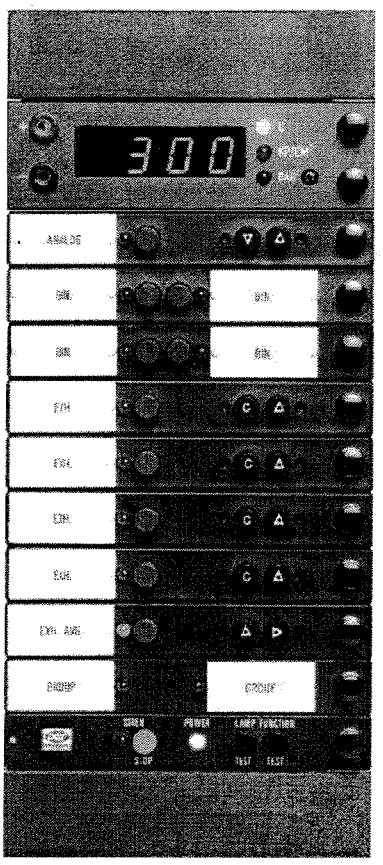
DEIF A/S

Alarm and Monitoring System

Type Malling 845

1159040012A



User's manual

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CONTENTS

1. MECHANICAL CONSTRUCTION

The alarm system consists of a number of cabinets type 845.71 containing 21 positions and type 845.73 containing 12 positions.

The system can be delivered in the following different ways.

1. Cabinets without internal and external wiring.

2. Cabinets internally wired according to customers request, sometimes delivered with fixed cable and terminals.

3. Cabinets wired and mounted in a box for bulkhead mounting.

The cabinets are normally delivered with code plugs mounted in the print connector of the alarm modules. The code plugs prevent exchange of differnt types of modules, which ensures that alarm cannot be prevented. Without code plugs the modules may be placed in all positions without damaging the alarm system and the sensors.

2. ELECTRICAL CONNECTION

2.1. Connection of Cassettes

The casettes in a system are connected two by two by means of interconnecting cables, see drawing no. 4162330008.

The interconnecting cable type 845.41-xx is used for transmission of the common signals. The cable contains, furthermore, 9 conductors which are only connected with a terminal strip on each cassette.

These conductors may be used for transmission of user defined signals e.g. group alarm signals and signals for selection of measuring range.

2.2. Connection to Power Supply

All cassettes are to be connected to 24V DC +/-20% separately through the belonging terminals. See drawing no. 4162330008.

When the power supply type 468.E3-041 and type 849.041 are used, they must be connected to 220V AC or 110V AC as well as 24V DC from emergency battery. See drawing no. 4157200080 or 4157200189.

The alarm system may also be connected directly to the emergency battery. This may, however, cause difficulties if earth failure should occur on other equipment connected to the battery.

The power supply is connected to the terminals of the cassette + 24 and 0V.

2.3. Connection to the Modules

8 terminals are connected to each position in the cassette by means of terminal blocks. These terminals are used for connection of inputs, outputs and for coding of alarm groups, range selection on instrument and cut off.

For all types of modules the connection of the 8 terminals is shown on drawing no. 4157430003.

NB: You have to be aware of the load of the earth potential, if you have several earth fault detectors on the same supply for instance the ship's battery. They may load each other.

3. BINARY ALARM MODULES

Binary alarm modules are used for alarms where the input signal is a switch signal. This signal may be of the normally open (NO) or the normally closed (NC) type.

If the NO type is used, a 10KΩs resistance may be connected in parallel with the alarm switch. This will ensure a supervision of the alarm sensor circuit. If a cable-break should occur the alarm unit will be activated and an alarm will arise.

3.1. Description

The alarm module includes two independent alarm channels. Each with a light emitting diode (LED) for visual alarm indication and a green push button for acknowledging the channel. Besides, they also serves as independent test of the unit. See drawing 4166330013.

3.2. Alarm

If an alarm occurs S(1), the LED on the actual alarm channel will start flashing, and the siren unit will be activated.

3.3. Acknowledged Alarm

The "Siren Stop" button on the siren unit, or possible external stop-button, must be acknowledged before reset of the module is possible. The light on the module is acknowledged by pressing the green push button of the alarm channel. This will change the flashing light to steady light.

3.4. Normal Condition

When the sensor is in normal condition the LED it not illuminated.

