

FIRE DETECTION AND FIRE ALARM SYSTEM
ADDRESSABLE ANALOGUE SYSTEM

MODULAR ANALOGUE ADDRESSABLE SYSTEM

With C.I.E. - MHU 116, MHU 117

Operational manual

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Control and Indicating Equipment - C.I.E. MHU 116, MHU 117

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1. DESCRIPTION, SCOPE OF USE

Control and Indicating Equipment, further abbreviated C.I.E., MHU 116 and MHU 117 are devices of Fire Detection and Fire Alarm System intended for the evaluation of fire situation in the guarded building. The system board with redundant conception is used for control of inner as well as outer functions of the whole modular addressable system to assure maximum reliability of the complete system. Two microprocessors Freescale Kinetis provide the redundancy. Only one microprocessor is used for standard operation of the C.I.E. The second one is ready to take over the control in case of system fault to avoid limitation of functionality of C.I.E.

The electronics of the C.I.E. is embedded in the metal case with cover. There is a panel with the graphic display 320x240 pixels, signal diodes and control knobs in the upper part of the cover. Inside the case there are boards with electronics, set (except for power parts) with the elements for the surface assembly.

The operation of this C.I.E. is executed by means of control buttons and the structured control menu in 4 levels for the access (according to EN 54-2) that prevent from unauthorised access of persons into the system.

The C.I.E.s allow modular solution when they are set into racks. Slots of the system board and the power supply board have pre-set placing and they comprise the basic setting of the C.I.E. Further C.I.E. MHU 116 includes 6 user's slots and the C.I.E. MHU 117 includes 12 user's slots for setting of line boards and loop boards, communication boards for MASTER_SLAVE system, peripheral boards, input/output boards according to the requested configuration of the C.I.E.

The line board includes 2 circle lines, each of which enables the connection of 128 addressable interactive detectors and addressable elements. The circle line can be divided into 2 single lines. Detectors and elements are connected to the line of the detection line in parallel way, the lines can be branched. The number of the element (address), if it has not got the mechanically set address, is possible to set with help of addressing preparation unit MHY535. You can also connect to the lines and combine detectors as well as interactive elements, which are addressable (from system MHU 109) and conventional detectors (non-addressable) with help of the addressable unit MHY 419. Isolators are built-in in some interactive detectors. As a single element, the isolator built in the input technology element MHG 942 can be used.

The communication line RS232 is placed on the system board for the connection of the printer, also on the system board there is USB port for the configuration PC, further as well as one input (input contact switching/disconnecting) and 3 system outputs (alarm, error, siren) of relay type of non-potential changeover contact.

Actions of output devices (for example input/output elements on the detection lines, input/output boards and system outputs) can be bound with help of configuration program for various inputs of the C.I.E., alternatively for their logic linkage.

C.I.E.s MHU 116 and MHU 117 can be linked to network with repeater MHS 817. Up to 16 units can be linked mutually and thus they can comprise the system. Events and commands go through the whole system and they are shown on all C.I.E.s and repeaters, where showing of particular events and execution of commands, can be limited or alternatively imposed on individual C.I.E.s.

2. WORKING CONDITIONS

C.I.E. is intended for environments that are protected against winds with the classification of conditions according to EN 60721-3-3.

K: climatic conditions for the environment	3K5
- range of working temperatures	-5°C to + 40°C
- range of relative humidity of air	≤75%, 10 days in year 95% at + 40°C In other days occasionally 85%
- range of atmospheric pressure	(86 to 106) kPa
- without condensation, glazed frost and glaze ice	
Z: special conditions	3Z1 thermal radiance negligible
B: biological conditions	3B1 no flora and fauna

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C: chemical conditions	3C1
S: mechanical active materials	3S1
M: mechanical conditions	3M1

Assembly position vertical on walls that are without shakes

Weight (without spare source)

C.I.E. MHU 116	ca 9 kg
C.I.E. MHU 117	ca 16 kg

Dimensions (w x h x l)

C.I.E. MHU 116	(332 x 420 x 202) mm
C.I.E. MHU 117	(458 x 606 x 202) mm

Cross-section of connecting wires

(0,5 ÷ 1,5) mm²

Degree of protection acc. to EN 60 529

IP 30

Equipment of class according to EN 60950

I

Degree of emission acc. to EN 55022

device of class B

Electromagnetic compatibility (EMC)

according to EN 50130-4

It complies with the requirements of standards

EN 54-2, EN 54-4

EN 55022

EN 60950

3. TECHNICAL PARAMETERS

Supply

	<u>MHU 116</u>	<u>MHU 117</u>
a) Basic source	230 V ^{+10%} _{-15%}	
Net frequency	50 Hz ± 5%	
Input power – stand-by mode	max. 35 VA	max. 50 VA
- alarm mode	max. 120 VA	max. 120/240 VA
b) Reserve supply source		
lead gas-tight battery/ACCU	2 x 12 V	2 x 12 V
capacity inside the C.I.E.	12 Ah	40 Ah
capacity outside the C.I.E.	40 Ah	40 Ah ÷ 65 Ah
current of the system from ACCU at stand-by	500 mA	850 mA
current of the system from ACCU at alarm	550 mA	890 mA

Outputs for supplying of external devices

Voltage	27,2 ^{+0.5} _{-2.2} V
Current at stand-by mode	
Operation from the network grid	max. 750 mA
Operation from ACCU (24 hours)	
AKU 12 Ah	max. 150 mA
AKU 40 Ah	max. 750 mA

Inputs on system board

1 x input contact switching ON/OFF (non-isolated)	
Voltage in open state	ca 9,2 V dc
Current in closed state	max. 2,2 mA

Outputs on system board

3 x relay non-potential changeover contact	max.48V/1A, 15W, 30VA
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(not watched)

Line RS 232

1 x isolated type RS 232 max. length 15 m

USB

1 x isolated type max. length depends on the type of used cable

Detection lines

	<u>MHU 116</u>	<u>MHU 117</u>
Total number of detectors	max. 1536	max. 3072
Number of circle lines	max. 12	max. 24
Number of single lines	max. 24	max. 48
Number of detectors on circle line	max. 128	
Number of detectors on single line	max. 64 (32 acc. to EN 54-2)	
Types of lines	2-wire addressable system LITES	

The circle line can be divided into 2 single lines with number of addresses 64, where the first half of original circle line will be labelled with the letter „a“ (1a-001 ÷ 1a-064, alternatively 2a-001 ÷ 2a-064), the second half of original circle line will be labelled with the letter „b“ (1b-001 ÷ 1b-064, alternatively 2b-001 ÷ 2b-064). Detection line can be branched with length of branching off route up to 300 meters.

Loops with non-addressable detectors

	<u>MHU 116</u>	<u>MHU 117</u>
Number of loops in total	max. 72	max. 144
Number of loops on board DSM-1	12 loops	
Number of slots for the board DSM-1	max. 6	max. 12
Number of detectors on loop	max. 25	
Ending of loop	with ending resistor	

Loop is monitored with regard to the short circuit and the interruption. When detector is taken out, the loop is interrupted. Detectors are connected to the line of loop with 2 wires, in parallel way. The loop line is not allowed to branch.

4. SAFETY REQUIREMENTS

General provisions

The basic rules how to use, test and maintain the device for electrical fire detection are stated in national standards for planning, design, installation, commissioning, checks, use and maintenance. Definition of basic terms are given in EN 54-1. User of device – C.I.E. is obliged to determine the persons responsible for the operation, the handling and the maintenance of the device - C.I.E. and to instruct them enough. It is necessary to realise that devices – C.I.E. as technical means do not replace fire-protection of buildings, but they are only one of its means that automatically or via human factor speeds up the transfer of the information about fire to the appointed persons or controls of another related devices.

Safety provisions

Regarding the protection from risk and injury caused by electricity, national standards and EN 50110-1 ed.3 "Safety provisions for operation and service on electrical equipment" applies. The C.I.E. may be operated only by persons instructed according to national standards and regulations. Repairs should only be carried out by a manufacturer and a competent person from the contractual companies appointed by manufacturer (person who has the necessary skills, knowledge and experience to carry out the work safely). These companies must be equipped sufficiently with respect to technical as well as documentation means in accordance with the recommendations of

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the manufacturer. The equipment must not be put into operation without the input technical review that should be executed in accordance with national standards.

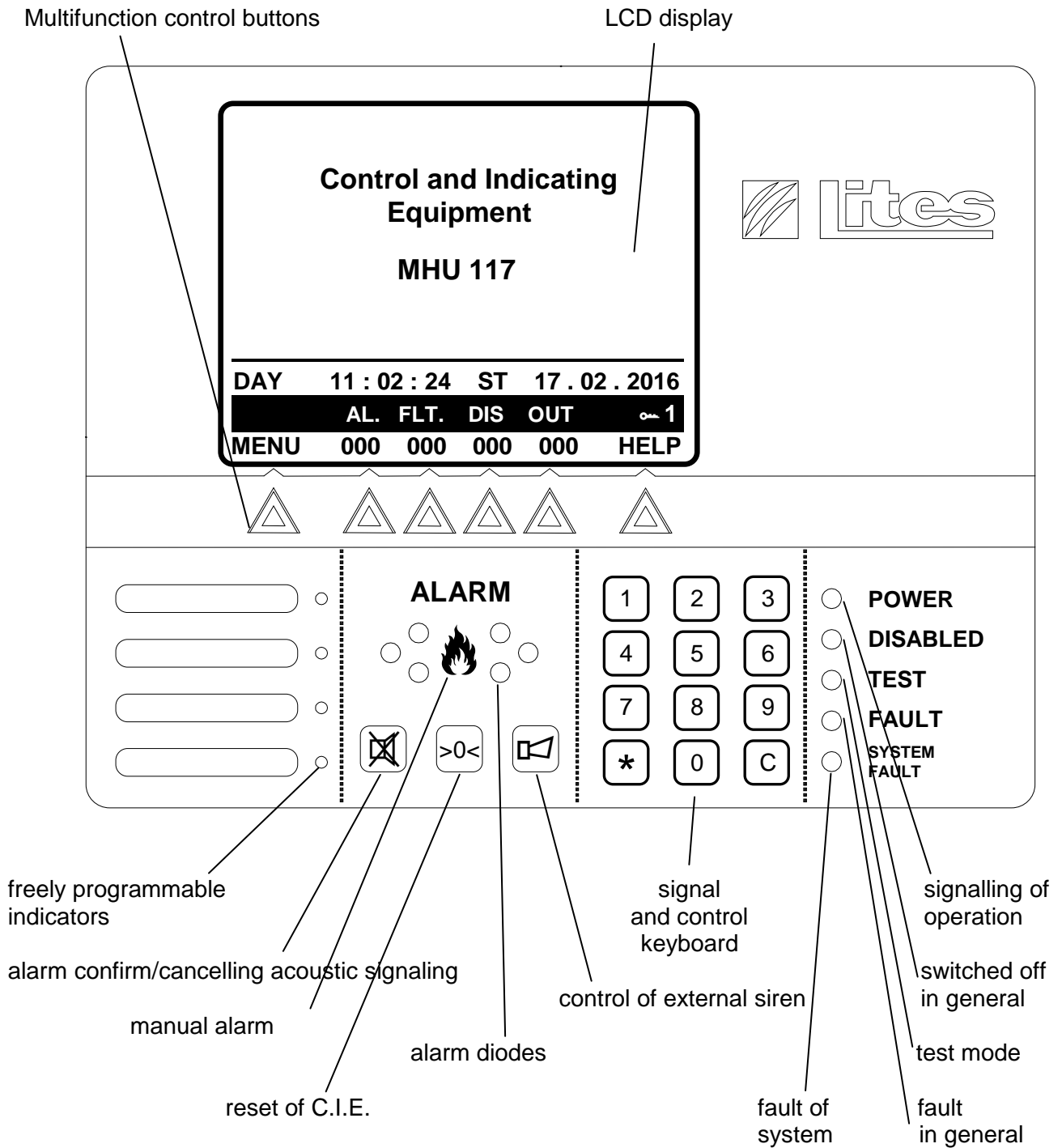
Checks of serviceability and activity tests of the Fire Detection and Fire Alarm System in operation are carried out according to national standards and regulations.

The C.I.E. meets the requirements on the devices of protection Class I according to EN 60 950 +A1+A2.

Notice

The C.I.E. contains many circuits that are sensitive to electrostatic charge, which can damage the circuits during inexperienced handling. Service workers proceed during service repairs with respect to protection against electrostatic charge. The working conditions of the C.I.E. must correspond to technical conditions. Especially the free air circulation must be ensured in space of placement, e.g. by modifications in building, by installation into cladding and the like. No radiant heat sources must be in close vicinity of the equipment. Equipment must not be installed on the walls that are directly lit by the sunshine because of the readability of signal buttons and warming. The assembly of device – C.I.E. is possible to perform only in accordance with the project drawings made by authorised project organisation and approved by relevant body for fire protection.

