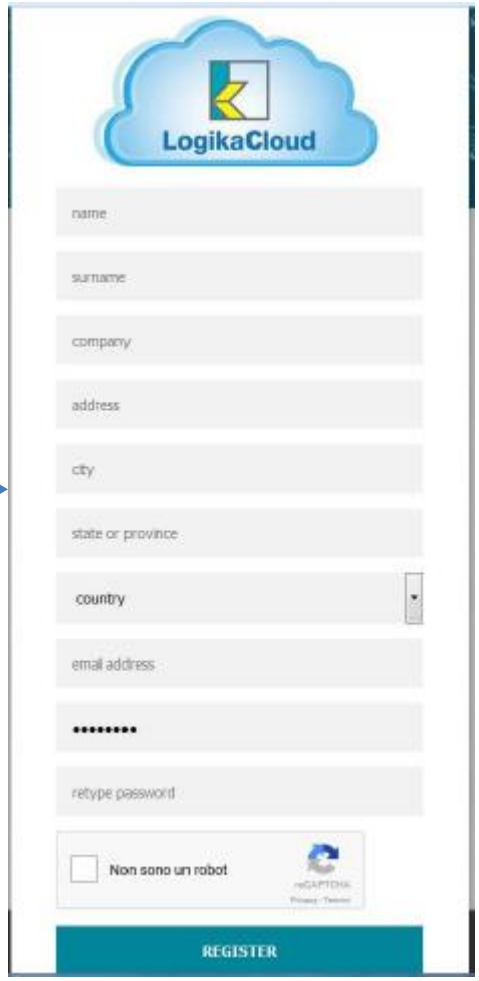




ETHERNET SERIAL GATEWAY
CLOUD LOGIN



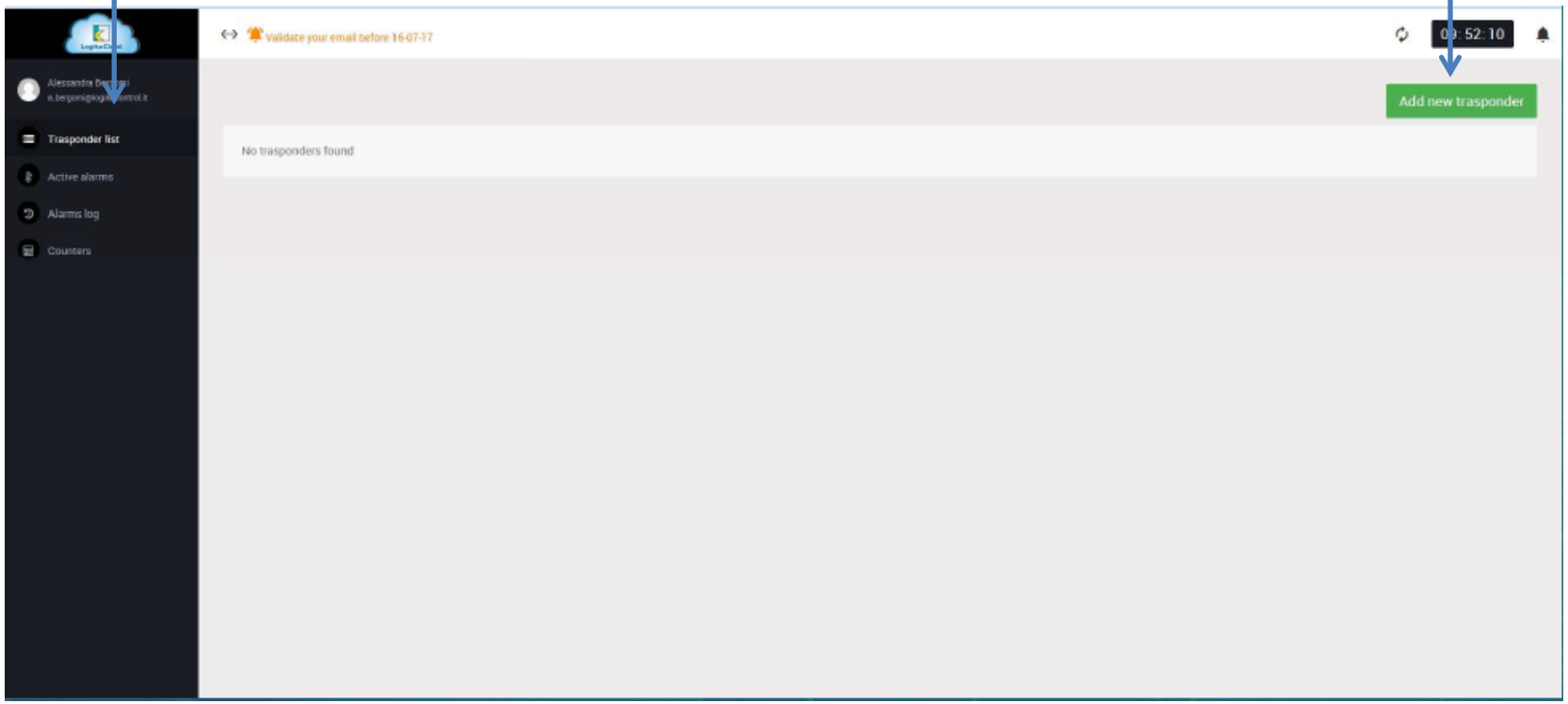
Create new account



ETHERNET SERIAL GATEWAY
TRANPONDER ADDING