3.5. Inhibit

Each alarm channel has a facility for inhibit of alarm. See **8. INHIBIT.**

3.6. Output for Group Alarm

Each alarm channel has an output for group alarm. The feature is used in connection with the group alarm modules, when separation in different alarm groups is required , i.e. critical alarms and non critical alarms. They may also be used for calling systems and control signals, e.g. start, stop, shutdown etc. of auxiliary engines.

3.7. Delay

The alarm modules are delivered either with a delay of 1 sec. or an adjustable delay of 1..25 sec. See description **7. DELAY.**

3.8. Individual Test

Caution: If the unit is part of a safety system, this test may cause a shut down. Each alarm channel may be individually tested by keeping the reset push button activated until the delay time is exceeded. This will bring the alarm channel into alarm condition.

3.9. Common Test

Common test of the alarm system may be done by pressing the Function test button on the siren unit. This will bring all alarm channels without inhibit into alarm condition.

3.10. Other specifications

Weight:	86 g	
Consumption:	Normal condition:	7.6mA
	Alarm condition (max)	37.3mA

4. ANALOG ALARM MODULES

Analog alarm modules are used for alarms, where the input signal is an analog signal generated by an analog sensor i.e. Pt100 sensors, NiCr-Ni sensors or current transmitters.

4.1. Description

The alarm module has a light emitting diode (LED) for visual alarm indication and a green push button for acknowledging the alarm. See drawing 4166330013 and 4166330014. Modules for Pt100 sensors and for current transmitters have a possibility of 2 alarm set points. 1 max. alarm and 1 min. alarm.

Modules for NiCr-Ni sensors only have a possibility of a max. alarm set point. See description **6.5. NiCr-Ni Sensor.**

4.2. Alarm

If an alarm occurs, the LED for the actual alarm channel will start flashing, and the siren unit will be activated.

4.3. Reset Alarm

The "Siren Stop" button on the siren unit or possible external stop button must be acknowledged before reset of the alarm. The alarm is acknowledged by pressing the green push button for the alarm channel, which will change to no light when the sensor is in normal condition.

4.4. Normal Conditions

At normal condition the LED is not illuminated.

4.5. Read Out of Sensor Value

If alarm modules with analog sensors are used in the system, the system normally includes a common digital instrument unit type 845.31.

The sensor value is read out by means of the instrument unit by pressing the green push button for reset on the actual alarm module.

4.6. Coding of the Measuring Ranges

All the range outputs from the modules, using the same measuring range, may be connected together, and modules connected to the requested range input on module type 845.31.

4.7. External Instrument

All analog modules have connection for external instrument. This instrument will always show actual sensor value. The output signal is 0..1V full scale. Max. load 2mA.

By means of individual function test, the external instrument will display the alarm limit during test.

4.8. Adjustment for Alarm Limit

All, alarm modules with analog sensors have one or two potentiometers to adjust the upper or/and lower alarm limit.

These potentiometers can, by means of a screw driver, be adjusted through holes in the front plate by the push buttons for read out of the limits.

The range, in which the individual alarm limit can be adjusted, is indicated in the description of the individual modules. See drawing no. 4157330002.

The alarm limits can never be adjusted in such a way that alarm cannot be given when a sensor is disconnected or short circuited.

4.9. Read Out of Upper Alarm Limit
Pushing af button marked "▲" causes the upper limit for the module in question to read out on the instrument module.

4.10. Read Out of the Lower Alarm Limit
Pushing a button marked "▼". This only causes that the lower limit for alarm of the alarm channel in question is read out on the instrument unit.

4.11. Hysteresis
All analog alarm modules have hysteresis in connection with the alarm given as a function of the sensor value. The value, which is read out by a push button for alarm limit, is the value which results in alarm condition. The sensor value which causes the alarm module to return to normal state is 2% of full range less/more than the value of the alarm limit.

4.12. Inhibit
Except the NiCr-Ni types (thermocouple), the modules have a facility for alarm inhibit. See **8. INHIBIT.**

4.13. Output for Group Alarm
Each alarm channel has an output for group alarm. The feature is used in connection with the group alarm modules. If divided into different alarm groups is required, i.e. critical alarms and non critical alarms. They may also be used for calling systems and control signals e.g. start, stop, shutdown etc. of auxiliary engines.