5. DESCRIPTION OF CONTROL BUTTONS AND SIGNAL INDICATORS

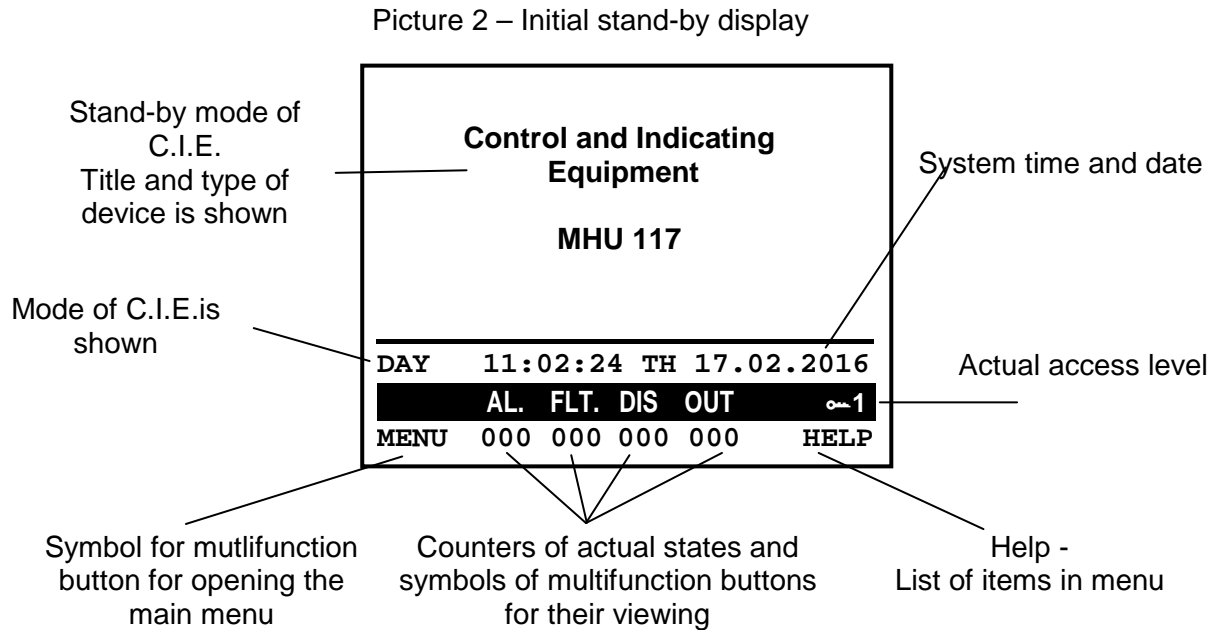


Picture 1 – Description of control buttons and signal indicators

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Information shown on the display:



Note: Symbols shown on display above multifunction buttons (picture 1) change their status depending on the actual shown state of C.I.E. or change according to the chosen function in menu and thus they determine the meaning for multifunction buttons.

Important notice:

C.I.E.s linked together into network create the system. Events shown on display of MASTER (C.I.E.,) depend on the setting for events showing among particular MASTERS. This setting is determined in configuration program, where for example it is possible to set the showing of all events or to limit the showing only for alarms and faults, alternatively to prohibit the showing the events among the chosen MASTERS.

In configuration program, you can also determine which MASTER will control other MASTERS connected in network.

If not stated otherwise, the description of the shown data on display in the following text relates to single C.I.E.

After switching on of C.I.E., stand-by screen is shown on display of C.I.E. (picture 2). This screen is divided into the following parts:

- Main screen - it shows the most important events in the system. If it is not necessary to show any events, title, type of device is shown, alternatively user's text defined in configuration program. The showing of particular events is divided into 2 sub-windows:

In upper part the following events are shown, ordered according to priority of showing:

- First section or general alarm, permanently shown
- Last active fault, permanently shown
- Last pre-alarm or conditional alarm, permanently shown
- Last active technology alarm, permanently shown
- Last technology event, shown for duration of 30 seconds
- Last event of other ones, shown for 30 seconds

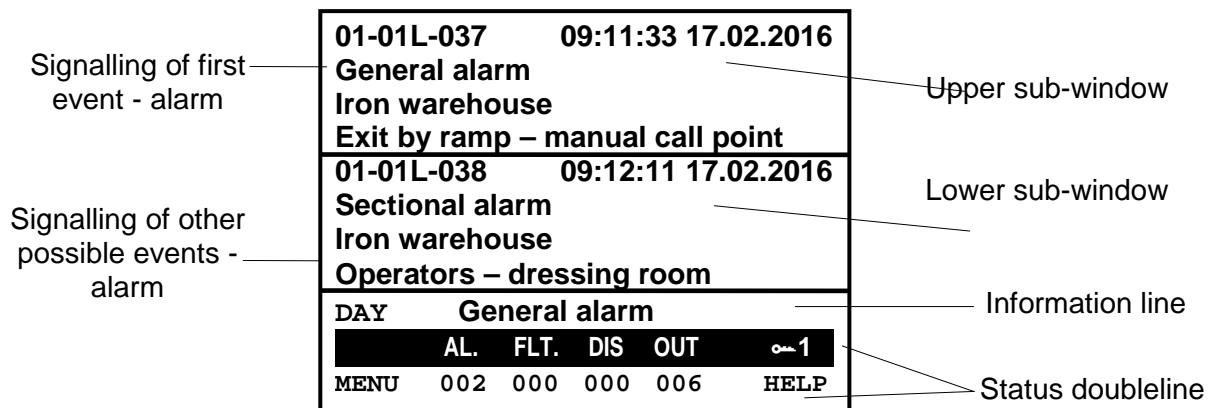
In lower part, you can view the last section of fire during the alarm (permanently shown)

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- Information line that can contain the following messages, ordered by priority of showing:
 - General alarm
 - Count down of time T1 of section alarm
 - Count down of time T2 of section alarm
 - Insert the paper sheet into the printer
 - Selected numeral combination of keys for direct option of function
 - Mode Day/Night of C.I.E., time and date
- Status double line that shows the actual states of the C.I.E. and at the same time it shows the hints for using of multifunction buttons:
 - Hint for the first multifunction button – open menu
 - Number of sections in alarm, the button opens browsing through the events of alarm
 - Number of sections in fault, the button opens browsing through the addresses in fault
 - Number of disabled addresses, the button opens browsing through the disabled addresses
 - Number of active outputs, the button opens browsing through addresses of active outputs
 - Hint for the last multifunction button – HELP (list of items in menu), OK (for confirming of numerical option of function)
 - Open access level

Picture 3 – Signalling of fire alarm



Optical signalling with help of LED diodes

- C.I.E. indicates the status of system through LED diodes:
 - Power – permanent light signals operation of C.I.E. (green LED).
 - Disabled – permanent light signals switching OFF of any address of system (yellow LED).
 - Test – permanent light signals that at least one address is in test mode (yellow LED).
 - Fault – blinks with frequency 0.6Hz, if some address is in fault (yellow LED)
 - System fault – permanent light indicates system fault in the C.I.E. (yellow LED)
 - Alarm diodes can signal (ordered by priority): (red LED diodes)
 - General alarm – all diodes blink with frequency 1.2Hz
 - Section (time T1) or conditional alarm – external pair of diodes blinks with the frequency 2.5Hz
 - Confirmed section alarm (time T2) – internal 4 diodes blink with the frequency 1.6Hz

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- The C.I.E. contains 4 2-color diodes (red/yellow LED) that shine or blink according to the user's setting in the configuration program.

Acoustic signalling

Acoustic signalling is released in the following cases (ordered by priority):








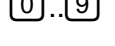
- General alarm, with the frequency 1.2Hz like for optical signalling
- Section alarm (time T1), with the frequency 2.5Hz like for optical signalling
- Conditional alarm, with the frequency 2.5Hz like for optical signalling
- Fault, with the frequency 0.6Hz like for optical signalling
- Technological alarm, 1 second long peep every 10 seconds
- Technological event, one-shot peep with 1 second duration

6. ACCESS LEVELS

Control functions of the C.I.E. are divided into 4 access levels. Access level 1 is without the code, to enter the access levels 2, 3 and 4 you need the access code that is required. The highest actual opened level is shown on the display below the pictograph f. User can run the functions arranged in the actual opened access level or in the lower level. If some function or sub-menu requires higher level than actual opened access level, (In next text there are requested access levels labelled with pictograph f and by the number of level), it opens the window for entering the code for opening the given level. When you enter the code, the code is not shown, only symbols *. After entering the code with help keys [0]..[9] after confirming with the key OK (with the key [C]) the C.I.E. verifies if the code corresponds to the requested level or some higher level and it opens this level. If the code is not correct, user can repeat entering level twice and if the code is not correct again, then running of this function is interrupted. After third non-successful attempt for entering the requested access level, the event **Error of access code** is generated. Closing of access level will run automatically after 120 seconds from the last press of the key.


The C.I.E.s connected in network (sub-systems) can have different codes for entering the access levels.

7. BASIC OPERATING OF C.I.E, FUNCTIONS WITH DIRECT OPTION

-  = to sound the general alarm manually on the C.I.E. It requires entering the confirming sequence [3] [3] [3] and to confirm it with the key OK ([C]). In configuration program, you can set the access level that is requested for running of this function. If it is required to open the access level for running the function, the confirming sequence is not entered anymore.
-  = cancelation of acoustic signalling and acknowledge of alarm during time T1
-  = reset of C.I.E. (🔑 2, reset of alarms and faults).
-  = it deactivates (silencing) external siren (f2) during the alarm and it deactivates the addresses determined in the configuration as siren output. Activation of these outputs is indicated on the display by the symbol .
-  = return to initial screen.
-  = the key for confirmation, it corresponds with the key (OK).
-  = keys for entering numerical option of function, for editing of numerical values. In some cases, they can have another functionality, similar like multifunction keys, according to hints on display.



The keys for using and context meaning of multifunction keys (upper row of 6 keys below display) are always defined by icons or short wordings on lower 2 lines of display.

Context meaning of the multifunction keys:

ESC	= return to previous option, cancellation of the executed change
MENU	= to open main menu
OK	= to enter to sub-menu, to confirm the executed change, to confirm the entered numerical code of function. It corresponds with the key  .
AL.	= direct browsing of actual events of alarm from the last reset
FLT.	= direct browsing of actual states of fault
DIS	= direct browsing of actual states disabled
OUT	= direct browsing of active outputs
REP	= to repeat the function
EDIT	= editing of function
←	= shift of cursor to the left
↑	= shift of cursor up, browsing through the list up, increasing of value by 1 during editing
↓	= shift of cursor down, browsing through the list down, decreasing of value by 1 during editing
→	= shift of cursor to the right

How to reset C.I.E., 2

C.I.E. is put into stand-by mode by reset. Signalling of all events is ended up (signalling of alarm, fault, technology event and the like), actual counters of alarms and faults are reset and all outputs are put into stand-by mode. If a cue for event notice persists after reset, this event is again signalled by C.I.E. including activation of relevant outputs.

Reset of C.I.E is carried out by pressing the key . On the display of C.I.E., it is shown the heading for command to enter the code for second access level. After entering code and confirming it by the key (OK) or the key C, the information about current running reset of C.I.E is shown on C.I.E display. If the second access level was already opened during the pressing of the key  (or higher access level), reset of C.I.E will run automatically without the demand for entering the code.

You can find detailed information about the procedure for operators in the part “The operation of system – administrative hints”.



Important note:

The operators must not carry out the reset repeatedly without checking the situation in any case.

This incorrect procedure is checked and monitored in the memory for events.

How to cancel acoustic signaling and confirmation of alarm

Acoustic signaling can be cancelled by the key . Acoustic signaling is activated when in fault, during the section or general alarm and during the technology alarm.

- Acoustic signalling during fault and technology alarm goes on if the cue for this activation remains or it is ended up with the key .
- Acoustic signalling during general and technology alarm remains until the reset of C.I.E. is performed or until it is ended up with the key .

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- By cancellation of acoustic signalling during section alarm (course of time T1) it serves to silence acoustic signalling as well as confirming of alarm state by the operator of C.I.E. Side red LED diodes below the heading ALARM, which indicate by blinking the course of time T1 of section alarm, goes down and 2 pairs of inner red LED diodes, which indicate the course of time T2, start to blink. At the same time the course of time T1 will change to the course of time T2 on C.I.E. display.

If C.I.E. after cancellation of acoustic signalling records another cue for its activation, acoustic signalling will start again.