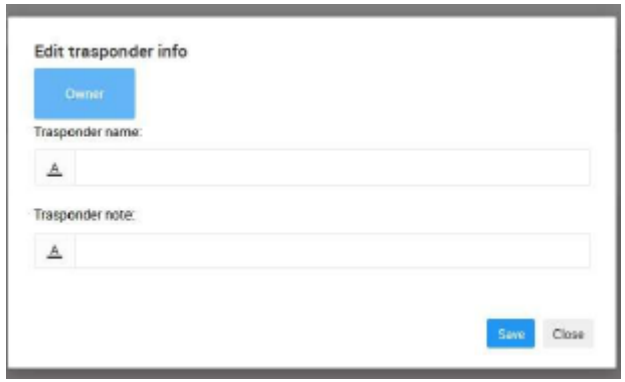
Transponder list

Add new transponder



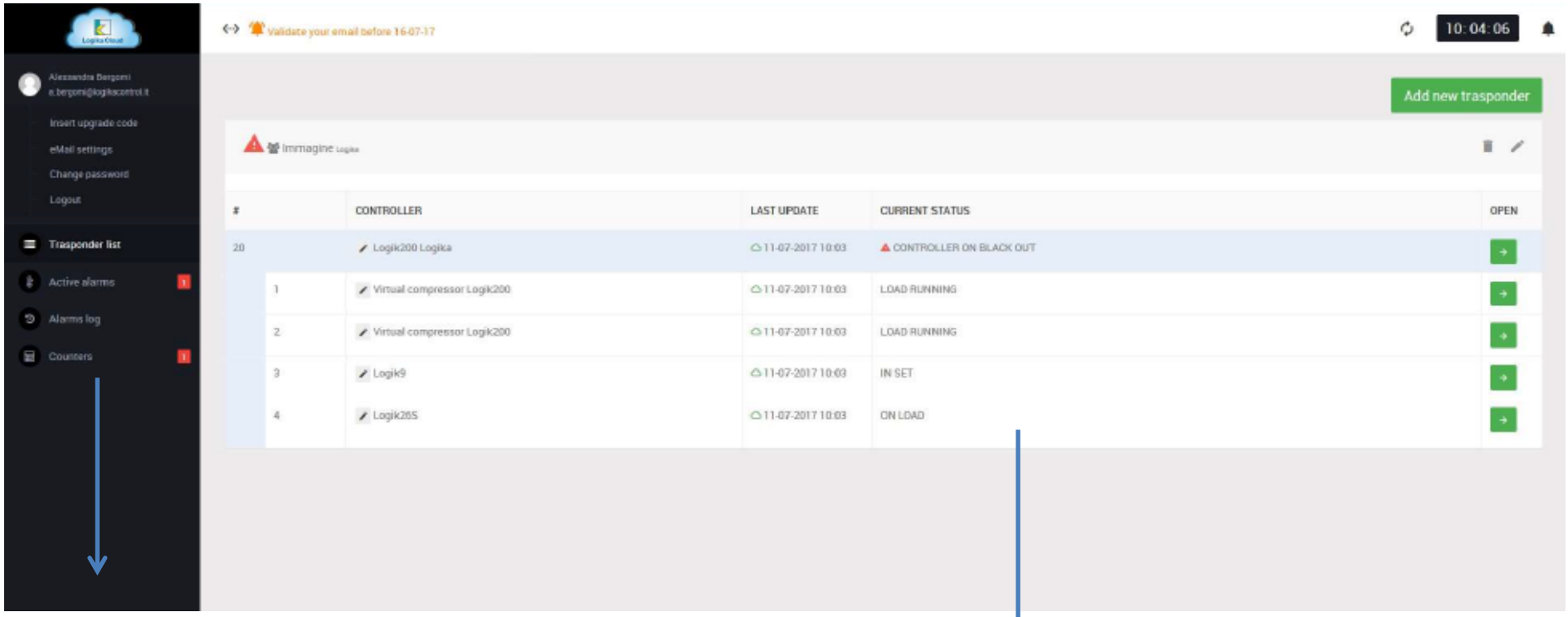
ETHERNET SERIAL GATEWAY TRANSPONDER ADDING

Enter 10 digits Transponder ID which is located behind of the device