4.14. Delay
The alarm modules are delivered either with a delay of 1 sec. or an adjustable delay of 1..25 sec. See **7. DELAY.**

4.15. Individual Test
Caution: If the module is part of a safety system, this test will cause a shut down.

The alarm module is tested by holding the reset button in acknowledge position and one of the buttons for alarm limit in read out position until the alarm delay is exceeded. The alarm module will be in alarm condition, possible activated inhibit will not prevent this test. The instrument unit and possible slave instrument will display the limit being tested.

4.16. Common Test
Common test for the alarm system can be done by pressing the function test button on the siren unit.

Alarm channels with activated inhibit will not respond to this test.

5. EXHAUST GAS MONITORING

Measurement of an engine exhaust gas temperature may be divided into measurement of:

- Exhaust gas after cylinders.
- Mean temperature after cylinders.
- Exhaust gas after turbo charger.

5.1. Exhaust Gas after Cylinders

For this purpose the modules type 845.60 or 845.601 may be used.
These modules are used together with the mean value unit type 845.69B.

5.2. Alarm Limit (See Drawing 2043260240)

The modules type 845.60 or 845.601 only have an adjustable upper alarm limit. This may vary in the range of 0..600°C. As the modules are used in connection with the mean value unit type 845.69B the upper and lower alarm limits are determined as a function of the mean value. However the adjustable upper limit of the alarm modules will never be exceeded without alarm.

5.3. Correction of Normal Divergences

The contribution to the mean value from the single alarm unit may be corrected up to +/- 50°C.The corrected value may be read out by pressing button "C", and this value may be adjusted trough a hole in the front plate beneath the button. It is the corrected value which is compared with the upper and lower alarm limits from the 845.69B unit, but it is the uncorrected value which is compared with the upper alarm limit of the module.

If the specified maximum deviation between the cylinders is small, it is necessary to have the corrected values as equal as possible. However, these corrections must always be accepted by the engine manufacturer.

5.3.1. Adjustment

1. Find the channel, where the difference between "contribution to mean value" and "mean value" is most distinct.
2. Adjust this channel's "contribution to the mean value" until the contribution indicates the mean value read earlier.
3. A new mean value has occurred. Press the green button on 845.69B.
4. Find the channel where the difference between "contribution to mean value" and "mean valeu" is most distinct.
5. Adjust this channel's "contribution to the mean value" until the contribution indicates the latest mean value.
6. A new mean value has now occurred.
7. Find the channel with the highest difference etc.

Continue this procedure until all the contributions to the mean value is equal to the mean value.

In practice a deviation less than 5°C will not be adjusted.

5.4. Disconnection of Modules

In a case of sensor failure it is possible to disconnect a module on pull out. The module does not contribute to the formation of the mean temperature and it does not transmit alarm signals.

This may be achieved by pushing the switch placed behind the front plate on the module. The state is indicated on the unit by means of the permanent light of the alarm lamp. The group alarm will not receive any signal from the module. At an individual or common function test, the unit will not release an alarm. The read outs on the instrument unit will not be influenced.

5.5. Individual Function Test

It should be noted that in these tests a sensor value is simulated equal to the alarm limit in question. This imply that the mean temperature changes and therefore the deviation alarm limits changes too. Therefore, it is also possible that function test of one of the modules also releases an alarm in one or more of the other alarm modules.

5.5.1. Alarm through the Upper Limit of the Unit

This is tested by holding the green button in acknowledge position and the button for alarm limit in read out position until the alarm delay is exceeded. This will bring the alarm module into alarm condition.

5.5.2. Alarm through the Lower Limit from 845.69B

It is tested by pushing the buttons "C" and "▲" on the unit in question at the same time. On the instrument unit the lower alarm limit with the actual mean value temperature is indicated.

5.5.3. Alarm through the Upper Limit from 845.69B

This is tested by pushing the button "C" on the 845.60/601-unit and the button "▲" on the 845.69B-unit.

5.6. Mean Temperature after Cylinders

Mean value module, type 845.69B is used in connection with the alarm modules for measuring of exhaust gas temperature after cylinders. The mean value module gives the opportunity to indicate the mean temperature for all cylinders. Depending on the magnitude of the mean temperature, this module calculates the upper and lower alarm limit for the connected modules. The module has 3 push buttons, in the following named: P1, P2 and P3 each with the following functions when pressed down:

P1 indicates the read out of the mean temperature for all cylinders.