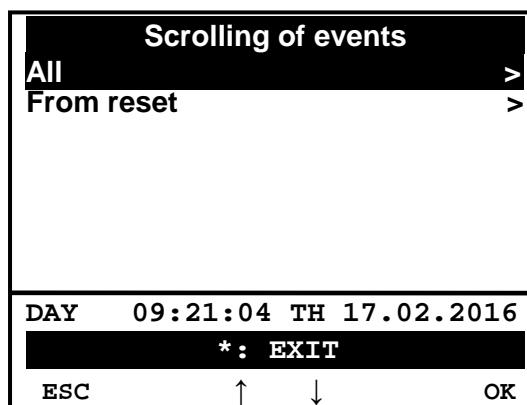
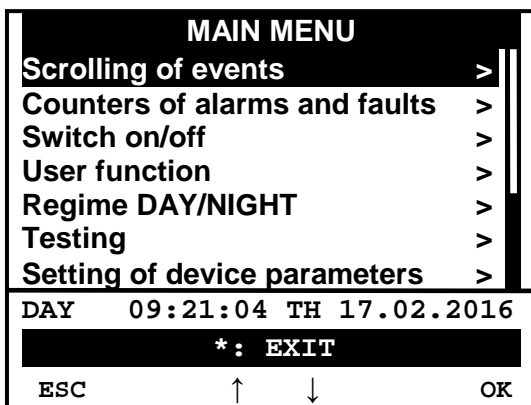
Browsing through events

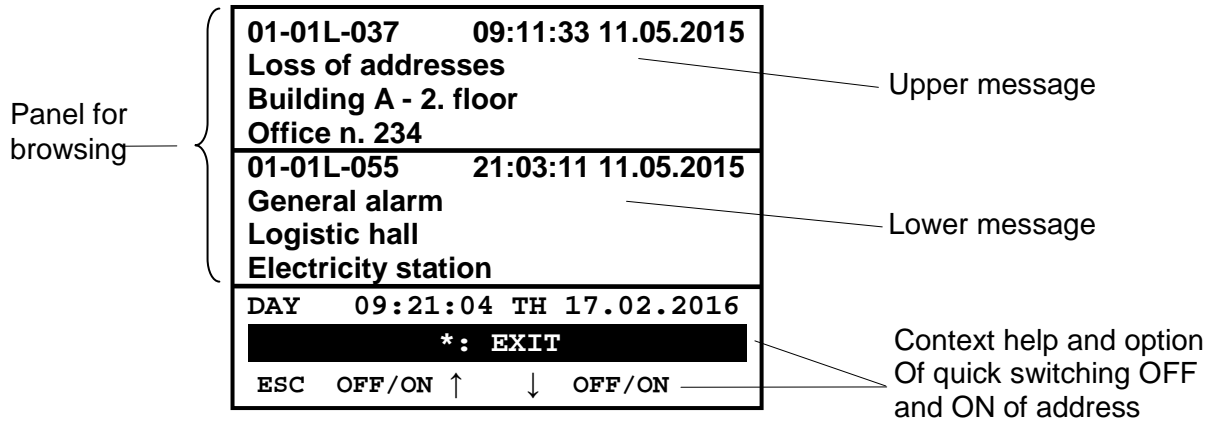
During all signalling (alarm, fault, disabled or others) these cases can come where there more events of one type or more types. Function of browsing through events enables showing of events according to set conditions. All events are stored in the memory for events together with information about type of event, date and time. Memory for events of C.I.E. has storage capacity of minimum 8000 events (mainly depending on the range of usage of user's texts). New event is stored at the beginning of the event list. When the memory is full, the oldest events at the end of the list are deleted.

When you browse through the event, you should proceed as follows:

- Press the button **MENU**, then you enter the main menu.
- Via the keys $\uparrow\downarrow$ you choose the item **Scrolling of events** and you confirm this choice with the key **OK**
- Choose if you want to browse through all the events stored in the memory or just events from the last reset of C.I.E. – then you confirm your choice **All** or **From reset**.
- Choose if you wish to browse through all the events or just selected events.

All	all the events
Alarms	events like section, general, technology alarm, pre-alarm
Faults	events like fault of the system with C.I.E., including internal faults of C.I.E.
Switch on/off	events like switching ON/OFF of line and system addresses
Tests	events like tests on line addresses and loops, signal tests
Inputs/outputs	events like activation/deactivation of inputs and outputs
The others	events not in any above-mentioned category, e.g. reset of C.I.E.





It shows the list of all the events according to the set conditions (type of events for browsing through and if to browse through all events or only after the last reset). In the list there are always maximum 2 events shown at one time. In the list you can browse through with help of the multifunction keys ↓,↑. The beginning and the end of the list is given with the text „Beginning of listing“, „End of listing“.

In lower part of the window for browsing through events there is the context help shown for the function of quick switching OFF/ON of the address. If it concerns the address that can be switched OFF, the function allows from this window directly to switch OFF the address that gave the stimulus for the shown event. By pressing the key below the symbol OFF/ON next to the arrow aiming down you switch OFF the address in the place of lower message. After the confirmation, you switch OFF the chosen address.

8. OPERATION OF C.I.E. – ORGANIZATIONAL INSTRUCTIONS

Basic duties of operator are given national standards and regulation. Regarding the possibility of differentiation of access levels, it is recommended to assign the particular competences for responsible persons.


Integral part of fire and safety regulations for the building must be:

1. to assign the responsible persons for management of access levels 1 - 3
2. instructions for operators how to proceed during:
 - a) signalling of fire on some detection line
 - b) long-term outage of basic supply (mains) from possible discharging of accumulators
 - c) the fault of C.I.E. total or partial

These instructions must be elaborated with respect to local conditions, configuration of C.I.E. and manner of safety precautions for securing the building.

For cases b) and c) instructions for securing of alternative manner of securing the building must be elaborated. Reports about operation, tests, maintenance, repairs and regular checks of C.I.E. must be administrated in the equipment book.

How to reset the alarm (fault)

Reset of alarm state or fault of C.I.E. is made with the key  and by entering the access code for 2nd access level.

For alarm state, it is considered the situation where C.I.E. reports fire in any phase or it reports fault. If after cancellation of alarm or fault, the physical stimulus of its source remains, alarm or fault is reported again.

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Note: If access level is not opened before, it is shown the command for entering the access code. Entering the access code is then confirmed by pressing the key (OK) or **C**.

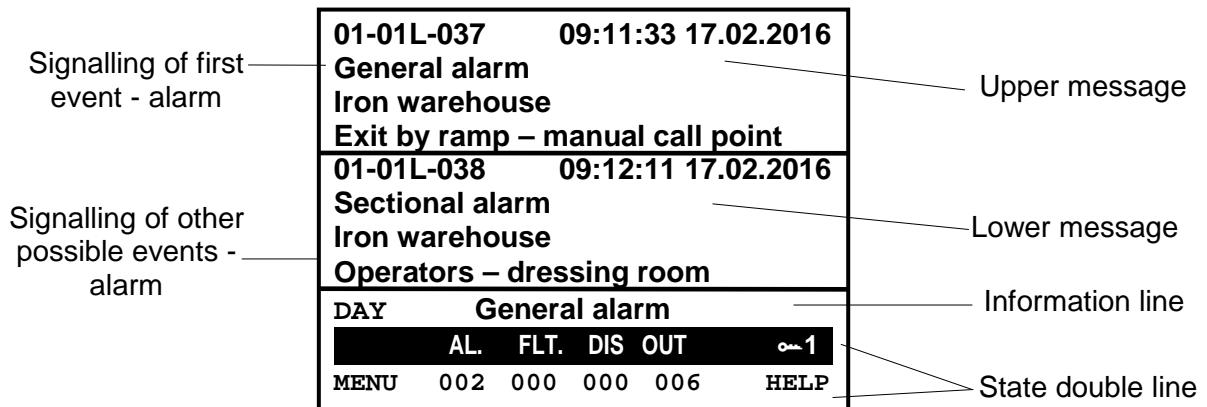
Operator without checking the situation must not carry out reset repeatedly in any case.

This wrong procedure is checked and monitored in the memory for events.

How to proceed during the fire - FIRE

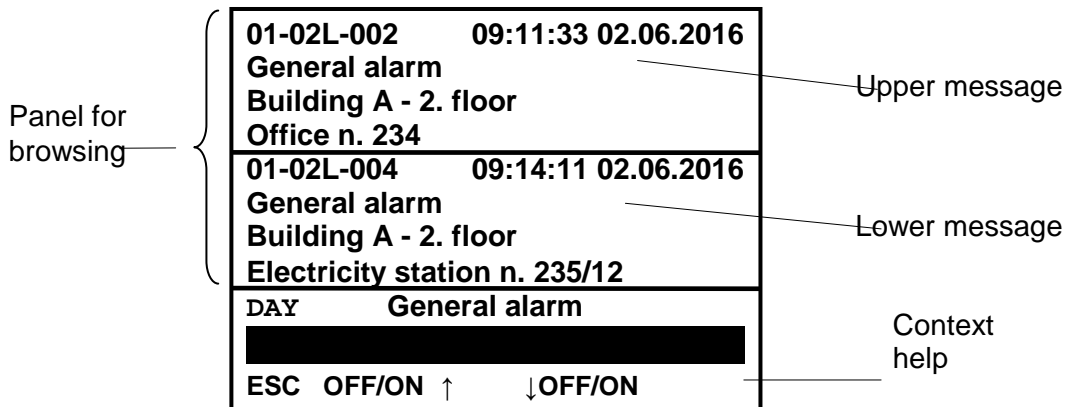
Information about the fire is shown on the display in text field of upper message. In case of another fire, the information about this fire is shown in the text field of lower message. Other fires are always shown in the text field of lower message, it means that there is still information about the first fire in the text field of upper message and there is information about the last fire in the text field of lower message.

Number of fires is displayed in the counter of actual states below the symbol AL. (alarms) in lower part of the display.



Display of C.I.E. when more alarms are shown

In order to start browsing through, press the key AL. and you browse through with the multifunction keys $\downarrow\uparrow$. In mode of browsing the fires are described in the way that there is information about the latest fire in the text field of upper message and there is information about the older one in the text field of lower message. With help of multifunction keys, you browse through up, the latest fire is shown and also heading the beginning of list – Beginning of listing, when you browse through down the oldest alarm is shown and also the heading the end of the list – End of listing.



Showing of the display during browsing through the multiple alarms with option of quick switching the address OFF.

Single stage and double stage signalling of fire

The manner of fire signalling is determined in the project of C.I.E. depending on the type and range of building and other conditions.


Single stage alarm signalling (JSP) in the building



During JSP, C.I.E. signals General alarm, resp. it transfers the information immediately after the clue from fire detectors.

This manner of signalling is used in cases, when C.I.E. is not handled by operator or when outputs of C.I.E. are not linked to other units, e.g. factory fire unit or equipment that carries out the firefighting action (for example sprinkler system). Single stage alarm signalling runs even in case that the stimulus comes out from the button fire detector/call point.



Double stage alarm signalling (DSP) in the building

During DSP, C.I.E. holds up to call General alarm and activation of outputs, it is delayed by the so-called times T1 and T2, that make possible the operator to verify rightfulness for calling an alarm.

C.I.E. calls first the Section alarm, that can be signalled to relevant fire unit, for the information for fire patrol. The counting down of time T1 starts on C.I.E. Time T1 is adjustable in the range 10 ÷ 180 s). The operator cancels the acoustic signalling by the key , by which the confirmation is then carried out. By this the counting down of time T2 starts (adjustable in the range of 10 ÷ 600 s). If the operator does not cancel the acoustic signalling during the time T1, after elapsing the time T1 it happens the calling of General alarm automatically. During time T2, the operator should follow the safety fire Instructions (verification of causes for signalling, alternatively range of fire).

According to results from verification, the operator speeds up the call of General alarm (key ) or he executes the reset of alarm (key ). If the time T2 elapses without intervention of the operator for another command for C.I.E., General alarm will be called automatically.

Schematic procedure for the operator during the call for the double stage alarm:

1. The operator should cancel the acoustic signalling .
2. verify the cause for signalling (by the phone, personally etc.).
- 3a. If there is a fire, he executes the calling for General alarm without hesitation and he carries on according to Instructions.
- 3b. If there is an accidental stimulus, he performs the reset of alarm .

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The manner of signalling of fire alarm (JSP or DSP) depends on the mode of C.I.E. (DEN/DAY, NOC/NIGHT) and on the operation of line element chosen in configuration program (section alarm, general alarm).

Operation of element → Mode of C.I.E. ↓	Section alarm	General alarm	In mode DAY - no response	In mode Night - no response
DEN/DAY	T1,T2 (DSP)	promptly(JSP)	It does not report	promptly (JSP)
NOC/NIGHT	promptly (JSP)	promptly(JSP)	promptly (JSP)	It does not report

Mode of C.I.E. is switched over manually (see menu Mode of C.I.E. DAY/NIGHT - DEN/NOC – actual mode, access level 2, function of $\boxed{2}\boxed{0}$), automatically in the pre-selected times or by external control via the chosen input. Automatic switching over and external control is defined in configuration program.

Mode DAY/DEN is set usually on C.I.E. when C.I.E. is under control of operator, mode NIGHT/NOC is usually set when C.I.E. is without control by operator.

Basic (default) setting is: Monday - Sunday

DAY	NIGHT
6 ⁰⁰ ÷ 18 ⁰⁰	18 ⁰⁰ ÷ 6 ⁰⁰

Operation, when the line element is activated, is chosen via configuration program, it is not possible to make influence on the operation from C.I.E. When the line element is activated, configuration program offers these operations:

Signalling of fault

During any fault evaluated by C.I.E., the acoustic signalling starts to sound and yellow LED diode Fault starts to blink and that is followed by the heading on display. After pressing the key $\boxed{\text{X}}\boxed{>0<}$ the acoustic signalling is switched OFF. By reset of C.I.E. the acoustic as well as optic signalling of Fault is cancelled. If the cue for fault still remains, signalling of fault is resumed. If C.I.E. is linked to other C.I.E.s (equipment MASTER) the transmitting of Fault among MASTERS is depending on setting in configuration program.

The others types of signalling

C.I.E. MHU 116/MHU 117 allows to signal, when the element (detector) is activated, except for Section and General alarm also further additional signalling:

Technological alarm - when there is an activation of the element for which this operation is set in configuration program, C.I.E. shows the information on the display and it runs the special acoustic signalling (shortly it sounds each time after 10 seconds). When technology alarm is ended up, the acoustic signalling is finished and there is information shown about the end of Technological alarm.

