EWCM 800/S

compressors manager

WHAT IT IS

The EWCM 800/S is a series of controllers designed specifically for the control of a machine room in a refrigeration system.
EWCM 800/S provides control management of the compressors (single units, multistage systems or compressors having different power).

HOW IT IS MADE

- **Housing: black ABS plastic, 72x144 mm, depth 120 mm**
- **Mounting: flush panel mount (67x136 mm) with brackets**
- **Connections: quick-disconnect screw terminal block**
- **Refrigerants: 22, R 134 A, 502, 404 A, 407, 507**
- **Suction sensor input: NTC or 4…20 mA pressure transducer (scaleable)**
- **One pressurestat alarm input**
- **Global alarm output: relay 6(3)A 250V AC**
- **Controller breakdown output: relay 6(3)A 250V AC**
- **Configurable outputs: 4, 6 or 9 relays 6(3)A 250V AC**
- **Alarm inputs: 4, 6 or 9 optoisolated inputs (the same voltage of the supply)**
- **Serial connection: RS-485 port for connection to the TELEVIS system**
- **Resolution: 0,01 bar; 0,1 PSI (°C); 1°F**
- **Accuracy: better than 0,5% end of scale**
- **Consumption: 6 VA**
- **Power supply: Depending on the model. See label on the instrument.**

PLUS PRODUCT

- **Alarm circuit combined with each compressor**
- **Clock to set the various operation setpoints in various time periods**
- **Conversion chart for the various freon types commonly used**

GENERAL FEATURES

The new EWCM 800/S is a series of controllers designed specifically for the control of a machine room in a refrigeration system.
The main input comes from a 4…20 mA pressure transducer for freon gas or from a NTC temperature probe, while up to 9 relay outputs with their digital alarm inputs are provided for the management of the single units, multistep compressors and compressors having different power.
The EWCM is provided with the management of the high and low pressure alarms and the management of the high and low pressurestat alarms.
The two programmable setpoints “normal” and “economy”, can be displayed in three programmable units of measurement: Bar/PSI, °C or °F. This feature which is available at any time, and not only during the configuration, makes the controller easy to use and adaptable to the preference of the User, the Installer or the Maintenance personnel.
A protection system executes a continuous diagnosis of the controller; in the event of a malfunction, a dedicated output is used to transfer the control of the main refrigeration plant to an emergency system which will take over until service personnel corrects the situation.

FRONT KEYPAD

“PRG” button: to have access the programming.
“HRS” button: to display/reset the running hours of each compressor.
“MAINT” button: to display/modify the “available” or “in service” status of each compressor.
“SET” button: to display/modify the “normal” or the “economy” Setpoints.
“UP” button: to increase the figures.
“DOWN” button: to decrease the figures.
“MUTE” button: to silence/reset an alarm.
“LOCK led”: to display the keyboard lock function.
“ALARM” led: to display an alarm condition.
“COMPRESSOR & STAGES” leds: red and green leds to display the output compressor status.
4 DIGIT DISPLAY: it shows the input probe value, the default unit of measurement can be programmed with “dEU” parameter. As soon as an alarm occurs the display will switch back and forth between the probe read-out and the alarm code label.

INPUT AND OUTPUT

Alarm relay output: remote alarm, the terminals 1 and 2 are closed when there is an active alarm.
Safety relay output: the terminals 3 and 4 are open when an EWCM failure appears.
Pressurestat alarm input: high and low pressurestat input alarms (terminals 5 and 6, “SEP” parameter).
Power supply: input terminals 9 and 10.
Economy set switch: to activate the economy setpoint (terminals 13 and 14 have free voltage contacts, “rSIP” parameter).
Suction probe: input terminals 15 and 16.
Televis System: RS-485, input terminals 19, 20 and 21.
Compressor alarms inputs: when active, the compressor output is swiched off (terminals from 22 to 39, “ALIP” parameter).
Compressor relay outputs: to supply the contactors of the compressors (terminals from 44 to 61).

PARAMETER PROGRAMMING
ENTERING THE PROGRAMMING MODE

The EWCM is provided with two levels of parameters programming: operating “oPr” and Configuration “CnF”.
To have access the “oPr” menu, push and release the “prg” button and then the “UP” arrow. To have access the “CnF” menu, push the “prg” button twice and then the “UP” arrow.
If a password has been activated, the “PAS” label will be showed before entering the programming.
To exit the programming mode, push the “prg” button another time, all the changes will be automatically memorized.