P2 indicates the read out of the upper deviation alarm limit for the cylinders, at the actual mean temperature. This alarm limit may be adjusted with a potentiometer called p2 trough a hole in the front plate by P2.

P3 indicates the read out of the cut-off temperature that is to say the mean value under which the alarm limits for the cylinders are independent of the mean value, and solely determined by the upper alarm limit adjusted on the individual 845.60/601 module. The cut-off temperature may be adjusted with a potentiometer called p3 through a hole in the front plate by P3.

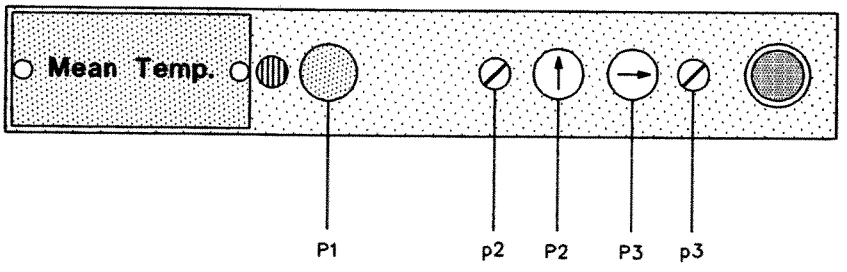


Figure 5.6.1

5.7. Adjustment of Permitted Deviation from the Mean Temperature

The purpose of this function is to get an indication of whether one or two cylinders start to deviate in temperature from the others. This is expressed as a deviation according to the mean value of the cylinders which are connected to the system. When they are in the area between cut-off temperature and 600°C the cyliders alarm limits are determined by the mean value card 845.69B. However, the absolute limits of the individual cylinders, adjusted on the respective cards 845.60 and 945.601, cannot be exceeded without release of alarm.

The dynamic limit, determined by 845.69B is a function of the actual mean value. It is calculated as a value which is being reduced when the mean value is being increased.

The dependence of the mean value may be adjusted with p2, see figure 5.7.1.

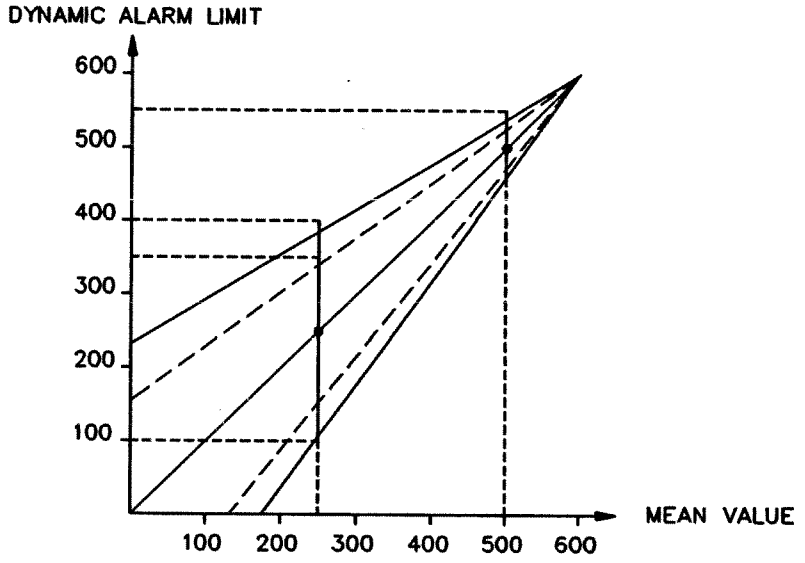


Figure 5.7.1

It appears from figure 5.7.1 that at a mean value of 250°C the deviation is ± 150°C that is when reading of max deviation the instrument will indicate 400°C. By adjusting p2 the deviation may be changed for instance ±100°C at 250°C and the instrument will indicate 350°C when reading the max deviation.

On figure 5.7.1 is appears that the permittable deviation is reduced when the mean value is increased. It is for instance ±43°C at 500°C.

The absolute limit of the respective modules may be considered as an extra alarm limit which may be either above or under the dynamic alarm limit, but in accordance with the actual value of the sensor. Alarm is released for the limit which is exceeded.