Technological event - when the element is activated, C.I.E. shows the information on the display and it runs shortly the acoustic signalling (only 1 peeping). After the end of Technology event, C.I.E. runs shortly the acoustic signalling again and the information is shown on the display about the end of Technological event.

Technological fault - when the element is activated, C.I.E. will call so-called Technological fault, i.e. the text is shown on the display and it is put into fault mode including corresponding signalling.

Conditional alarm - when the element is activated, C.I.E. is signalling in the similar way like for the section alarm, but no time runs and C.I.E. does not go over to General alarm without further cues.

Control and Indicating Equipment - C.I.E. MHU 116, MHU 117

Operational manual

Conditional signalling of alarm in the building

C.I.E. MHU 116/MHU 117 enables to line up the detectors into groups, whose alarm signalling, resp. activation of outputs is conditioned by logic link. Lining up of detectors into groups is performed with help of configuration program on PC.

Access level 4

Only through the access code. The function is intended strictly for the workers of the assembly and service organisations, that may change the operational configurations of system in accordance with the project documentation and they have the relevant authorisation for these activities from the manufacturer.

9. MAINTENANCE

Putting C.I.E. into operation

Putting C.I.E. into operation is performed after the finishing of the complete assembly of the whole equipment. Putting into operation is carried out by the authorised service organisation that will execute all the required works, check the system, adjustment of time etc.

Standard maintenance

C.I.E. MHU 116, MHU 117 does not require any special maintenance works during operation. Possible dirty surface is cleaned by the wet soft piece of cloth, alternatively with use of detergent. The assigned person for maintenance can carry out only the replacement of fuse inside C.I.E., only when the supply is switched OFF.

Description of fuse function for MHU 116, MHU 117

The fuse T4,0A/35A for MHU 116 and T6,3A/35A for MHU 117 is located in the fuse holder in the covering of the mains part.

Circuit ACCU-AKU, input for the mains source and the supplying output are protected with automatic fuse.

10. INSTRUCTIONS FOR INSTALLATION, SERVICE AND CHECKS OF SERVICEABILITY

These stated activities are provided by the manufacturer or by the workers of the organisation that have the relevant electro qualification and skills and they were demonstrably trained by the manufacturer.

11. PACKING, TRANSPORT, STORAGE

Packing

Products are delivered in the packing. The packing is provided with the labelling of product type, with marking of manufacturer, serial product number, the code of manufacturing, the relevant number EN and the marks that define handling with the product.

Transport

The products must be transported by the means of transports that are covered without the direct influence of wind with the classification according to the standard EN 60721-3-2.

K: climatic conditions for the environment
- range of temperatures
- relative air humidity

2K2
(-20 to +55) °C
max. 80 % at +25 °C

Control and Indicating Equipment - C.I.E. MHU 116, MHU 117

Operational manual

B: biologic conditions	2B1
C: chemical active substances	2C2
S: mechanical active materials	2S1
M: mechanical conditions	2M2

During transport, it must not occur rough shakes and the products must be handled according to symbols and marks on the package.

Storage

The products must be stored in the premises with roof, in the environment without aggressive vapours, gases, dust with the classification conditions according to the standard EN 60721-3-1.

K: climatic conditions for environment	1K2
- range of temperatures	(-5 to +40) °C
- relative humidity	max. 80 % at 40°C
B: biologic conditions	1B1
C: chemical active substances	1C2 (1C3)
S: mechanical active materials	1S1
M: mechanical conditions	1M1

The products must be stored in the undamaged package and during unpacking (especially in winter), they must be left for 5 hours in the package under the working conditions so that they should not be covered with the dew.

12. GUARANTEE

The manufacturer provides the customer with the guarantee on the product in accordance with valid commercial terms and conditions.

The manufacturer is not responsible for the faults that resulted from rough or inexperienced handling, alternatively from improper storage.

13. DECLARATION OF PARAMETERS

The declaration of parameters has evidence number CPR-MHU 116, CPR-MHU 117. Declarations of parameters are on the web page www.lites.cz.

14. ANNEXES

- Picture of the interior of C.I.E. MHU 116
- Picture of the interior of C.I.E. MHU 117

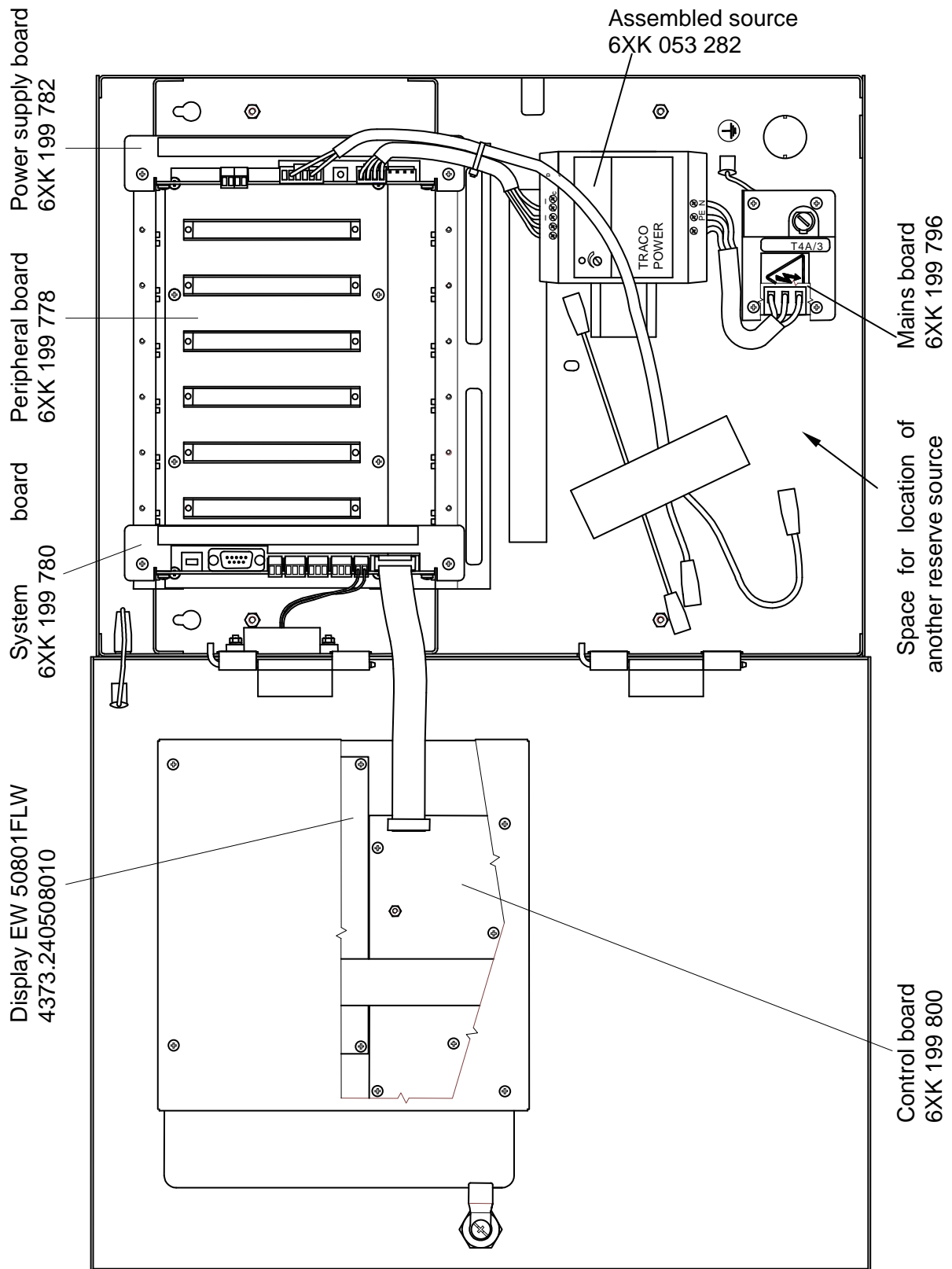
15. OPTIONAL BOARDS

- DSY-2 System board
- DZD-1 Power supply board
- DLI-1 Line board
- DSM-1 Loop board
- DSL-1 Slave board
- DMA-1 Master board
- DPE-1 Peripherals board
- DVV-1 Input/output board
- DVV-2 Outputs board
- DVV-3 Input/output board
- DVV-4 Inputs board
- DVV-5 Input/output board

Control and Indicating Equipment - C.I.E. MHU 116, MHU 117

Operational manual

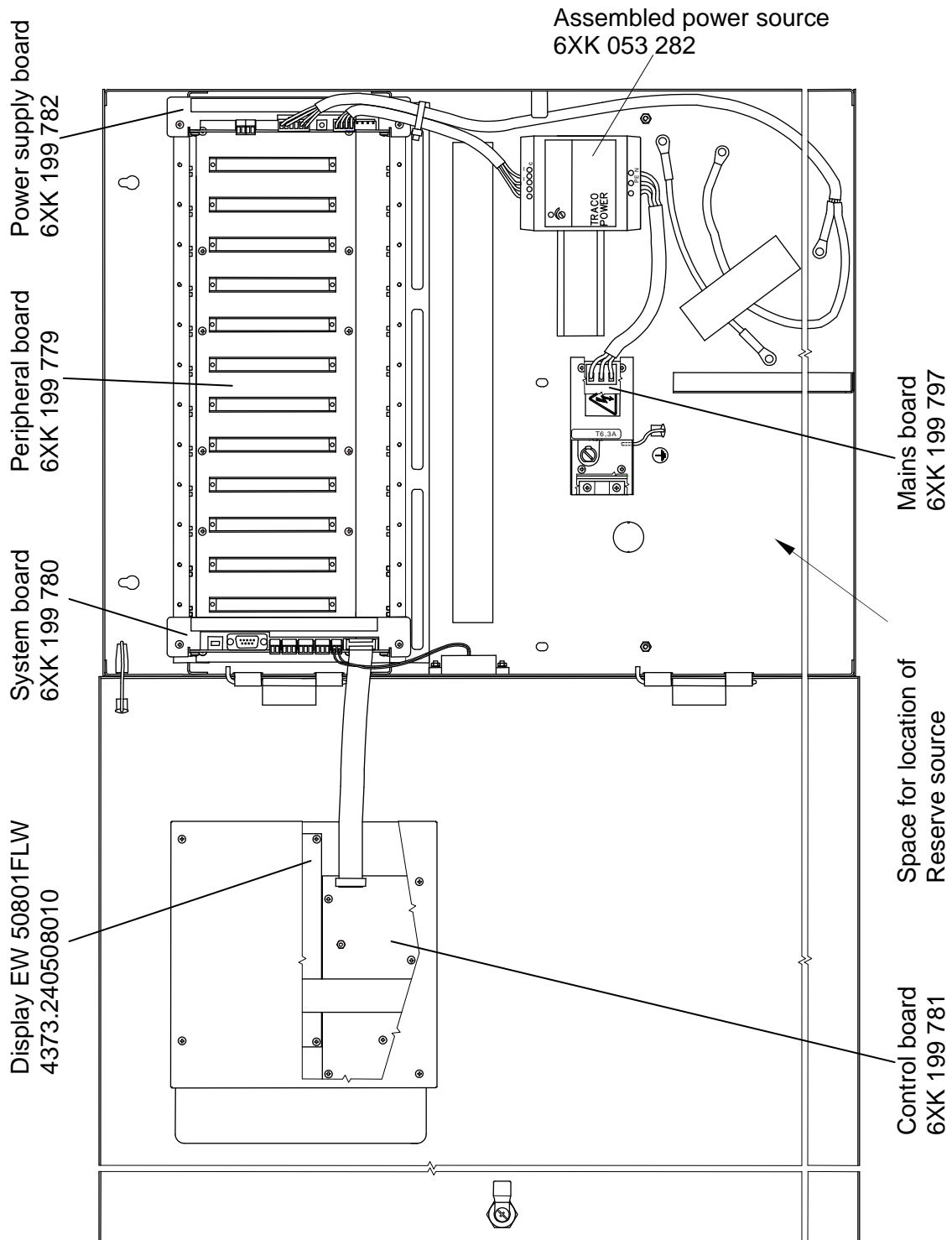
Picture of the interior of C.I.E MHU 116