HOW TO DISPLAY AND MODIFY THE PARAMETERS

After entering programming, to display a parameter label push the “UP” or “DOWN” arrows:
- to show a parameter value push the “set” button;
- to modify the parameter value push the “UP” or “DOWN” arrows;
- to exit the parameter value push the ”set” button.

PASSWORDS

The passwords “Psc” and “Pso” are provided to enter the Configuration and Operating parameters programming.
To activate the password enter the programming mode, select the password label and set the password number.

CONFIGURATION PARAMETERS

System capacity

CPnU: ComPressor nUmber.
Number of compressors installed.
CtyP: Compressor tyPe.
0 = compressors having different power (Neutral Zone Control);
1 = compressors having the same power (Proportional Control).
Note: compressors having the same power, but without partial reduction valves.
- Neutral Zone (dead band) is used with compressors having a big power.
- Proportional control is used with small power compressors.

CPSt: ComPressor Step.
Number of steps of each compressor (only for CtyP = 1).
If CtyP = 0, this parameter will default to 1.
PC1…PC9: Power Compressor 1…9.
These parameters set the power of each compressor from1 to 255 (only for CtyP = 0).
For instance: 3 compressors of 10, 20 and 40 Hp; PC1 = 10, PC2 = 20 and PC3 = 40, or PC1 = 1, PC2 = 2 and PC3 = 4.
rot: Compressors rotation.
Enables the fixed sequence or rotation of the compressors according to the hours worked.

DEFAULT SETTINGS - STANDARD MODELS

Parameter	Description	Range	Default	Unit
CONFIGURATION PARAMETERS				
CPnU	ComPressor nUmber	1…4 / 6 / 9	4 / 6 / 9	number
Ctyp	Compressor tyPe	0 / 1	1	number
CPSt	ComPressor Step	1…6	1	number
PC1…PC9	Power Compressor 1…9	1…255	1	number
rot°	Compressors rotation	0 / 1	0	number
Sat°	Compressors saturation	0 / 1	0	number
nCPC°	Number of Master Compressor	0...Cpnu	0	number
FtyP°	Freon tyPe	0 / 1 / 2 / 3 / 4 / 5	1	number
PSI°	Pressure Selection Unit	0 / 1	0	number
PA04*	Pressure At 0…4 mA	0…8	0,5	Bar
PA20*	Pressure At 0…20 mA	0…31	8	Bar
CAL**	CALibration	–0.5…0.5	0	Bar
CAL***	CALibration	–5…5	0	°C
SEP	SEt (alarm) Polarity	0 / 1	1	number
rSIP	reduced Set Input Polarity	0 / 1	1	number
ALIP	ALarm Input Polarity	0 / 1	1	number
StPP	Step outPuts Polarity	0 / 1	1	number
Psc	Password configuration	0…255	0	number
tAb	tAble of parameters	/	/	/
OPERATING PARAMETERS				
Pri	Primes	0…59	0	minutes
HoUr	HoUrs	0…23	0	hours
daY	dAY	1…7	0	number
dEU	dEfault Unit	0 / 1 / 2	0	number
Pbd	Proportional band	0.1…5	0,4	Bar / °C / °F
onon	on/on (compressor)	0…255	5	minutes
oFon	oFF/on (compressor)	0…255	5	minutes
don	delay on	0…5000	15	seconds
doF	delay oFF	0…255	5	seconds
donF	delay on/oFF	0…255	15	seconds
FdLy	First deLay on	0 / 1	1	number
FdLF	First deLay oFF	0 / 1	1	number
odo	output delay at on	0…255	0	seconds
LSE	Lower SEt	0.1 / HSE	0.2	Bar / °C / °F
HSE	Higher SEt	LSE / 25	5	Bar / °C / °F
StrS	Start time reduced Set	0…24	0	hours
SPrS	Stop (time) reduced Set	0…24	0	hours
rSd1…rSd7	reduced Set day 1…7	0 / 1	0	number
UAro	Unit Alarm override	0 / 1	1	number
Aro	Alarm override	0…255	15	minutes
PAO	Power Alarm Override	0…255	30	minutes
LAL	Lower ALarm	0.01…25	5	Bar
HAL	Higher ALarm	0.01…25	5	Bar
tAo	time Alarm override	0	255	minutes
SEr	SErvice	1…9999	3000	hours
PEn	Pressurestat Errors number	0…15	5	number
PEI	Pressurestat Errors Interval (time)	0…15	15	minutes
CPP	Compressor Probe Protection	0 / 1	0	number
SPr	Step Probe protection	0 / CPnU	1	number
PoPr	Power (with faulty) probe	0 / n	0	number
rELP	rELative Pressure	0 / 1	1	number
Loc	keyboard Lock function	0 / 1	1	number