Give name and description for regarding transponder

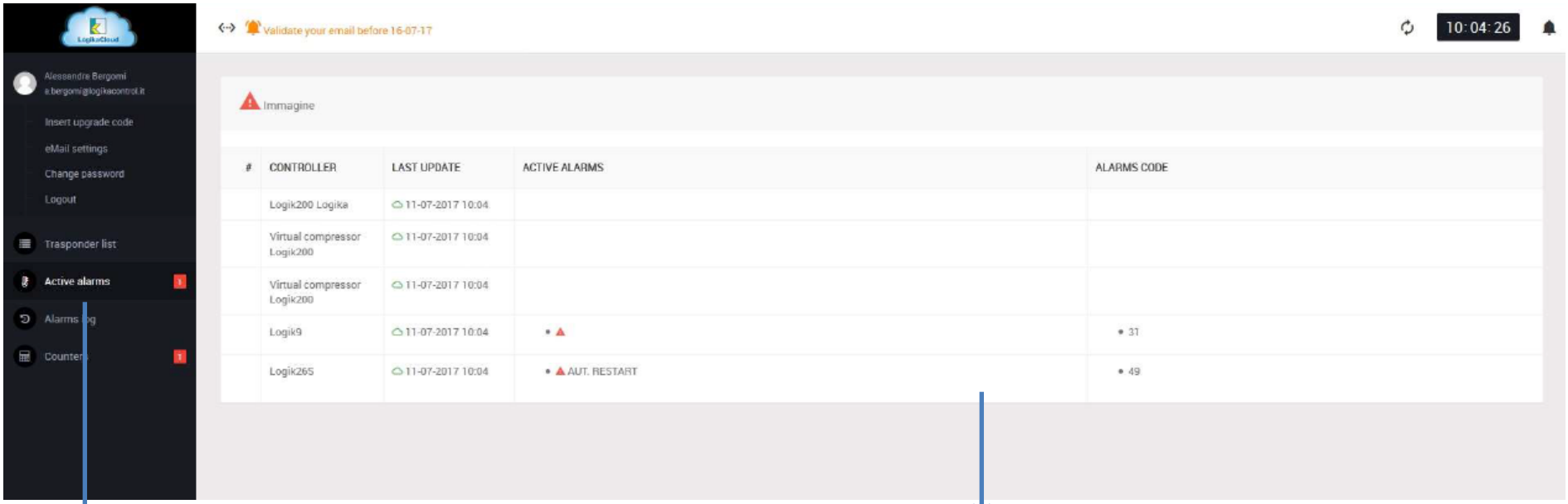
ETHERNET SERIAL GATEWAY
COMPRESSOR LIST



Alarms and Counters info