Control and Indicating Equipment - C.I.E. MHU 116, MHU 117

Operational manual

Picture of the interior of C.I.E MHU 117



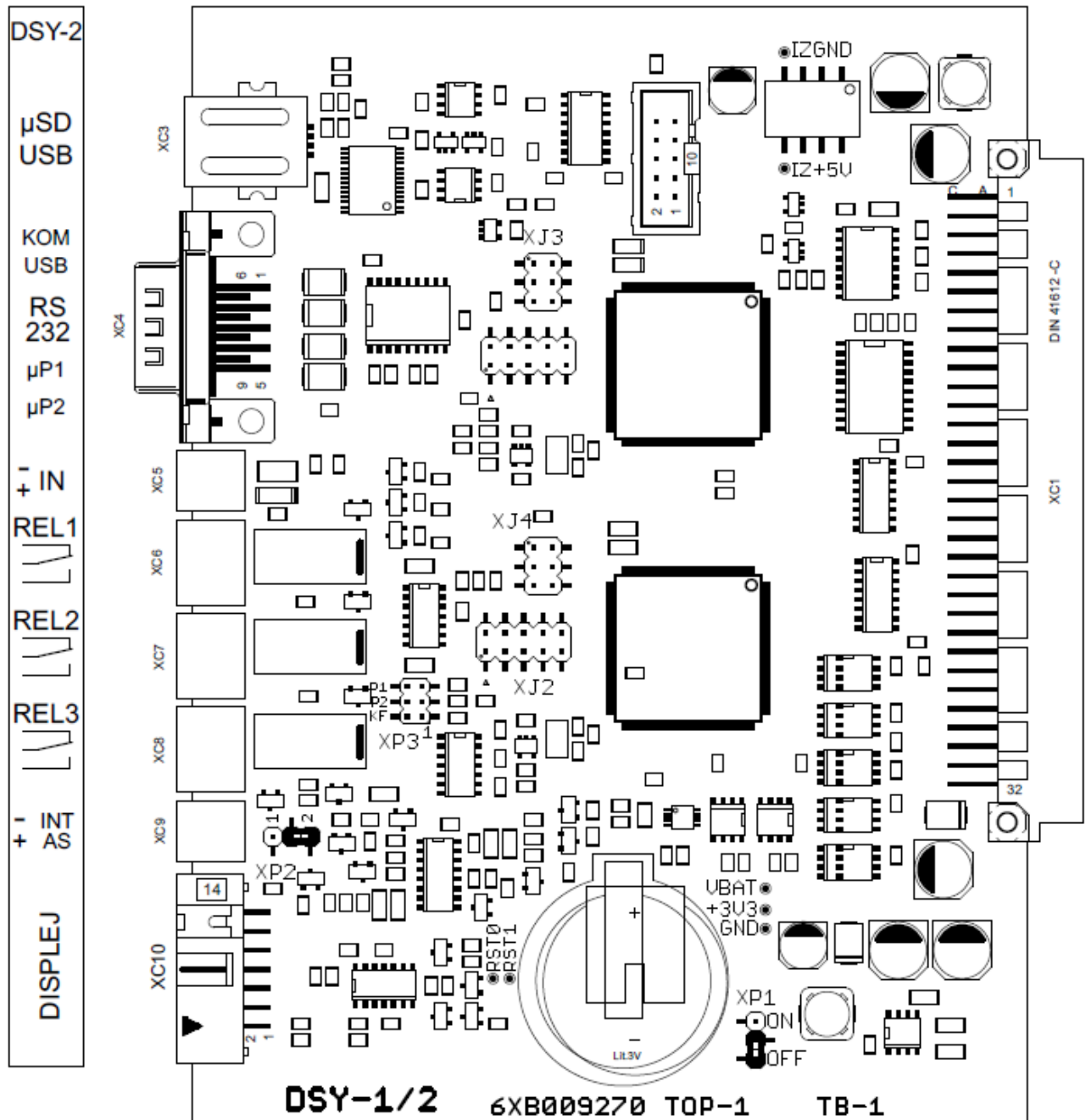
Control and Indicating Equipment - C.I.E. MHU 116, MHU 117

Operational manual

DSY-2 SYSTEM BOARD

System board (marked DSY-2) is for control of internal as well as external functions of the whole C.I.E. and for the communication with other user's boards and power supply board. To secure maximum reliability of the whole system, the circuits of system board are solved in a redundant way and through 2 microprocessors Freescale Kinetis. Only one of these processors is used for the common operation of C.I.E. The other one is ready to take over the control in case of system fault so that it would not be any limitation of functionality of C.I.E.

Picture of DSY-2, System board, including panel



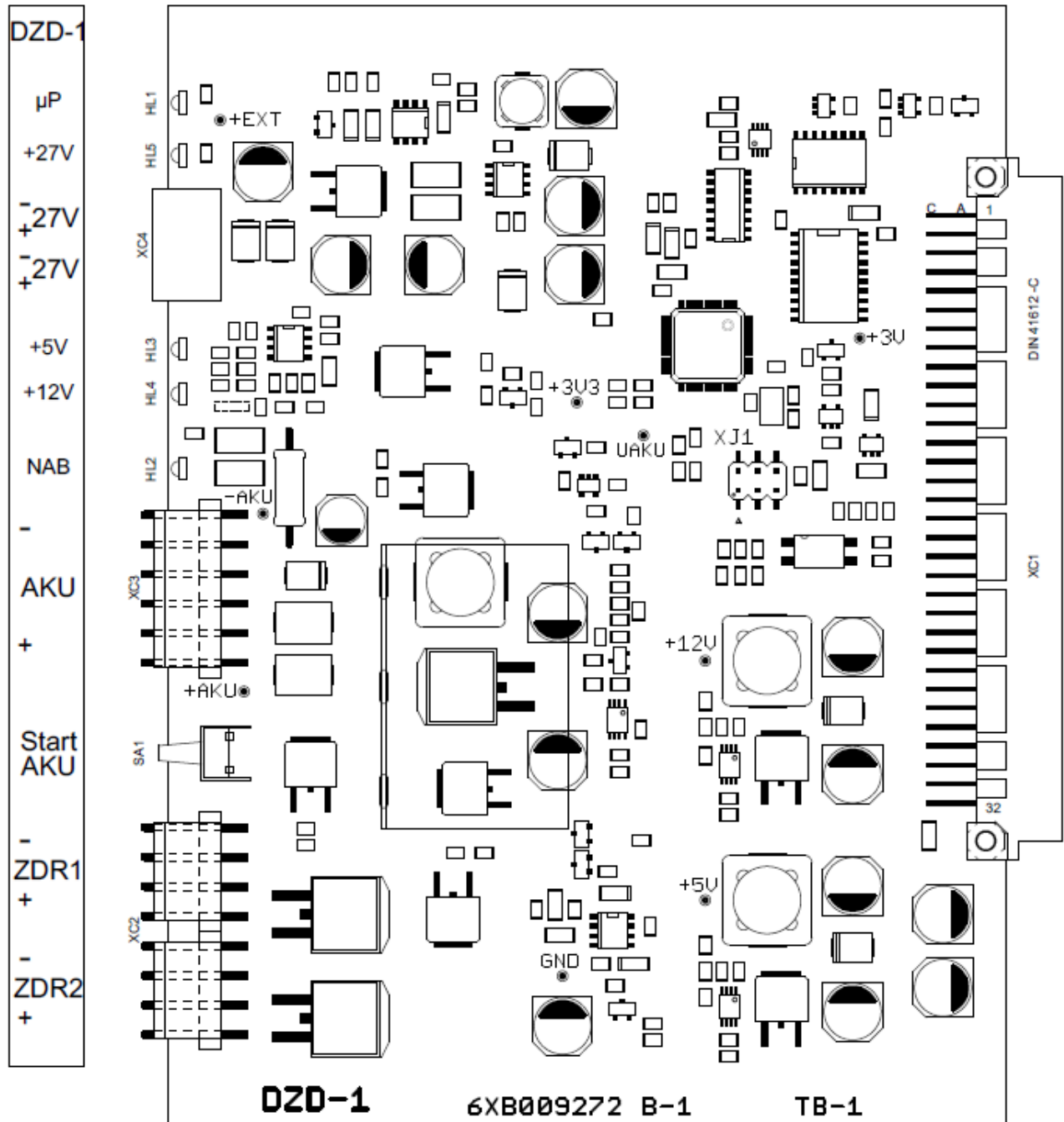
Control and Indicating Equipment - C.I.E. MHU 116, MHU 117

Operational manual

DZD-1 POWER SUPPLY BOARD

Power supply board (marked DZD-1) is intended for supplying the internal and external circuits of the whole C.I.E. and for monitoring and evaluation of fault state of main and back-up supply source of C.I.E. Further it checks the state of voltage levels supplied on the bus and it communicates about all the states with system board. It contains 2 connectors of outputs for supplying of external devices.

Picture of DZD-1, Power supply board including panel



Control and Indicating Equipment - C.I.E. MHU 116, MHU 117

Operational manual

DLI-1 LINE BOARD

Line board (marked DLI-1) serves for supplying and communication with linked interactive detectors and addressable elements. It is set into user's slots of C.I.E.s MHU 116 (as many as 6 units) and MHU 117 (as many as 12 units). It includes 2 circle lines, each of which enables to connect 128 addressable detectors and line elements. It is possible to divide the circle line to 2 single lines with capacity of 64 addresses via configuration program. A pair of circle lines on the line board is galvanically isolated from the circuits of C.I.E.

The resistance of the line of the main route must not be higher than 100 Ω and the total capacity must not exceed the value 200nF.

Number of the element (address), if there is no mechanical setting of address, can be set by the addressing preparation for setting of address, device MHY 535.

Types of connected elements and their equivalent current

a) detectors, addressable, interactive

MHG 161 – ionization detector „light-weight“	150 μ A
MHG 261 – optical detector „light-weight“	200 μ A
MHG 262 - optical „light-weight“	200 μ A
MHG 361 – heat detector „light-weight“	100 μ A
MHG 362 – heat detector „light-weight“	100 μ A
MHG 861 – multi-sensor detector „light-weight“	250 μ A
MHG 862 – multi-sensor „light-weight“	250 μ A
MHG 186 – ionization detector „heavy-weight“	150 μ A
MHG 283 - optical „heavy-weight“	200 μ A
MHG 383 – heat detector „heavy-weight“	100 μ A
MHG 661 - linear	200 μ A
MHG 662 - linear	200 μ A
MHG 664 - linear	200 μ A

b) detectors, addressable

MHA 141 – manual call point „light-weight“	120 μ A
MHA 142 – manual call point „light-weight“	120 μ A
MHA 143 – manual call point „heavy-weight“	120 μ A
MHA 144 - manual call point „heavy-weight“	120 μ A
MHA 145 - manual call point „heavy-weight“	120 μ A
MHA 183 - manual call point „heavy-weight“	120 μ A
MHA 184 - manual call point „heavy-weight“	120 μ A
MHG 141 – ionization detector „light-weight“	150 μ A
MHG 142 – ionization „heavy-weight“	150 μ A
MHG 241 - optical „light-weight“	200 μ A
MHG 242 - optical „heavy-weight“	200 μ A
MHG 243 - optical „light-weight“	200 μ A
MHG 341 – heat detector „light-weight“	200 μ A
MHG 941 – single input element	120 μ A
MHG 942 – single input element with isolator	200 μ A
MHG 943 - input element with 4 inputs	200 μ A

c) addressable unit

MHY 419 – addressable unit	200 μ A + current of non-addressable det.
MHY 416 – multi addressable unit	10 μ A (external supplying)

d) input/output elements

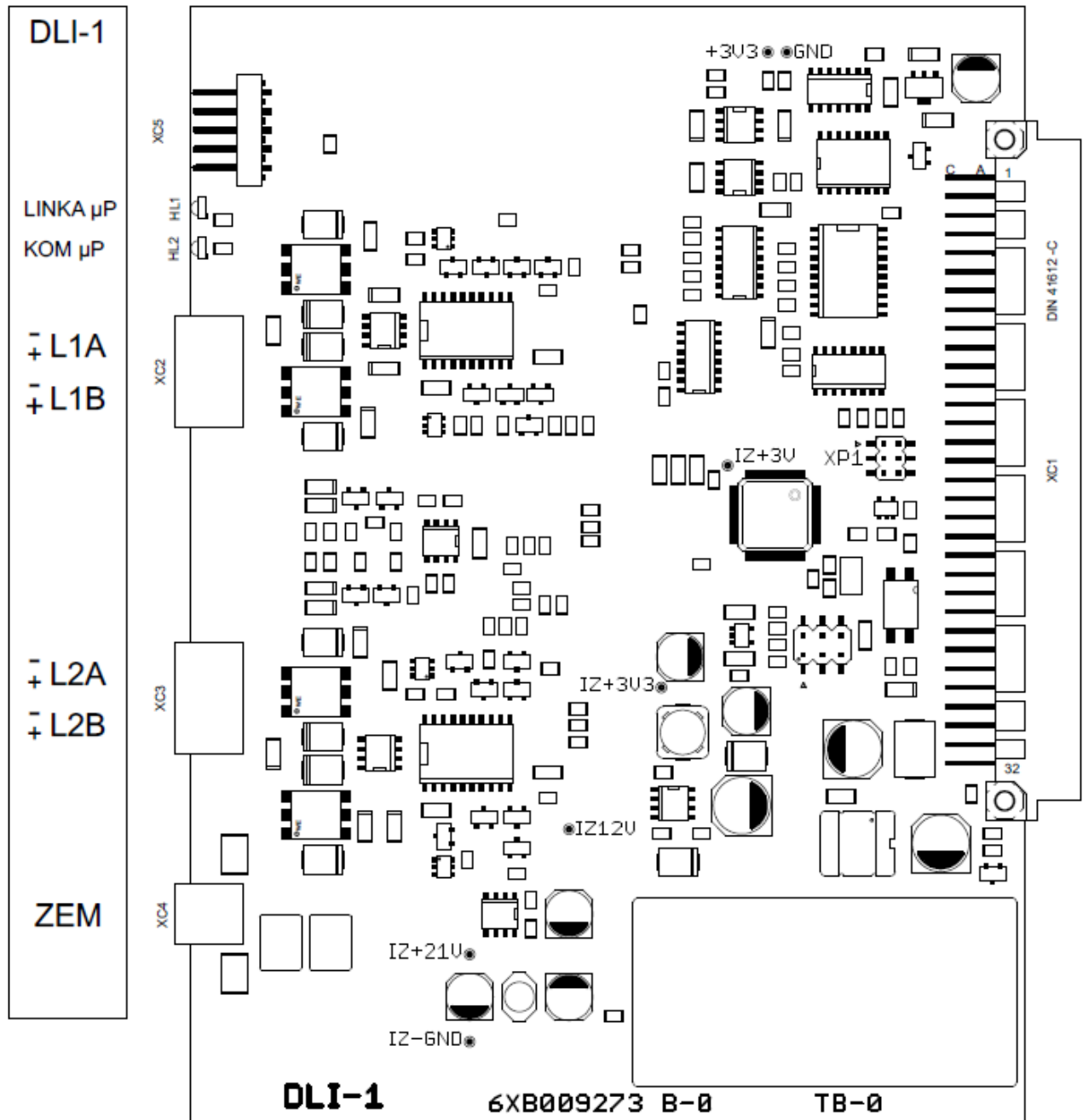
MHY 923 – input/output element	200 μ A
MHY 924 – addressable module for siren	200 μ A External, 500 μ A ACCU/Aku
MHY 925 – multi input/output element	200 μ A

All elements can be freely combined as you choose on one detection line.