Parameter	Description	Range	Default	Unit
Pso	Password operating	0…255	0	number
FAA	FAmily Address	13…14	13	number
dEA	dEvice Address	0…14	0	number
tAb	tAble of parameters	/	/	/
EL 1	ELIWELL 1	/	/	/
EL 2	ELIWELL 2	/	/	/

° only for New Refrigerants version
parameter FtyP: 4/5 available only for New Refrigerants version
* Not available for NTC models.
** For programmable input 4…20 mA.
*** For input probe NTC.

0 = fixed sequence;
1 = compressor rotation.
Sat: Compressors saturation.
Enables the saturation algorithm for shutting down proportioned compressors (see section Saturation Algorithm);
0 = disabled;
1 = enabled.
FtyP: Freon tyPe.
Type of freon used in the system.
0 = R 134 A;
1 = 22;
2 = 502;
3 = R 404 A;
4 = R 407 C;
5 = R 507.
PSI: Enables the pressure values to be displayed in PSI.
0 = standard display;
1 = PSI display.

Suction line sensor configuration

*not available for NTC models;
PA04*: Pressure At 0…4 mA.
Read-out corresponding to the low input signal of 4 mA.
PA20*: Pressure At 0…20 mA.
Read-out corresponding to the high input signal of 20 mA.
CAL: CALibration.
Read-out probe calibration.

Other inputs configuration

SEP: SEt (alarm) Polarity.
Pressurestat input polarity (terminals 5 and 6). It selects the active condition for a pressurestat alarm.
0 = active alarm without voltage;
1 = active alarm with voltage.
rSIP: reduced Set Input Polarity.
Economy set input polarity (terminals 13 and 14). It selects the active condition for an active economy set.
0 = active economy set with open contact;
1 = active economy set with closed contact.
ALIP: ALarm Input Polarity.
Alarm input polarity (terminals 22 to 39).
It selects the active condition for an input compressor alarm.
0 = active alarm without voltage;
1 = active alarm with voltage.
StPP: Step outPuts Polarity.
It selects the active output of the partial reduction valves (only for compressor having the same power).
0 = it means active step without voltage;
1 = it means active step with voltage.

Password

Psc: Password configuration.
Password required to access the configuration parameters (operating parameters).
Range 0...255;
0 = password disabled;
1...254 = password enabled;
255 = software lock: the programming parameters cannot be accessed.
tAb: tAble of parameters.
It cannot be modified.

OPERATING PARAMETER

Economy set clock setting

Pri: Primes.
Minute setting.
HoUr: HoUrs.
Hours setting.
dAY: daY.
Day setting.
NOTE: 1 = Sunday; 7 = Saturday.

Control cycle setting

dEU: dEfault Unit.
Default unit of measurement.
0 = bar;
1 = °C;
2 = °F.
Pbd: Proportional band.
Proportional band width, the unit of measurement is expressed by “dEU” parameter. With compressors having the same power, the Proportional band width is divided by the number of the available resources to give the pressure step width for each resource. With compressors having different power, “Pbd” sets the dead band witdh: if the probe value is higher than the setpoint + Pb/2, the compressors will be swiched on by following the delay time parameters setting. If the probe value is lower than the setpoint – Pb/2, the compressors will be switched off by following the delay time parameters setting. If the probe value is within the proportional band no compressor will be swiched on or off.
onon: on/on (compressor).
Compressor on/on delay. Time delay in minutes, between two consecutive starts of the same compressor.
oFon: oFF/on (compressor).
Compressor off/on delay. Time delay between stop and start of the same compressor.
don: delay on.
Step delay on. Time delay in seconds, between starts of two steps.
doF: delay oFF.
Step delay off. Time delay in seconds, between stops of two steps.
donF: delay on/oFF.
Step delay on/off. Minimum resource activation time, in minutes.
The activated compressor will work minimum for the time set in this parameter.
FdLy: First delLay on.
The delay time “don” can be used also before the first request of power.
0 = no; 1 = yes.
FdLF: First deLay oFF.
The delay time “dof” can be used also before the first request of power.
0 = no; 1 = yes.
odo: output delay at on.
After swiching on the power supply the output will be off during the time set in this parameter.