The upper alarm limit L(T) at any mean temperature T may be calculated from the actual mean temperature A and the upper limit L(A) at the actual mean temperature:

$$L(T) = T + \frac{L(A) - A}{600 - A} \cdot (600 - T)$$

or, if the value of L(A) is wanted:

$$L(A) = A + \frac{L(T) - T}{600 - T} \cdot (600 - A)$$

Provided that a max deviation on for instance ±20°C is given - the mean value is 400°C and the actual mean temperature is 350°C. The deviation temperature at 350°C may then be calculated to be ±20°C at 400°C.

Deviation temperature = $$350 = \frac{420 - 400}{600 - 400} \times (600 - 350)$$

Deviation temperature = 375°C.

That is in order to get an upper limit of 420°C at a mean value of 400°C there must be adjusted to an upper limit of 375°C at 350°C.

If the mean value is under the cut-off temperature the dynamic limits are disconnected and only the limits for the respective cards are valid. This is shown on drawing 4174040001.

5.8. Adjustment of Cut-off Temperature

When P3 is pressed down, the p3 adjusts the requested cut-off temperature. This may be adjusted in the range of 0..300°C. Even if the cut-off temperature is adjusted to a value higher than the actual mean temperature, the adjustment in passage E7 can still be made.

When the mean temperature is below the cut-off temperature, the yellow LED on the module gives steady light.

5.9. Exhaust Gas after Turbo Charger

For measurement of max. temperature of exhaust gas, the modules type 845.61, or 845.611 may be used. Function as described for analog modules.

6. CONNECTION OF SENSORS

For all type of sensors screened cable is not required.

We recommend that cables for NiCr-Ni sensors are placed at least 1 meter from power cables.

If screened cables are used, the screen must be connected to ground on the sensor side. Further the screen must not be connected to the alarm system, if it is not insulated.

6.1. Binary Sensors

For connection of binary sensors 2 wires per sensor is recommended. If an earth failure should occur, this may be located by removing one module from the cabinet, at the time.

This is an easy way to disconnect the sensors from the alarm system.
If a common wire is used for on/off sensors this must be connected to one of the terminals marked "sensor return". All "sensor return" terminals must be connected together in order to avoid alarm condition for all the alarm modules with common wire, if one module is removed.

6.2. Normal Open Sensors

The resistor for normal open sensors must be placed directly across the sensor to ensure the cable supervision.
Cable resistance: Max. 300Ω.
Resistor: 10 KΩ, +/-5%, 0.1W.

6.3. Pt100 Sensors

3-conductor connection of the sensor is recommended. The conductors must be in the same cable and have the same line cross section. Each conductor may have at least 100Ω line resistance, without giving measuring defects.

If a 2-conductor connection is used, a measuring defect of + 2.5° per Ω collective line resistance will occur.

6.3.1. Sensor Failure

Disconnected conductor to sensor is indicated in the instrument module by positive overrange or a temperature lower than - 20°C, depending on which of the conductors is disconnected. A short-circuit sensor is indicated by a temperature lower than - 20°C.

6.4. 4..20mA Transducer (EMP2)

2-conductor connection of the transducer is used.

Max. collective line resistance is 100Ω, assuming that transducer type EMP2 is used.

6.4.1. Sensor Failure

A disconnected conductor to the transducer is indicated in the instrument module by a value equal to - 25 % of the measuring range. A short-circuit conductor to the transducer is indicated in the instrument module by value above 130% of the measuring range. The indication of failures between sensor and transducer depend on the transducer type being used.

6.5. NiCr-Ni Sensor

Module type 845.60B and 845.61B:
NiCr-Ni compensation cable with max. line resistance of 20Ω is required.

Module type 845.601 and 845.611:
NiCr-Ni compensation cable is only required from the sensor to a common compensation box.

Temperature is measured in the compensation box by a Pt100 sensor connected to the alarm system, see drawing 4157430029.
N.B. Terminal 3 is occupied for this purpose.

6.5.1. Sensor Failure

Disconnected sensor gives an instrument reading below - 400°C and the module releases an alarm.

Short-circuit sensor releases an instrument reading of the temperature where the short-circuit is. This condition will not release an alarm.

7. DELAY

All alarm modules are delivered either with a fixed delay of 1 sec. or an adjustable delay of 1..25 sec. The type numbers for modules with adjustable delay have the addition DL. Alarm modules with 2 channels have the same type of delay for both channels.