Control and Indicating Equipment - C.I.E. MHU 116, MHU 117

Operational manual

Picture of DLI-1, Line board including panel



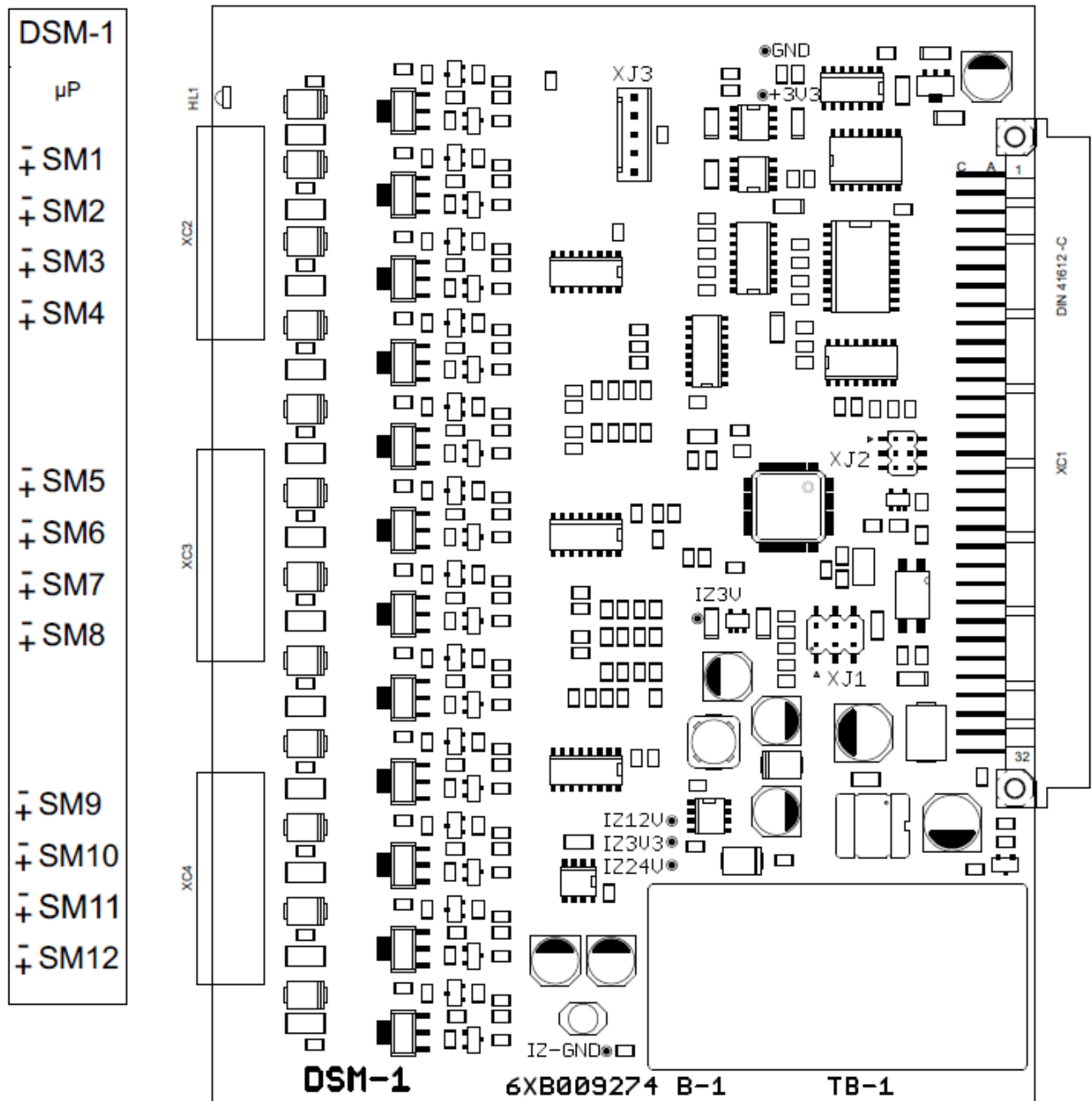
Control and Indicating Equipment - C.I.E. MHU 116, MHU 117

Operational manual

DSM-1 LOOP BOARD

Loop board (marked DSM-1) is used for the connection of lines with the non-addressable (conventional) detectors. It is set into user's slots of C.I.E. MHU 116 (as many as 6 units) and MHU 117 (as many as 12 units). Detectors with voltage as well as current characteristic can be connected on the loop. Voltage and current detectors must not be combined on one loop. Loops with non-addressable detectors are ended up with the resistor. The following table should be used for determining of indicative value of resistor:

Picture of DSM-1, Loop board with panel



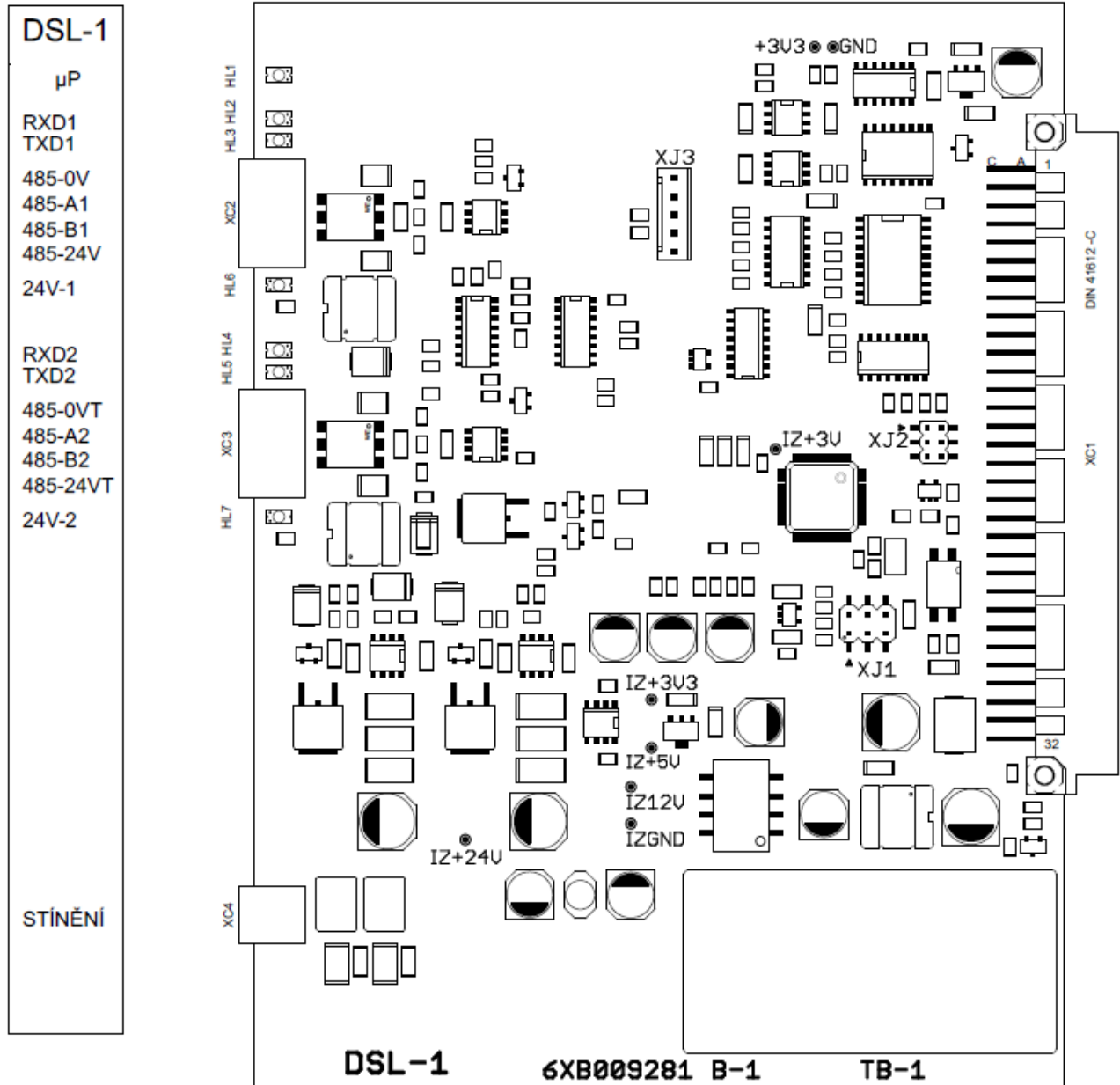
Control and Indicating Equipment - C.I.E. MHU 116, MHU 117

Operational manual

DSL-1 SLAVE BOARD

Slave board (marked DSL-1) serves for connecting of output devices typed SLAVE, i.e. units of outputs MHY 918 and input/output elements MHY 925/8 and MHY 925/4 on the circle or the single line SL-RS 485 that is galvanically isolated from the circuits of C.I.E. It is set into user's slots of C.I.E.s MHU 116 (as many as 6 units) and MHU 117 (as many as 12 units).

Picture of DSL-1, Slave board with panel



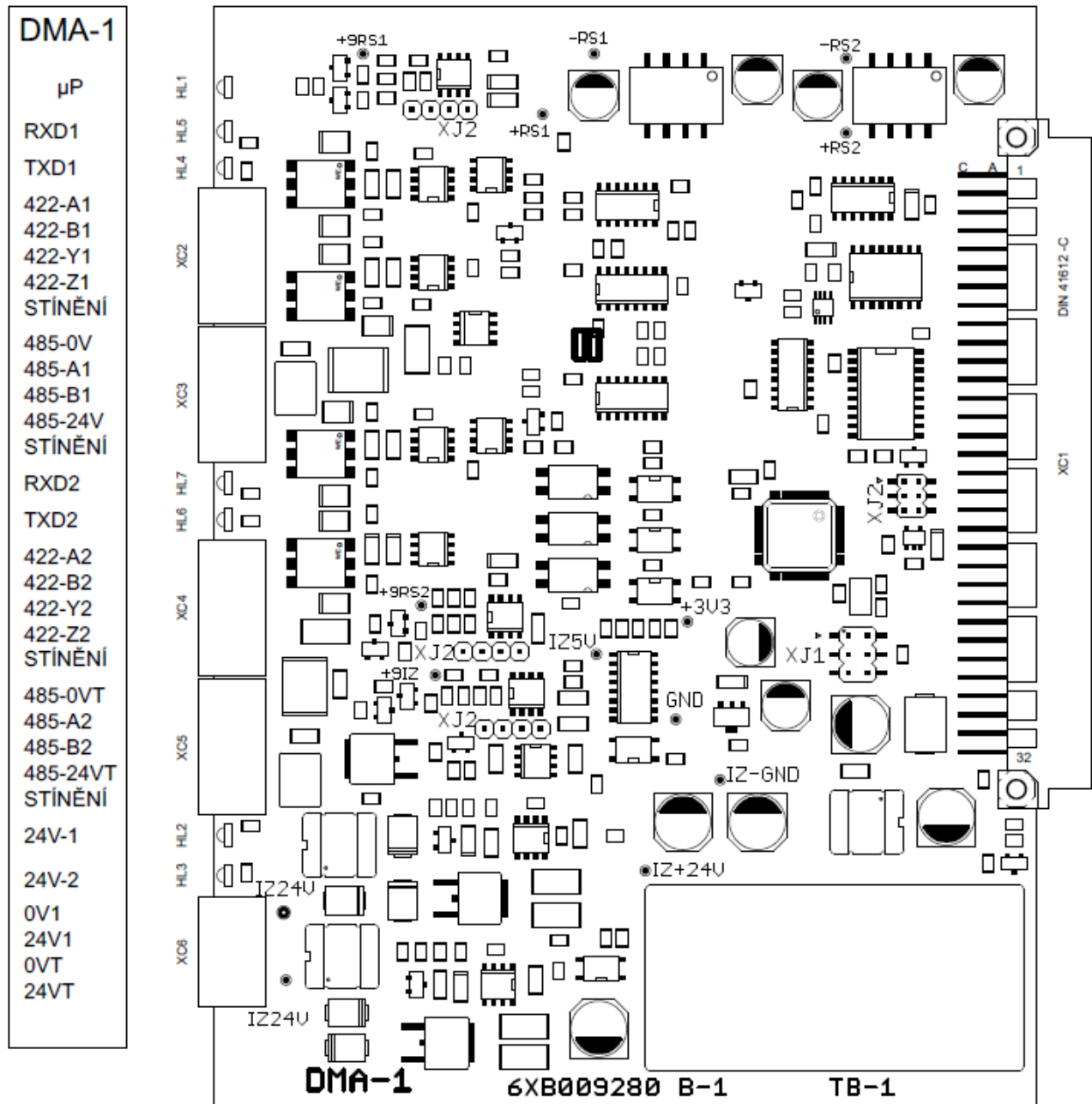
Control and Indicating Equipment - C.I.E. MHU 116, MHU 117

Operational manual

DMA-1 MASTER BOARD

Master board (marked DMA-1) is for the link of devices typed MASTER, i.e. other C.I.E.s and repeaters of operator on the circle and single line RS 485/422 that is galvanically isolated from the circuits of C.I.E. It is possible to interconnect as many as 16 devices of type MASTER in total in this way. Only one MASTER board is set to user's slot in the C.I.E. The format of the communication RS 485 and RS 422 can be combined during the interconnection of MASTER devices as necessary, the format of communication between 2 devices must be the same on the both sides. Running of communication as well as the presence of supply voltage on the communication line is optically indicated.