Setpoint

LSE: Lower SEt.
Lower setpoint limit for both setpoints, the default unit of measurement is expressed by “dEU” parameter.
HSE: Higher SEt.
Higher setpoint limit for both setpoints, the default unit of measurement is expressed by “dEU” parameter.
StrS: Start time reduced Set.
Start time for economy set.
SPrS: StoP (time) reduced Set.
Stop time for economy set.
rSd1…rSd7: reduced Set day 1…7.
Day of the week to activate the economy set.
0 = Normal Set, economy set active during period StrS...SPrS;
1 = Economy Set only.
NOTE: rSd1 = Sunday; rSd7 = Saturday.

Alarms

UAro: Unit Alarm override.
Unit of measurment for alarm silencing (“Aro”).
0 = minutes;
1 = hours.
Aro: Alarm override.
Alarm silencing override time.
PAO: Power Alarm Override.
Power on pressure alarms override time, in minutes. After turning on the power supply, the pressure alarms are silenced during this time.
LAL: Lower Alarm.
Low pressure alarm limit. If the probe signal is lower than Set – LAL, the “Er03” low alarm label is displayed.
HAL: Higher Alarm.
High pressure alarm limit. If the probe signal is higher than Set + HAL, the “Er04” high alarm label is displayed.
tAo: time Alarm override.
Time delay before displaying the “Er03/Er04” alarm condition, in minutes.
SEr: SErvice.
Numer of compressor running hours. When a compressor running hours reache the number set in this parameter, the “Er14” maintenance warning message will be displayed.

PEn: Pressurestat Errors number.
Number of high and low pressurestat errors on terminals 5 and 6.
PEI: Pressurestat Errors Interval (time).
CPP: Compressor Probe Protection.
It selcts the system protection when the probe is faulty “Er01”.
0 = the system operates with the same compressors which were working when the probe failed;
1 = the system operates with the number of stages set in “SPr” in case of compressors having the same power; or with the power level set in “PoPr” in case of compressor having different power.
SPr: Step Probe protection.
Number of stages to run the system if the probe is faulty (CtyP = 1 and CPP = 1).
PoPr: Power (with faulty) Probe.
Power level to run the system if the probe is faulty (CtyP = 0 and CPP = 1).

User interface

rELP: rELative Pressure.
Relative or absolute pressure read-out.
0 = absolute;
1 = relative.
Loc: keyboard Lock function.
It disables the following functions: setpoint adjustment, compressor running hours reset, avilable and in service compressor status control. The “Loc” parameter can however be modified.
0 = keyboard unlocked;
1 = keyboard locked.
Pso: Password operating.
Password to access the programming Operating parameters.

Tele-assistance

FAA: FAmily Address.
It selects the family number when connected to a Televis network.
dEA: dEvice Address.
It selects the device number when connected to a Televis network.
tAb: tAble of parameters.
This parameter can not be modified.
EL1: ELIWELL 1.
This parameter can not be modified.
EL2: ELIWELL 2.
This parameter can not be modified.

USER INFORMATIONS

How to display/modify the setpoint

The EWCM is provided with two setpoints: normal and economy (used during the night time or holidays).
Push and release the “set” key to display the normal set, the other unit of measurement and the economy set can be displayed by pushing repeatedly the “set” key whithin 5 seconds. The corresponding led status lights on the right side of the display shows the unit of measurement selected, the active setpoint displayed is identified by the “N” or “R” green led, the other setpoint by the “N” or “R” blinking light.
By pushing “UP” or “DOWN” arrow keys the selected setpoint can be modified.

Compressors leds status

Before switching on an output the corresponding green led blinks, this blinking period depends on the delay parameters.
When the relay output has been swiched on the corresponding red led will light.
Note: after turning on the power supply the pressure may result out of range, therefore to start up the system the EWCM controls the compressors simply as the probe value were higher than the alarm limits.
After the time delay set to the parameter “PAO”, if the probe value is still out of range, the EWCM will start working following the “CPP”, “SPPr” and “PoPr” parameters setting.