List of the controller connected to the transponder

ETHERNET SERIAL GATEWAY
ALARM LIST



Alarms

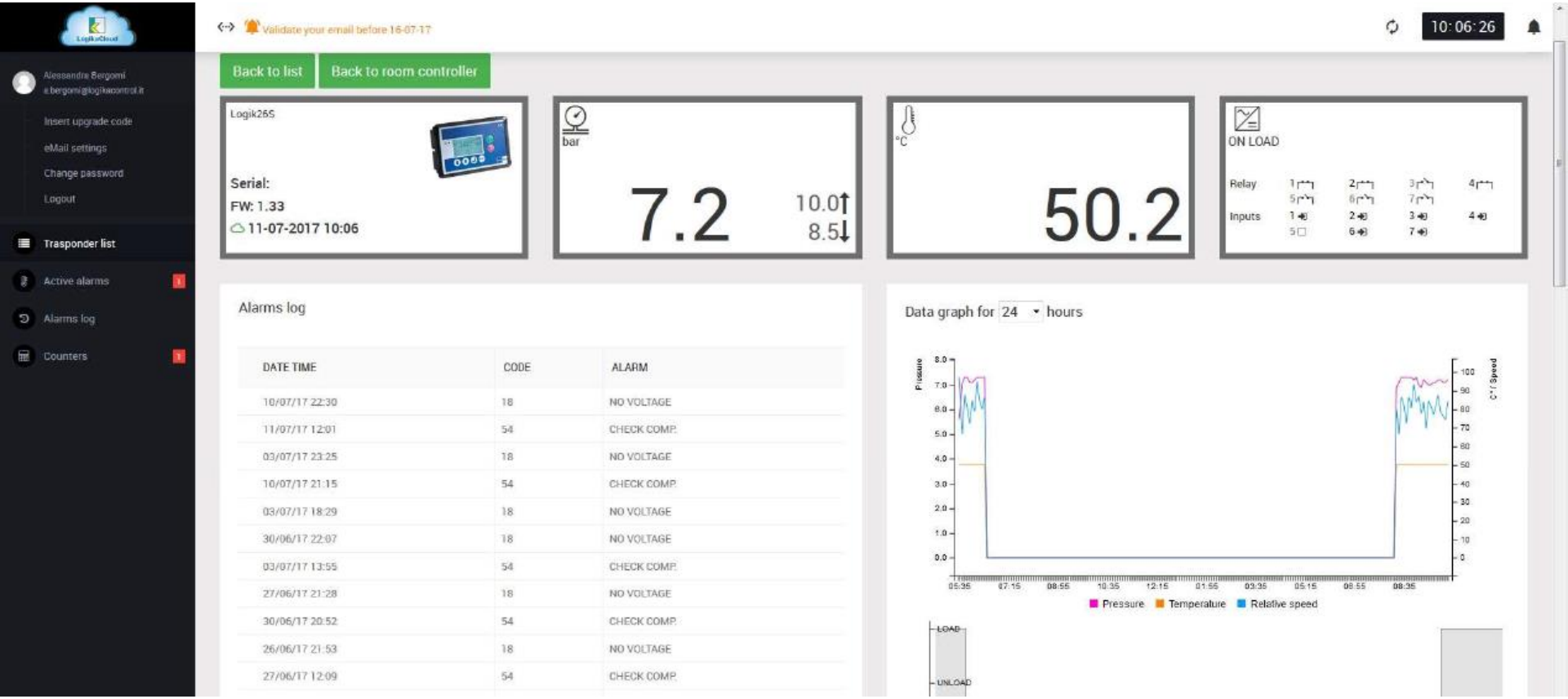
Total alarm list of connected controllers for regarding transponder