7.1. Adjustment

The adjustable delay is adjusted by means of a potentiometer, which is only accessible when the alarm module is removed from the box. An extension module, type 845.45 may be used for this purpose, when the adjustment shall be done.

7.2. Test of Delay

The delay time of an alarm channel may be measured in connection with the function test.

For the correctness of the measurement it is necessary that the module has been in normal condition for a period, exceeding the delay time of the module.

7.3. Return Delay

If the alarm condition lasts for more than the double delay time, the time which passes from the alarm condition has disappeared to the normal condition appears, will be equal to the adjusted delay time.

An exception for this is module, type 845.101 HDL, which has always max. 1 sec. return delay.

8. INHIBIT

Inhibit is sometimes required in order to avoid that alarms show up if a normal procedure is taking place, i.e. Lub. Oil Alarm during stop of the main engine.

The signal for inhibit is a switch signal of the NO type, which is activated during the time for inhibit. The switch for inhibit must be of the potential free type. The switch is connected to the zero voltage of the alarm system, and the alarm module which shall be inhibit.

All alarm modules for on/off sensors., Pt100 sensors and pressure transducers have an input for inhibit.

When the input signal is 0V the actual alarm channel is prevented from giving alarm.

The same contact for inhibit may be used for several alarm channels. In this case the inputs for inhibit are connected together.

For system classed to Bureau Veritas a contact for each alarm channel is required. Instead of having i.e. 10 contacts on the main engine, auxiliary relays may be used.

8.1. Inhibit during Alarm Condition

Inhibit has no effect when the alarm channel indicates an occurred alarm. At acknowledgement of the alarm, the inhibit will make the alarm channel switch into normal condition.

9. COMMON MODULES

9.1. Siren Module, Type 845.20

This module has a potential free change over switch for activation of the sound producers and/or calling system, maximum load 3A/24V DC. Each system has to contain one and only one module of this type.

Furthermore, the modules contain as follows:

9.1.1. Pushbutton for Siren Stop

9.1.2. Input for External Siren Stop

9.1.3. Push-button for Common Function Test

When this button is kept pressed down, all alarm channels without inhibit are brought into the state of alarm after their individual delay.

9.1.4. Push-button for Lamp Test

A press down of this button makes all lamps in the system and all segments with exception of the sign in the instrument module to lighten up.

9.1.5. Green Lamp for Indication of "Power On"

9.1.6. Red Lamp for Indication of Alarm

This is indicated with flashing light.

9.1.7. Common Flash Generator for the System

9.1.8. Other Specifications

Weight:	92 g.
Consumption:	Normal condition 19mA
	Alarm condition 55mA

9.2. Instrument Module, Type 845.31

9.2.1. Indication

When a measuring button on an analog alarm module is pressed, the instrument indicates the corresponding value and gives the module in either °C, kp/cm² or Bar.

9.2.2. Overflow

If the maximum reading of the instrument is exceeded, it is indicated by the figures being dark, while correct sign and decimal point are still given.

The maximum reading is 1999, independent of the decimal point position of the actual measuring range.

9.2.3. Other Specifications

Weight:	226 g
Consumption:	Stand-by condition 47mA
	Measuring condition 95mA

9.3. Earth Failure Module, Type 845.971

9.3.1. Function

This module supervises that the system is galvanic separated from the frame.

In the system there is to be one and only one module of this type.

9.3.2. Input Terminal
This has to be connected with the boxes of the system and earth.

9.3.3. Alarm Limit
The module releases an alarm, if the leakage current from the + or - pole of the supply voltage exceeds 0.5mA.

The alarm module module cannot return to the normal condition untill the leakage is below 0.25mA. The leakage current may be measured with a DC Voltmeter through the plugs in the front plate.

9.3.4. Other Specifications

Weight:	76 g
Consumption:	Normal condition 5mA
	Alarm condition 17mA

9.4. Earth Failure Module, Type 845.97

9.4.1. Function
This module is equal to type 845.971 except for the alarm limit. This module must be used for systems including analog modules.

9.4.2. Alarm Limit
The module releases an alarm if the leakage current from the + or - pole of the supply voltage exceeds 0.05mA.

The alarm module cannot return to the normal condition until the leakage is below 0.025mA.

9.5. Group Alarm Module, Type 845.25

This module is used when the alarm is divided into groups with external group indication and alarm.

9.5.1. Description
Each module has a possibility of showing two different alarm groups. Alarm indication is shown by flashing LED's and external lamps.