Picture of DMA-1, Master board including panel



Control and Indicating Equipment - C.I.E. MHU 116, MHU 117

Operational manual

DPE-1 PERIPHERAL BOARD

Peripheral board (marked DPE-1) is intended for the connection of PC, remote transmitting device and operating field of vision of fire protection to C.I.E.

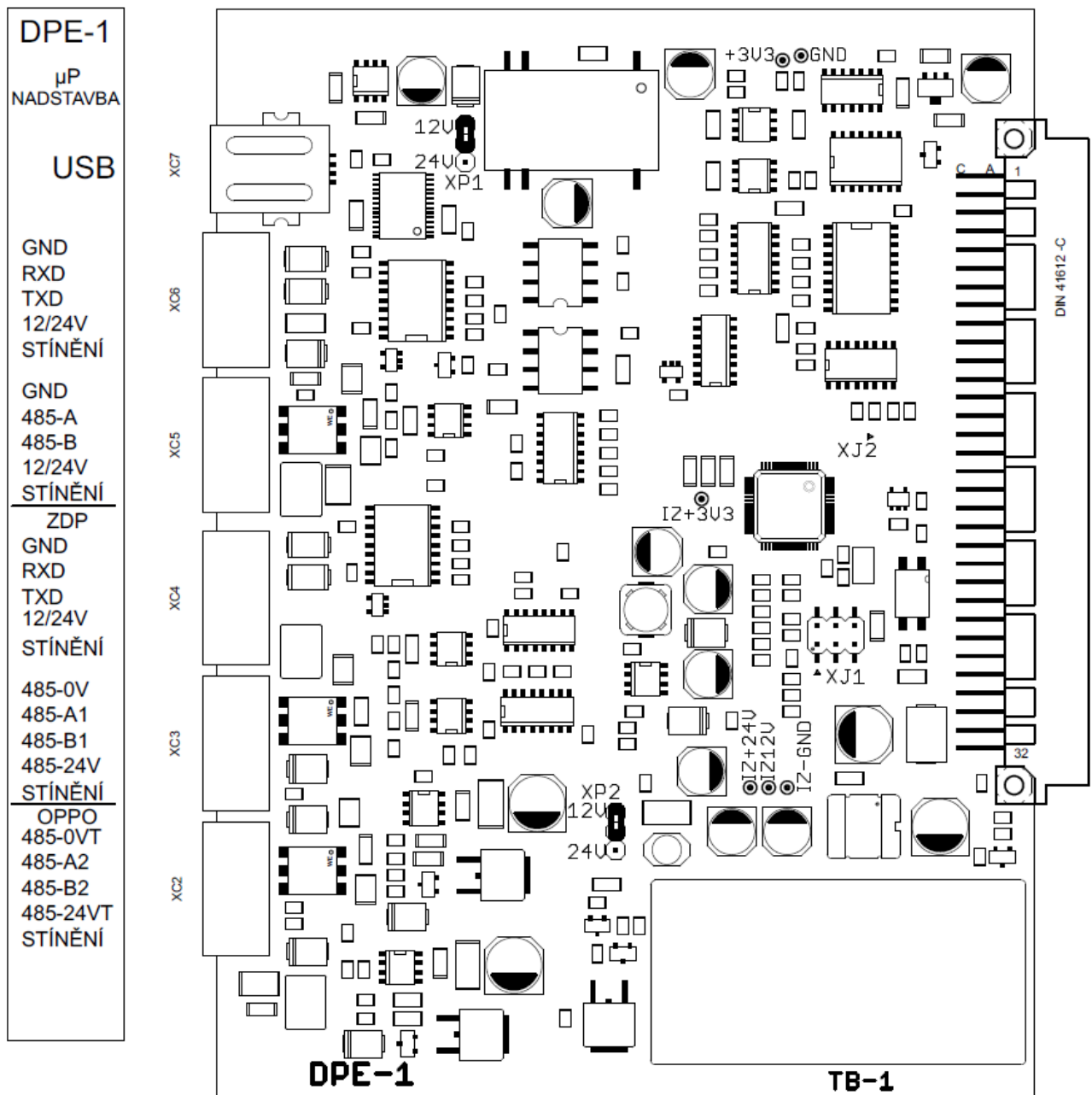
PC for better management of system can be connected to the interface USB, RS 232 or RS 485.

Remote transmitting device is possible to link with isolated interface RS 232, or isolated interface RS 485 by simple line (channel 1) or by the circle line (to interconnect channel 1 and 2).

OPPO of the type MHY 919 can be connected to isolated interface RS 485 by simple line (channel 2) or by the circle line (to interconnect channel 1 and 2).

Run of communication and presence of supply voltages on the communication lines are optically indicated.

Picture of DPE-1, Peripheral board including panel



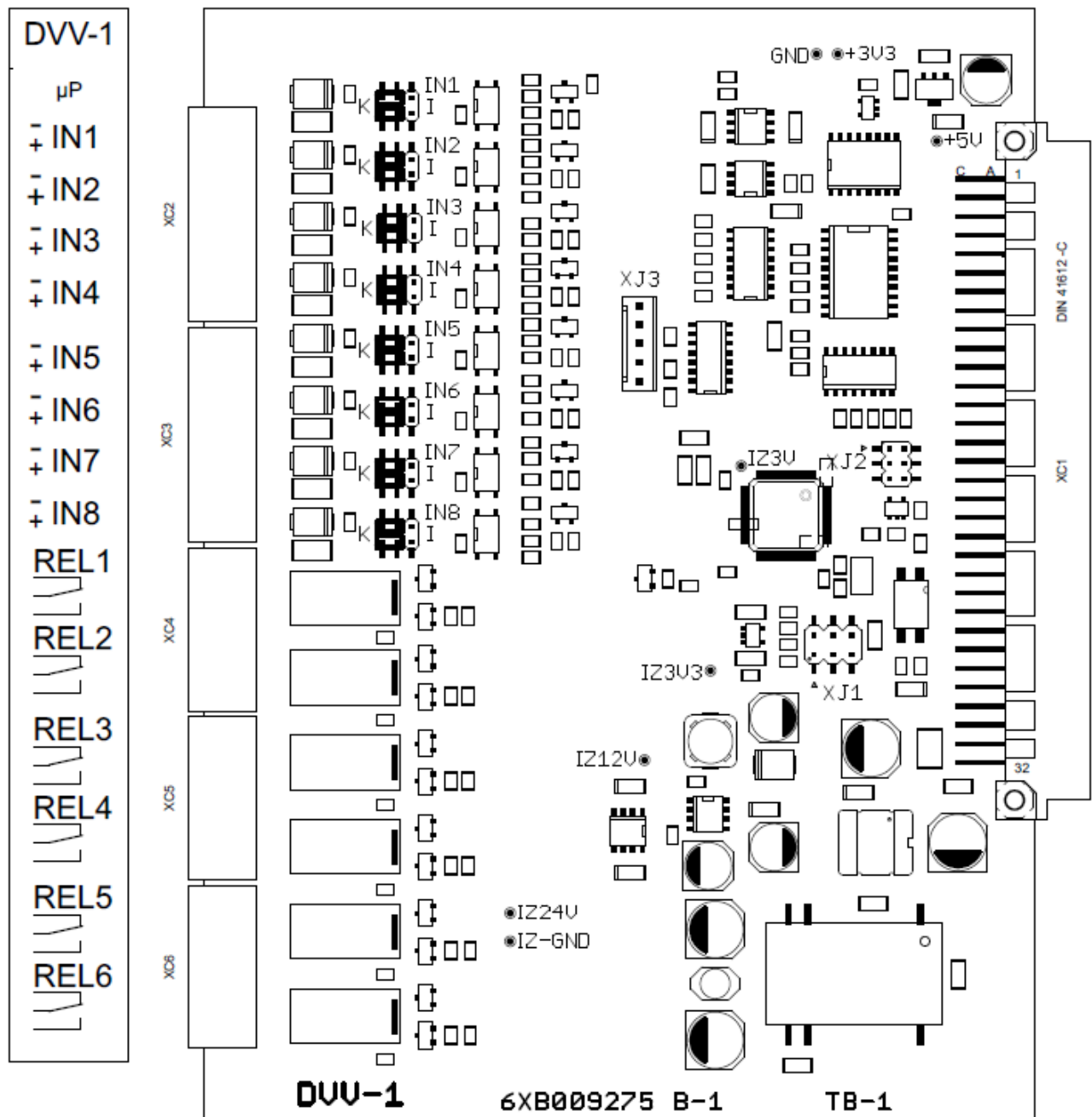
Control and Indicating Equipment - C.I.E. MHU 116, MHU 117

Operational manual

DVV-1 INPUT/OUTPUT BOARD

Input/output board (marked DVV-1) contains 8 universal inputs and 6 relay non-potential changeover contacts. It is set into user's slots of C.I.E.s MHU 116 (as many as 6 units) and MHU 117 (as many as 12 units). Universal inputs can be connected like opto-isolated or like inputs for switching/disconnecting contacts with option for monitoring of the loop of the input. Type of input is selected with help of jumpers IN1 ÷ IN8. The stand-by mode of input, alternatively if the input is monitored, is chosen in configuration program. Inputs are marked IN1 ÷ IN8. According to level of voltage connected to the input in the mode of opto-isolated input, C.I.E. evaluates the input modes of stand-by and activation. In mode of the contact input, C.I.E. evaluates the input modes of stand-by and activation, in mode of contact monitored input, besides C.I.E. evaluates fault -short circuit or breaking the line to the contact.