ETHERNET SERIAL GATEWAY COUNTERS

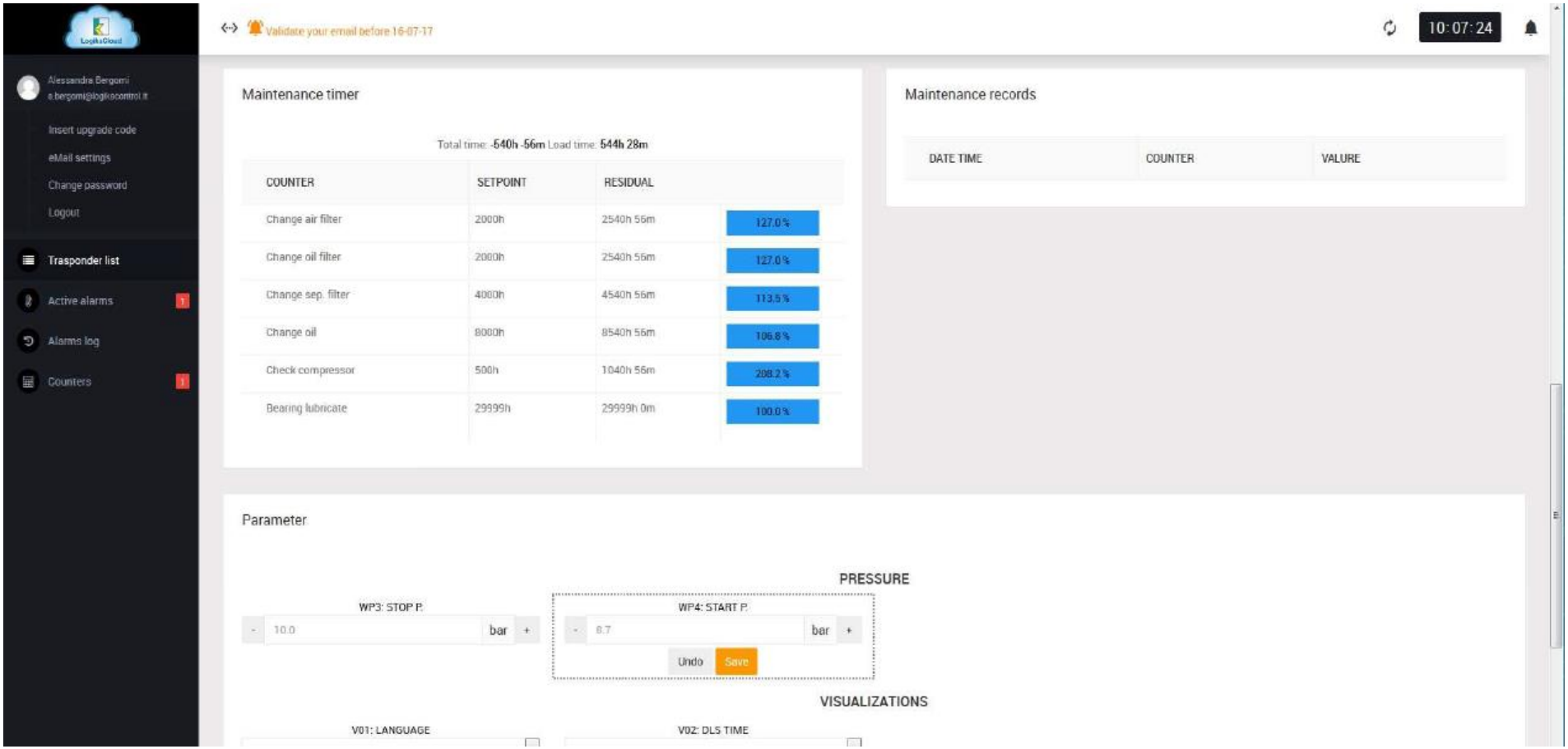
Counters

Maintenance and Running hour visualizations of connected controllers

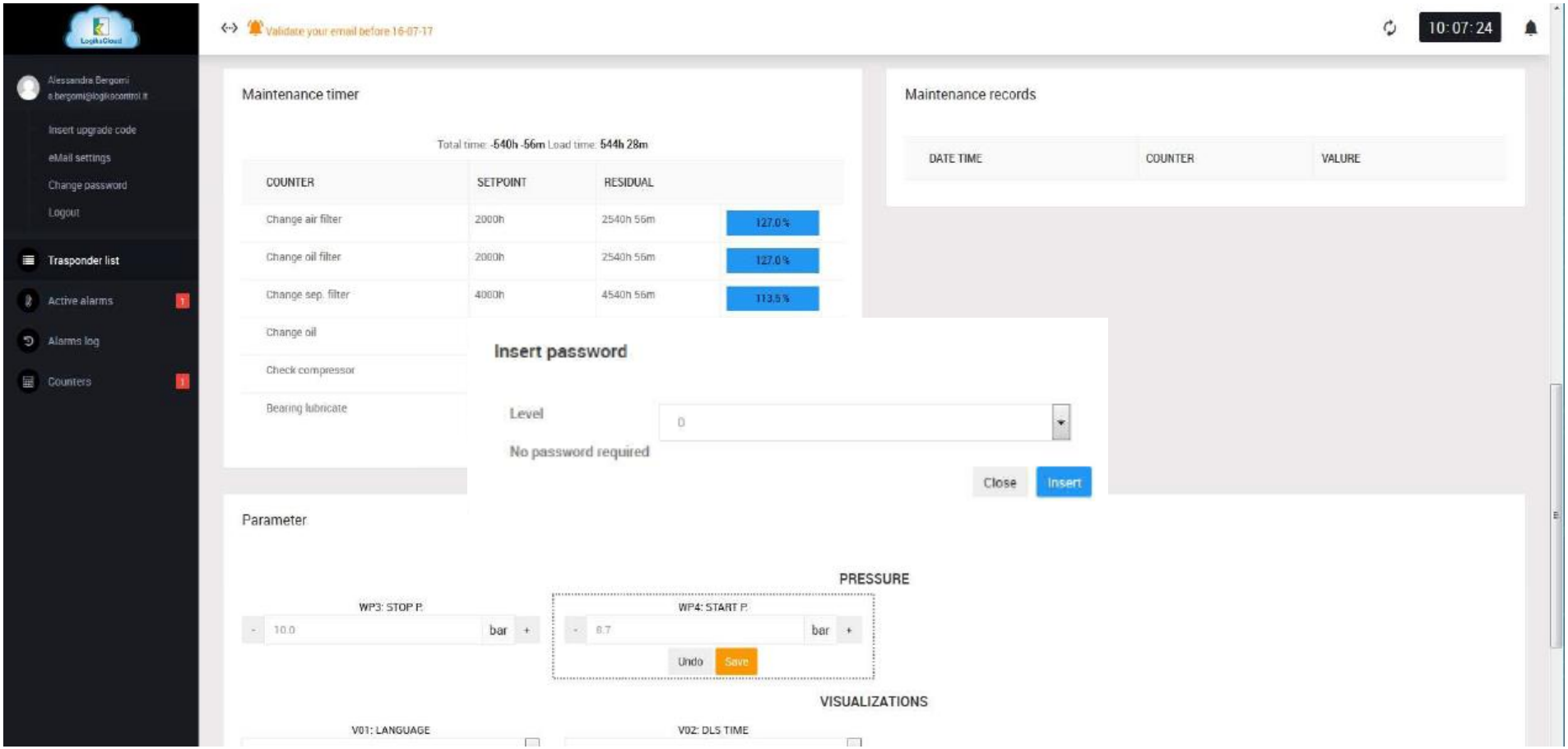