9.5.2. Function
The local group lamps follow the group lamps on the bridge, see **10. ALARM SEQUENCES FOR THE GROUP ALARM ON THE BRIDGE.**

9.5.3. Connections
All group outputs from the alarm channels in each group are connected together with the group input terminal of the group module. Each alarm channel must be connected to one group only.

If more than one group alarm module is used, the signals for acoustic group alarm and reset must be connected in parallel for all the group alarm modules.

9.5.4. Other specification

Weight:	81 g
Consumption:	Normal condition 4,50mA
	Alarm condition 35,00mA + external lamps
	Max. load pr. group 500mA/24V

9.6. Group Alarm Relay for Automatic Control, Type 845.202

Function: At alarm in one of the channels in the connected group, the relay is activated, and the alarm lamp gives firm light. By pushing the RESET button or EXTERNAL RESET, the relay switches to normal state and the alarm lamp turns dark. If a new alarm arises in the group, the relay and the alarm lamp are activated again.

When all alarms in the group are acknowledged and repaired, the module is automatically reset to normal state.

The relay is in normal state if the alarm system is without voltage supply.

The module may be used together with the normal group alarm system.
Max. load of the relay; 24V DC, 3A.

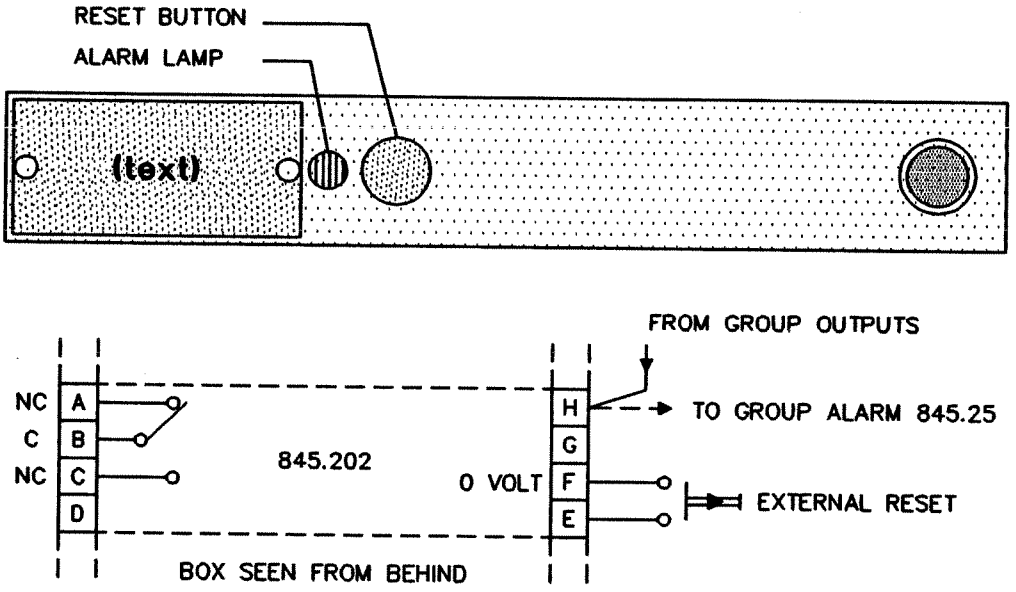


Figure 9.6.1

9.7. Flash Supervision Module, No. 845.106

This module supervises that the flash generator placed in the siren module 845.20 is intact. If this is not the case the alarm is given in a normal way, except that the alarm lamp of the siren module and the group alarm lamps will not flash.

The alarm lamp of the flash supervision module will flash by means of a separated flash generator in the module.

This module is only requested in systems classified by Bureau Veritas.

10. ALARM SEQUENCES FOR THE GROUP ALARM ON THE BRIDGE

This sections deal with the group alarms in the bridge panels 869.25 and 869.26 connected to 845.25.

10.1. Arisen Failures

When the alarm channel releases an alarm for arisen failures, the belonging group lamp will start to flash with maximum intensity and the acoustic group alarm will start too.

This is irrespective of the state of the other groups, and irrespective of the fact that the group already has alarm modules with acknowledged and/or unacknowledged alarms.

10.2. Reset of the Group Alarm

If the reset button in the bridge panel is pressed, the acoustic group alarm will stop. The group lamps continues to flash but with moderate intensity.