Picture of DVV-1, Input/output board with panel



Control and Indicating Equipment - C.I.E. MHU 116, MHU 117

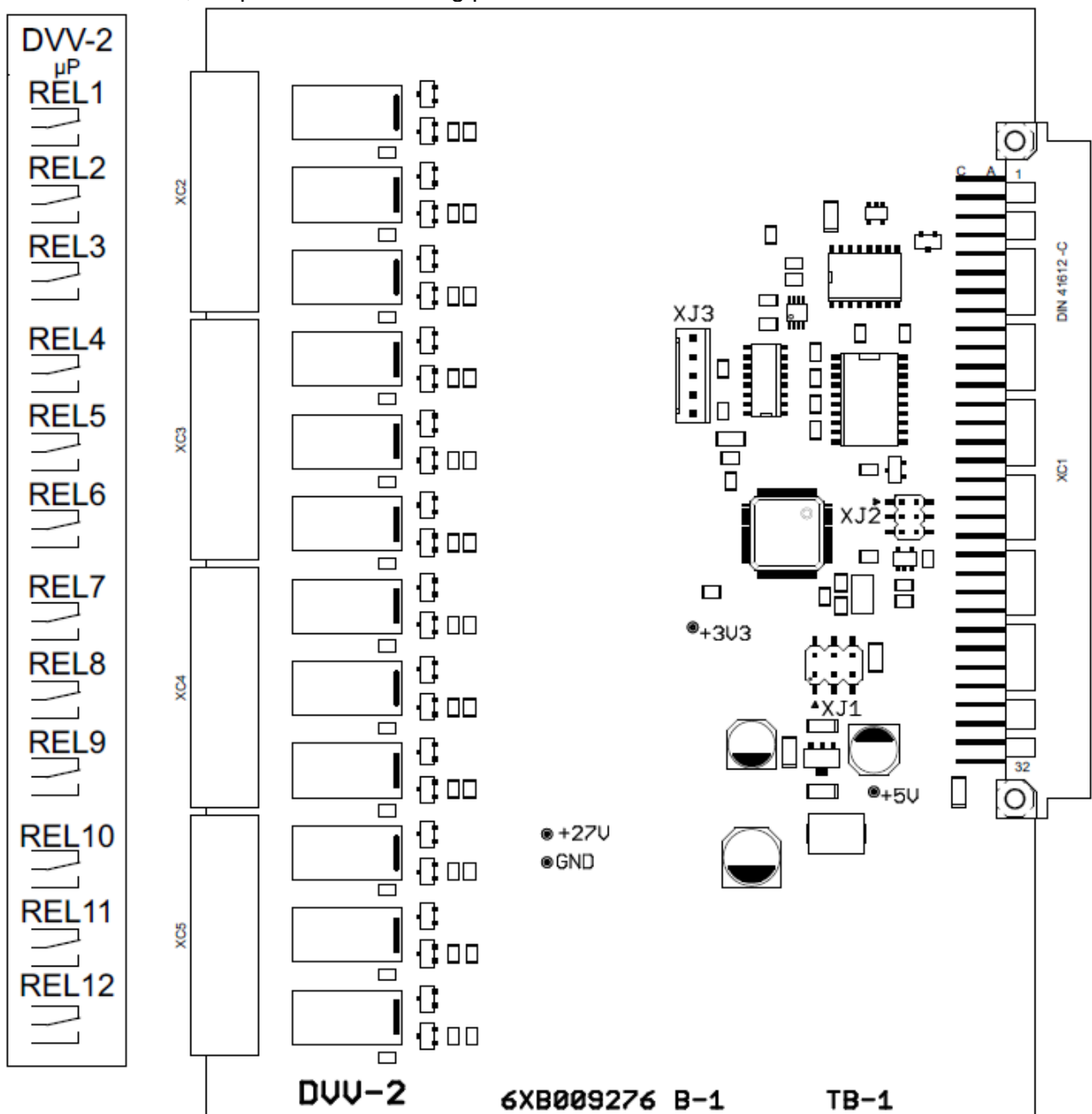
Operational manual

DVV-2 OUTPUTS BOARD

In case of necessity for changeover relay non-potential contacts, it is possible to use the outputs board (marked DVV-2) that is set into user's slots of C.I.E.s MHU 116 (as many as 6 units) and MHU 117 (as many as 12 units). It contains 12 change-over relay non-potential contacts. Matching contacts, alternatively timing of outputs can be set through configuration program. Non-potential relay contacts are monitored on short-circuit or cut-off of connected line.

The change-over relay contacts can be loaded with the maximum current **1 A** at maximum voltage **48 V**. When making project of linked equipment, it is necessary to take into account that some equipment (for example sirens) may have transient current at switching ON that can be considerably higher than the rated current.

Picture of DVV-2, Outputs board including panel



Control and Indicating Equipment - C.I.E. MHU 116, MHU 117

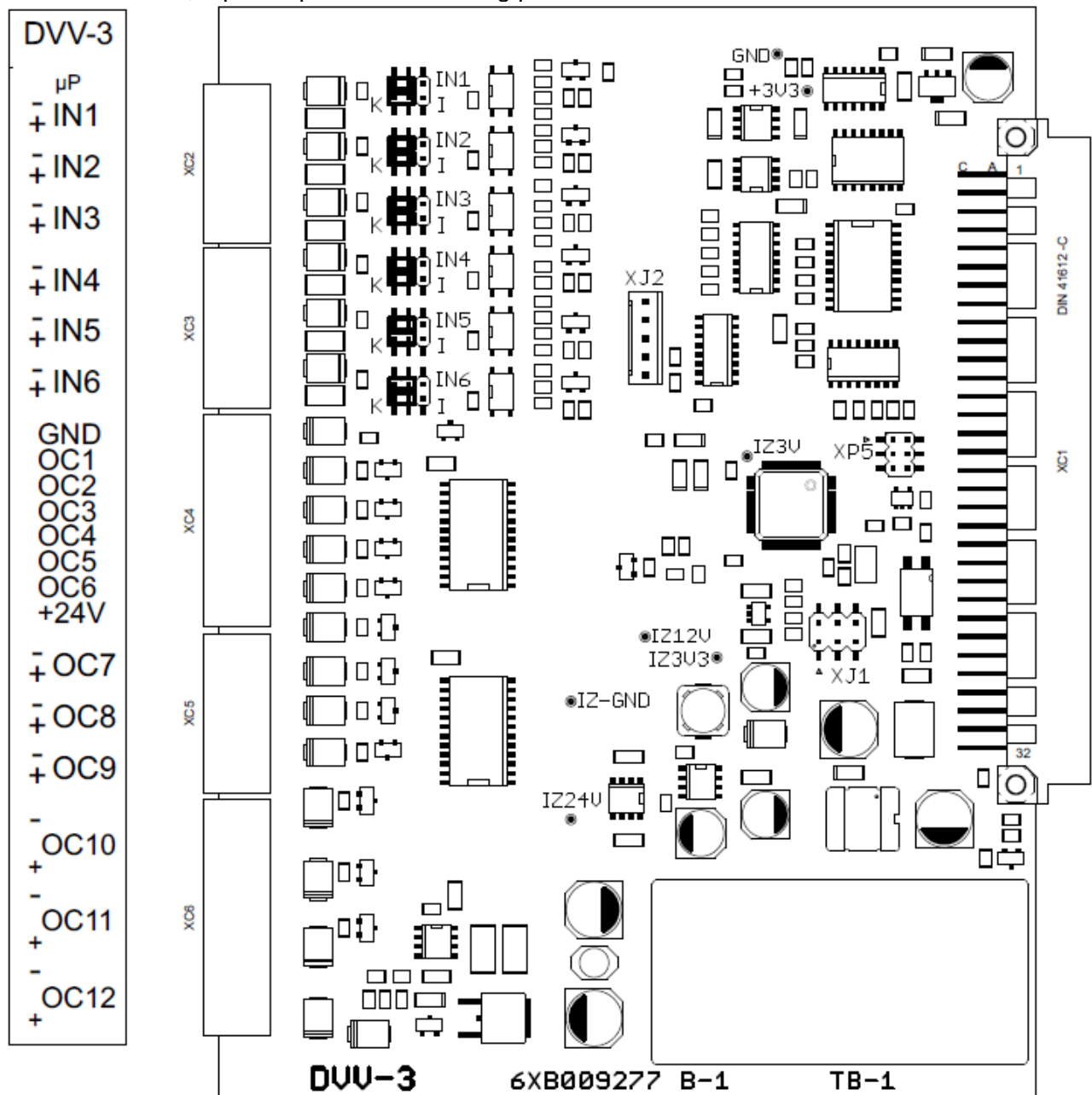
Operational manual

DVV-3 INPUT/OUTPUT BOARD

Input/output board (marked DVV-3) contains 6 universal inputs and 12 outputs typed of open collector. It is set into user's slots of C.I.E.s MHU 116 (as many as 6 units) and MHU 117 (as many as 12 units). Universal inputs can be connected like opto-isolated or like inputs for switching/disconnecting contacts with option for monitoring of the loop of input. Type of input is selected via jumpers IN1 ÷ IN6. The stand-by mode of input, alternatively if the input is monitored, is chosen in configuration program. Inputs are marked IN1 ÷ IN6.

Using of outputs – open collector (matching, type of activation, the conditions for switching ON including timing) is set with help of configuration program. Outputs can be loaded with the current max. **0,15 A** at maximum voltage **30 V**. When you make design of the connected equipment, it is necessary to take into account that some devices (for example sirens) can have transient current at switching ON that is much higher than the rated current.

Picture of DVV-3, Input/output board including panel



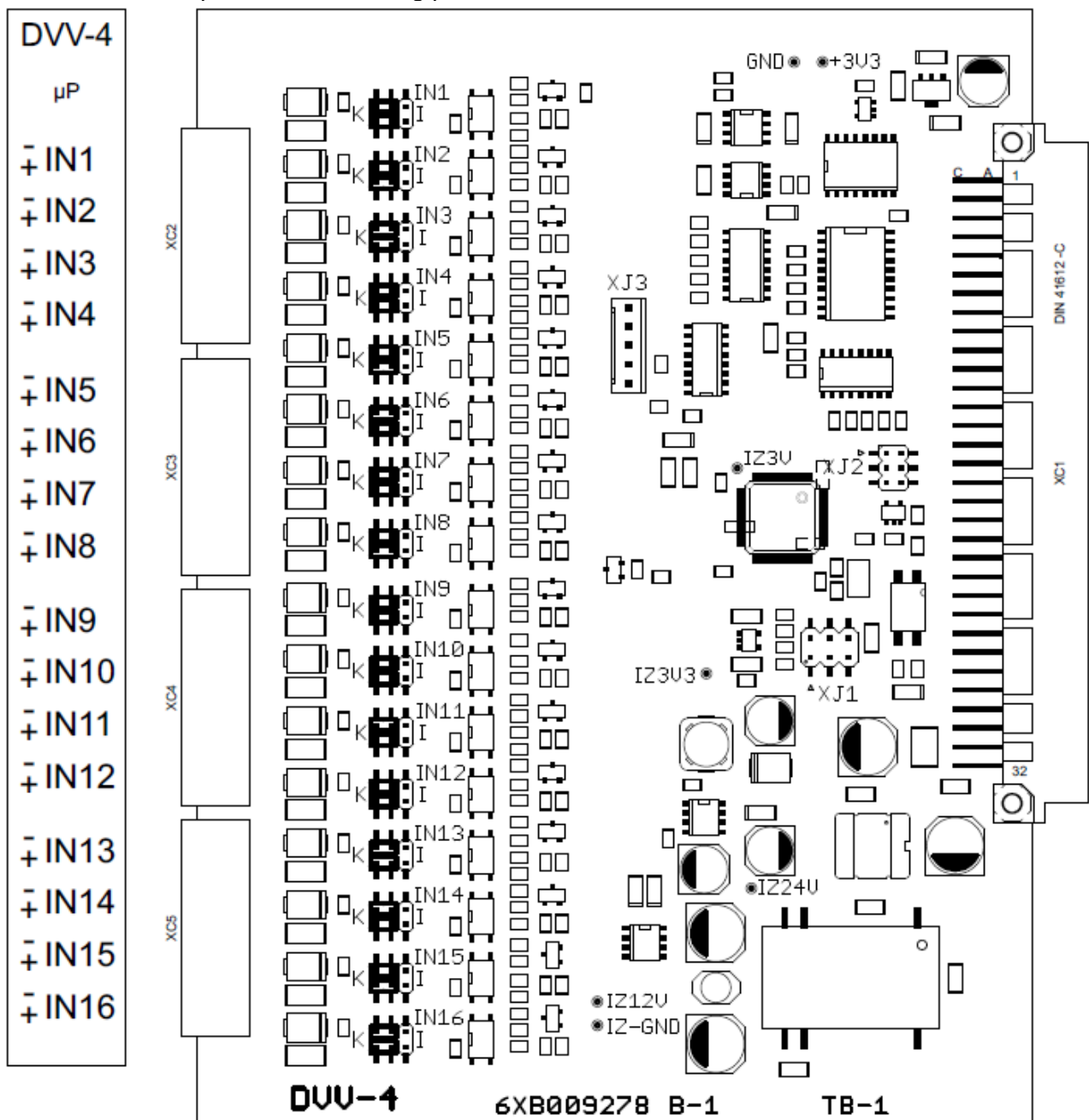
Control and Indicating Equipment - C.I.E. MHU 116, MHU 117

Operational manual

DVV-4 INPUTS BOARD

Besides information from the detectors, C.I.E. can also process the information from the inputs board (marked DVV-4) that is set into user's slots of C.I.E. MHU 116 (as many as 6 units) and MHU 117 (as many as 12 units). It contains 16 universal inputs that can be connected like opto-isolated or like inputs for switching/disconnecting contacts with option for monitoring of loop of input. Type of input is selected via jumpers IN1 ÷ IN16. The stand-by mode of input, alternatively if the input is monitored, is chosen in configuration program. Inputs are marked IN1 ÷ IN16. According to level of voltage connected to the input in the mode of opto-isolated input, C.I.E. evaluates the input modes of stand-by and activation. In mode of the contact input, C.I.E. evaluates the input modes of stand-by and activation, in mode of contact monitored input, besides C.I.E. evaluates fault -short circuit or breaking the line to the contact.

Picture of DVV-4, Inputs board including panel



Control and Indicating Equipment - C.I.E. MHU 116, MHU 117

Operational manual

DVV-5 INPUT/OUTPUT BOARD

Input/output board (marked DVV-5) contains 8 universal inputs and 8 relay potential outputs. It is set into user's slots of C.I.E.s MHU 116 (as many as 6 units) and MHU 117 (as many as 12 units). Universal inputs can be connected like opto-isolated or like inputs for switching/disconnecting contacts with option for monitoring of the loop of input. Type of input is selected via jumpers IN1 ÷ IN8. The stand-by mode of input, alternatively if the input is monitored, is chosen in configuration program. Inputs are marked IN1 ÷ IN8.

Using of relay potential outputs (matching, type of activation, the conditions for switching ON including timing) can be set with help of configuration program. Lines connected to the potential outputs is watched on cut-off and short-circuit. These events are signalled like fault on C.I.E.

Picture of DVV-5, Input/output board including panel