ETHERNET SERIAL GATEWAY
COMPRESSOR DATA



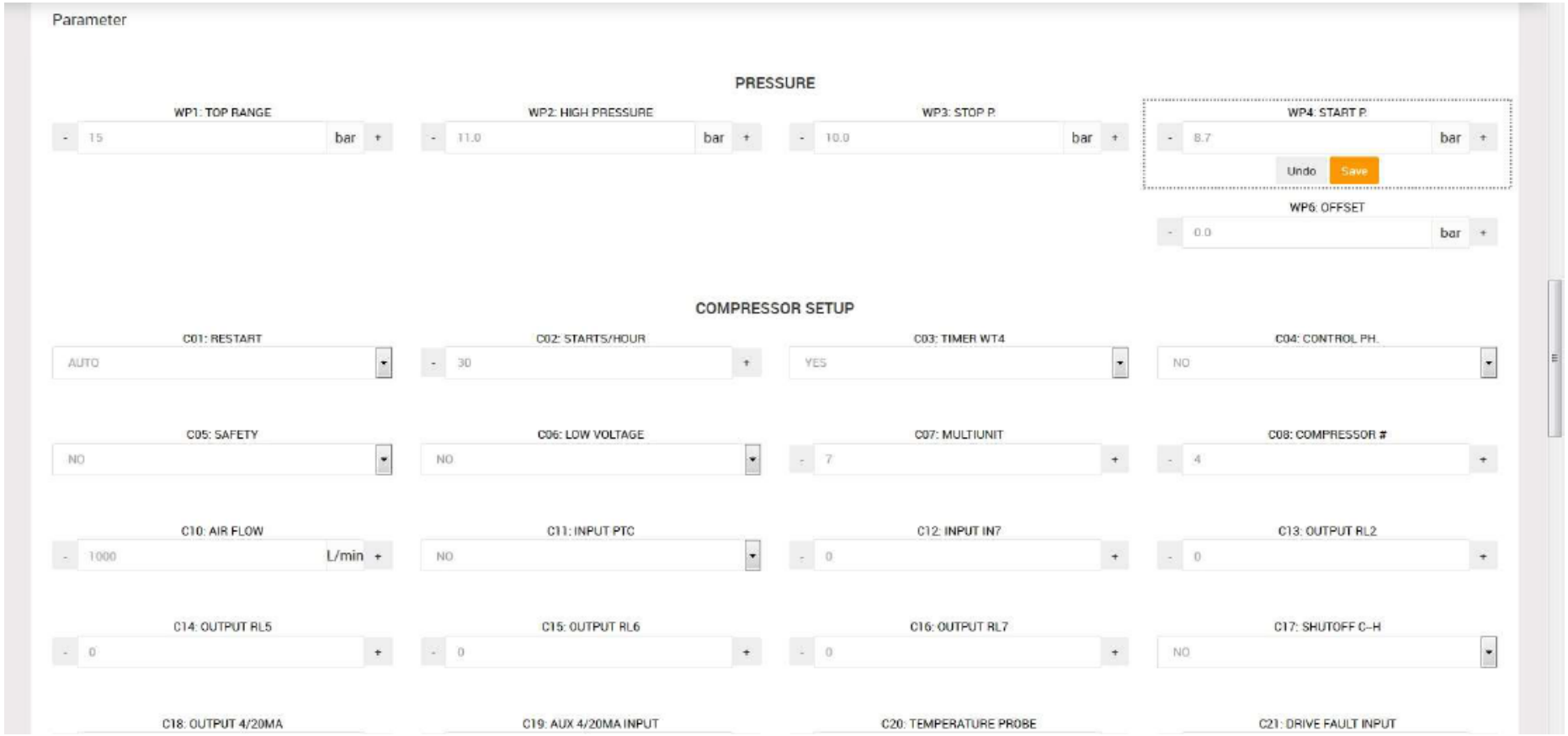
ETHERNET SERIAL GATEWAY
PARAMETER MANAGEMENT



ETHERNET SERIAL GATEWAY
PARAMETER MANAGEMENT



ETHERNET SERIAL GATEWAY
PARAMETER MANAGEMENT



STAND ALONE COMMUNICATION

- Baud Rate : 9600 bits/s
- Parity : None
- Stop Bits : One
- Modbus Address = Comp. number