How to display/reset the compressors running hours

Push and release the “hrs” key to display the first compressor running hours, the “hrs” led will light; push the “UP” arrow within 5 seconds to display the successive compressors, the corresponding red led will blink; the compressor running hours can be reset by keeping pressed the “mute” key for 5 five seconds; to exit this procedure push and release the “hrs” key once again.

How to display/modify the “maintenance” and “in service” status

Push and release the “maint” key to display the first compressor status, the corresponding red led blinks and the “maint” green led is on. The “onLn” (on line) message means that the output is “in service”. To modify it keep the “mute” key pressed for 5 seconds, the “oFLn” message means that the output is in “maintenance” and the corresponding red led will blink.
During the working cycle the “maintence” status of a compressor is shown by the blinking of the corresponding red and green leds, in this case the output compressor is always swiched off.

Digital alarm inputs

High and low pressurestat alarm

Terminal 5 and 6, “SEP” parameter.
Until the condition alarm on these terminals is active, the EWCM keeps all the compressor outputs switched off. This kind of alarm does not need a manual reset. If during the “PEI” interval time the number of pressurestat errors reaches the “PEn” value, the “Er0L” or the “Er0H” warning message will be displayed. “Er0L” means low pressurestat alarm and “Er0H” means high pressurestat alarm. Press the “mute” button for 5 seconds to reset this alarm. This function can be excluded by setting PEn = 0.

Alarm inputs linked to outputs

Terminals from 22 to 39, “ALIP” parameter.
Each compressor alarm protection must be connected to the corresponding alarm input (e.g. low compressor oil level, klixon etc.). If one of these alarms is active, the corresponding compressor output will be switched off, the corresponding red led will blink, the “alarm” red led will light and the display will show the “Er02” warning message.
This alarm does not need a manual reset.

Alarm silencing

When an alarm condition is active, the alarm relay will be energized and the terminal 1 and 2 are closed.
To silence an alarm push and release the “mute” key, the alarm relay will be de-energized and the “alarm” led will blink if the alarm condition is still active. The silencing time depends on the “UAro” and “Aro” parameters setting.
If during the silencing time another alarm becomes active, the silencing time will be reset, and the new alarm condition will be displayed. Alarms that need a manual reset: keep pressed the “mute” key, the display will show the “CAnC” message and then the “rES” message.

Saturation Algorithm

When inserting steps in a multi-step compressor system, the principle of fully saturating one compressor before starting the next must be adopted. This logic changes when removing a step in plants of the same type, in that before shutting down the last step of a working compressor, a step of another compressor should be shut down first to prevent a restart request for same compressor shut down. This will happen if parameter “Sat = 0”. If parameter “Sat = 1”, when switching off it is also possible to shut down the last step of a compressor (shutting it down completely) before switching off the steps of another compressor.

ALARM WARNING MESSAGES

Er0L…Er0H: Error Low…High.
Low and high pressurestat alarms. It switches off all the compressor outputs.
Er01: Error 01.
Faulty probe alarm, see “CPP”, “SPr” and “PoPr” parameters setting.
Er02: Error 02.
Inputs linked to outputs compressor alarms. It switches off the corresponding compressor output.
Er03: Error 03.
Low pressure alarm. It appears when the probe value is lower than the Set – LAL.
Er04: Error 04.
High pressure alarm. It appears when the probe value is higher than the Set + HAL.
Er11: Error 11.
Wrong clock programming. Check “Pri”, “HoUr” and “dAY” parameters setting.
Er12: Error 12.
Wrong parameter programming. More than the 9 available outputs have been programmed. It needs a manual reset.
Er13: Error 13.
Wrong data memory. It needs a manual reset.
Er14: Error 14.
Maintenance alarm.

TECHNICAL DATA

Housing: black ABS plastic, 72x144 mm, depth 120 mm.
Mounting: flush panel mount (67x136 mm) with brackets.

Connections: quick-disconnect screw terminal block.
Data storage: non-volatile EEPROM memory.
Refrigerants: 22, R 134 A, 502, 404 A, 407 A, 507 A.
Suction sensor input: NTC or 4…20 mA (scaleable).
Pressure switch input: one (1).
Global alarm output: relay 6(3)A 250V AC.
Controller breakdown output: relay 6(3)A 250V AC.
Configurable outputs: 4, 6 or 9 relays 6(3)A 250V AC.
Alarm inputs: 4, 6 or 9 (250 Vac optoisolated; other voltages on request).
Serial connection: RS-485 port for connection to the Televis system.
Resolution: 0,01 bar; 0,1 PSI (°C); 1°F
Accuracy: better than 0,5% end of scale
Consumption: 6 VA.
Power supply: Depending on the model. See label on the instrument.