Logik9

Logik33S

Logik26S

RS485 line
Modbus Rtu Protocol

STAND ALONE COMMUNICATION

Logik9

Logik33S

Logik26S

RS485 line
Modbus Rtu Protocol

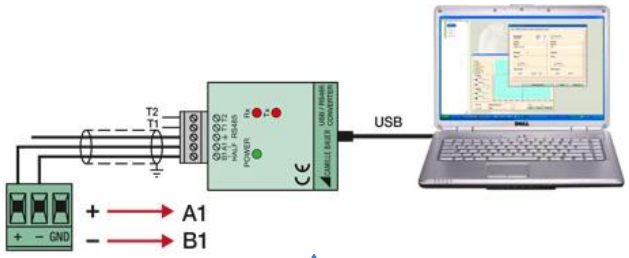
0408	unsigned	W	2	Controller fieldbus commands	Bit mapped allocation: 0x0001 START COMPRESSOR 0x0002 STOP COMPRESSOR 0x0004 ALARM RESET 0x0008 - 0x0010 - 0x0020 ACK & RESET ALL ALARMS 0x0040 - 0x0080 WATCHDOG (IF SET, MUST BE SET AGAIN EVERY 5 SECONDS OTHERWISE COMPRESSOR STOPS WITH A FIELDBUS FAULT THAT MUST BE RESET EITHER BY FIELDBUS OR MANUALLY) 0x0100 RESET AIR FILTER MAINT. COUNTER 0x0200 RESET OIL FILTER MAINT. COUNTER 0x0400 RESET SEPARATOR FILTER MAINT. COUNTER 0x0800 RESET OIL MAINT. COUNTER 0x1000 RESET COMPRESSOR MAINT. COUNTER 0x2000 RESET BEARING LUBRICATE COUNTER

STAND ALONE COMMUNICATION
LOGIK CLIENT

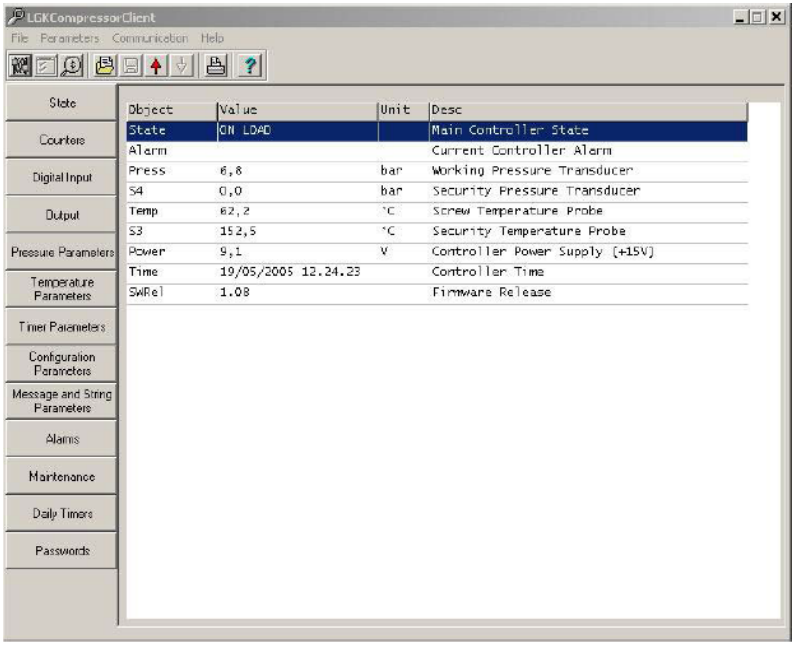
Logik9

Logik33S

Logik26S



RS485 line
Modbus Rtu Protocol



- Parameter management
- Compressor observation
- Alarm handling

STAND ALONE COMMUNICATION
OTHER SOLUTIONS

Logik9

Logik33S

Logik26S

RS485 line
Modbus Rtu Protocol

Modbus

Protocol
Converter

BACnet

PROFIBUS

EtherNet/IP

PROFINET

hertz
KOMPRESSOREN

Thank You …