DISCLAIMER

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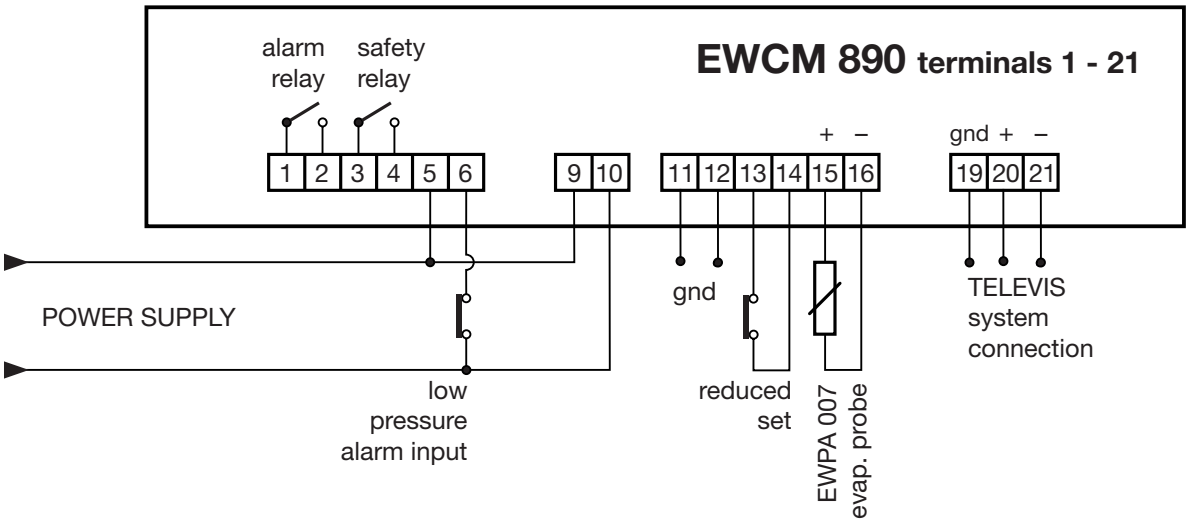
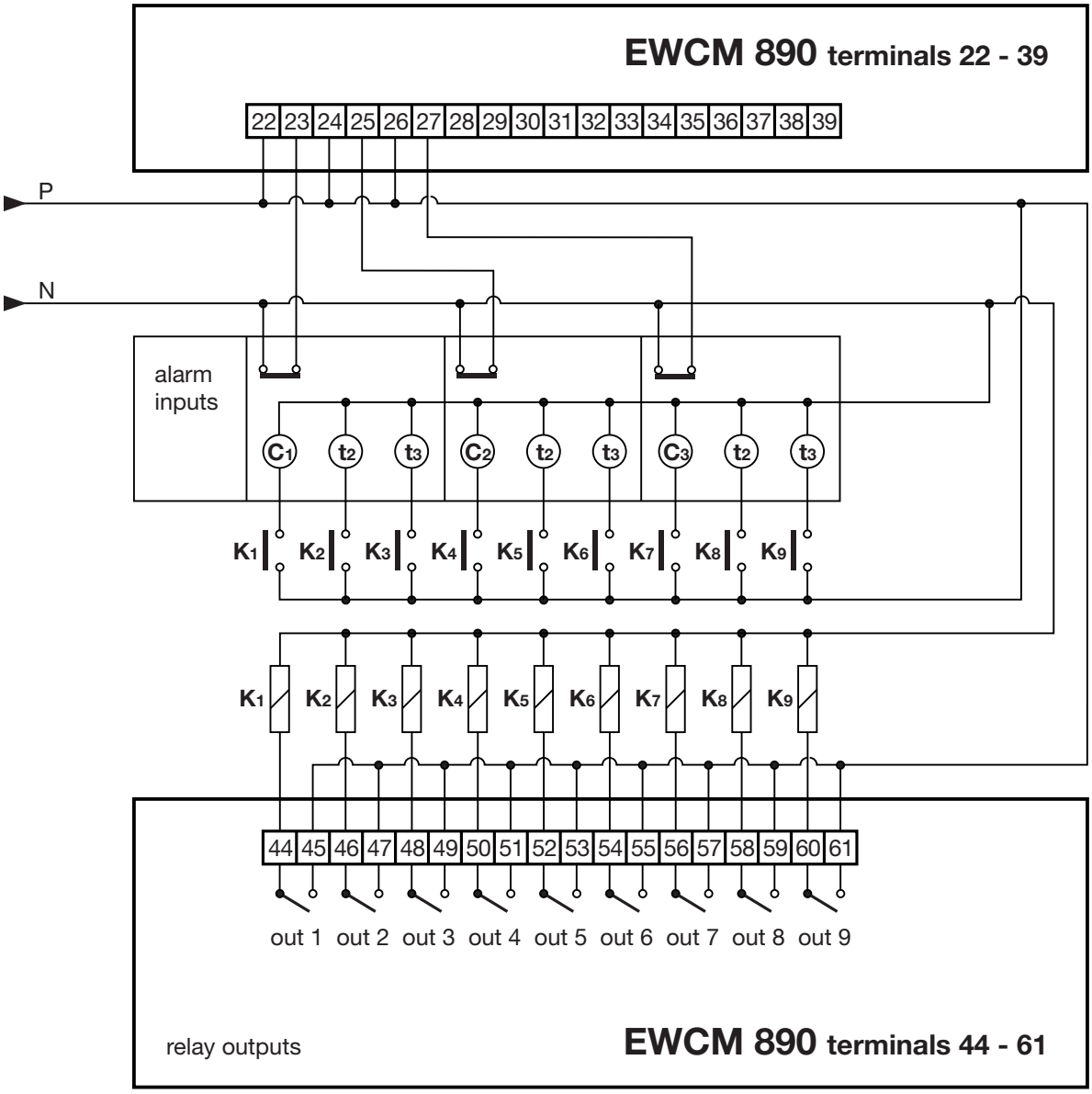
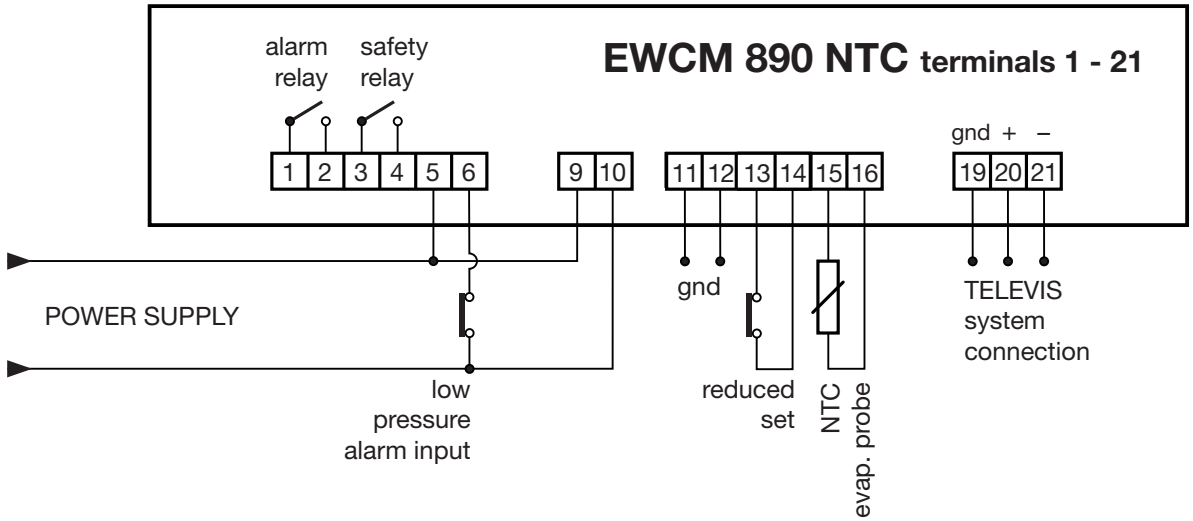
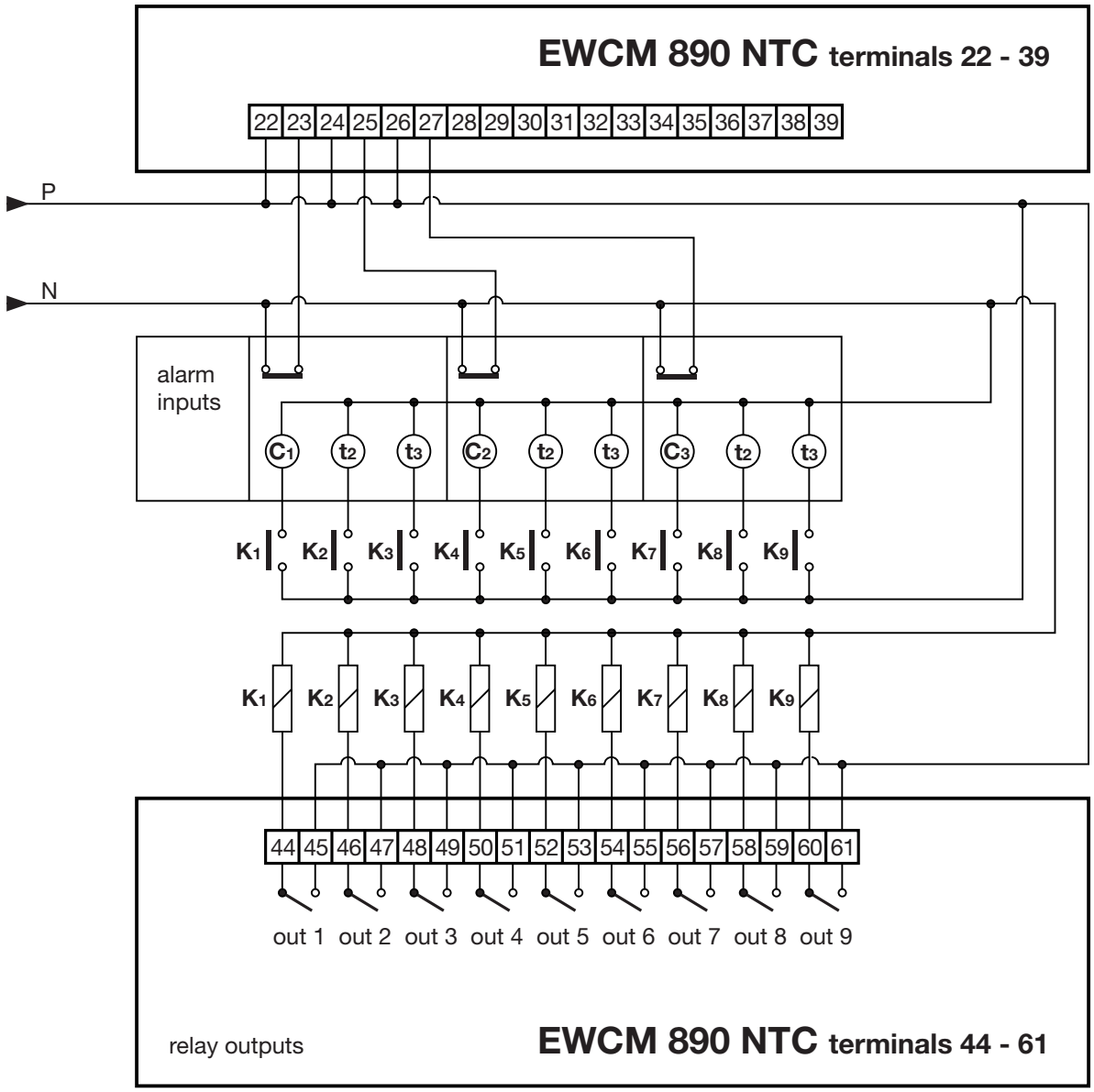

alarm relay
safety relay
EWCM 890 terminals 1 - 21
1 2 3 4 5 6
9 10
11 12 13 14 15 16
+ –
gnd + –
19 20 21
POWER SUPPLY
low pressure alarm input
gnd
reduced set
EWPA 007 evap. probe
TELEVIS system connection


EWCM 890 terminals 22 - 39
22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
P
N
alarm inputs
C1 t2 t3 C2 t2 t3 C3 t2 t3
K1 K2 K3 K4 K5 K6 K7 K8 K9
K1 K2 K3 K4 K5 K6 K7 K8 K9
44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61
out 1 out 2 out 3 out 4 out 5 out 6 out 7 out 8 out 9
relay outputs
EWCM 890 terminals 44 - 61

THREE COMPRESSORS HAVING THE SAME POWER AND TWO PARTIAL REDUCTION VALVES