10.3. Reset of Siren

At reset of siren the flashing group lamps switches to permanent light. If the group alarm has not been reset already, this will take place when resetting the siren.

10.4. Normal Again

When all faults inside a group have been repaired and reset on the modules in question, the group lamp turns dark.

11. FAULT FINDING

11.1. Earth Failure

Earth failure may occur at earthing to the bulkhead from sensors, inhibit inputs, external instruments, group alarm systems, calling systems and from power supplies.

Fault in the failure module itself is controlled by disconnecting the terminal A module from the bulkhead.

Then a possible earth failure alarm should disappear. The size of the leakage current can be measured by putting in a DC meter in the plugs.

Please note that a current of e.g. 0.1mA corresponds to a leakage resistance of about 120KΩ as only half the supply voltage should be on the input terminal of the earth failure module.

11.1.1. Earth Failure on the Sensors

This may be located by removing the alarm modules from the box, one by one, before the fault disappears. In systems provided with diving terminals the sensors can also be disconnected by means of the dividing terminals.

If a common return core for the ON/OFF sensors is used, the fault will not disappear before the module is removed from the channel by which the common core is connected. The common core must then be separated until the fault has been found.

If a common screen is used for the NiCr-Ni sensors, the fault will not disappear before the channel is removed and the screen is connected.

11.1.2. Earth Failure on Inhibit

This can be located by removing the alarm modules in question and by disconnecting the connection of the inhibit switch from OV.

11.1.3. Earth Failure on External Instruments

This can be located by removing the modules connected with the external instrument.

11.1.4. Earth Failure on the Group Alarm System

This may be located by removing the group alarm modules and by disconnecting the group alarm panels from the supply power.

11.1.5. Earth Failure on the Calling System

This will only be registered on the 845 system if the calling system is using the same power supply as the 845 system. In this case the fault may be located by disconnecting the calling system from power supply.

11.1.6. Earth Failure on the Power Supply

This may be located by measuring the resistance to the bulkhead from the output terminals after disconnecting all load and power.

11.2. Other Failures

Control the supply voltage of the system. It has to be between 19.2 and 28.8V DC measured on the terminals, + 24 and 0V on the cassette.

11.2.1. Siren Module

This may cause the following faults:

- Flash is missing in all modules.
- All the modules release alarms.
- The siren relay will not operate.
- The siren cannot be reset.

The later fault may also be due to a defect alarm channel. The fault can be encircled by removing the modules.

11.2.2. Modules for Pt100 Sensors

The sensor connection may be controlled by removing the unit and then by measuring the resistance between the terminals A and C and also between terminals B and C. These measures are to show exactly the same value, 100..200Ω dependent of the temperature of the sensor.

The exactness of the measurement can be controlled by mounting of precision resistance of 138.5Ω instead of the sensor. The instrument module should indicate 100.0°C.

11.2.3. Modules for 4..20mA Transducer

The voltage above the terminals A and B and below A and C to be higher than 15V (terminal C is only used at 3-core transducers). Control that the current to terminal B is between 4..20mA. Otherwise, a possible connection between the sensor and the transducer is controlled.

The exactness of the measurement may be controlled by breaking the connection to terminal B. Over the terminals G and H the voltage has to be measured to 0.250V, G positive. The instrument module will display - 25% of the measuring range.

11.2.4. Modules for NiCr-Ni Sensors

The voltage above the terminals B and C has to be higher than 3V. If this is not the case you may have a short circuit between a sensor and the screen or a defect module. The fault is to be found among the channels in the cassette in question and to be located by removing the modules, also including a possible mean value module.

In systems with 845.601 and 845.611 the fault may be caused by a missing connection to the compensation module 845.11B.

Besides, the sensor connection may be controlled by measuring the resistance between the terminals A and B after the module has been removed from the cassette. This resistance has to be less than 20Ω or the sensor will be disconnected.

845.60B/61
The exactness of the measurement may be controlled as follows: Measure the voltage between terminals A and B, p mV. The sensor temperature reading should be:

Box temperature + 24.1 x p.

Example: Box 40°C, voltage between A and B 19.8mV.

Correct temperature reading:
24.1 x 19.8 + 40 = 477 + 40 = 517°C

Especially a short circuit between A and B gives a sensor temperature equal to the temperature of the cassette.

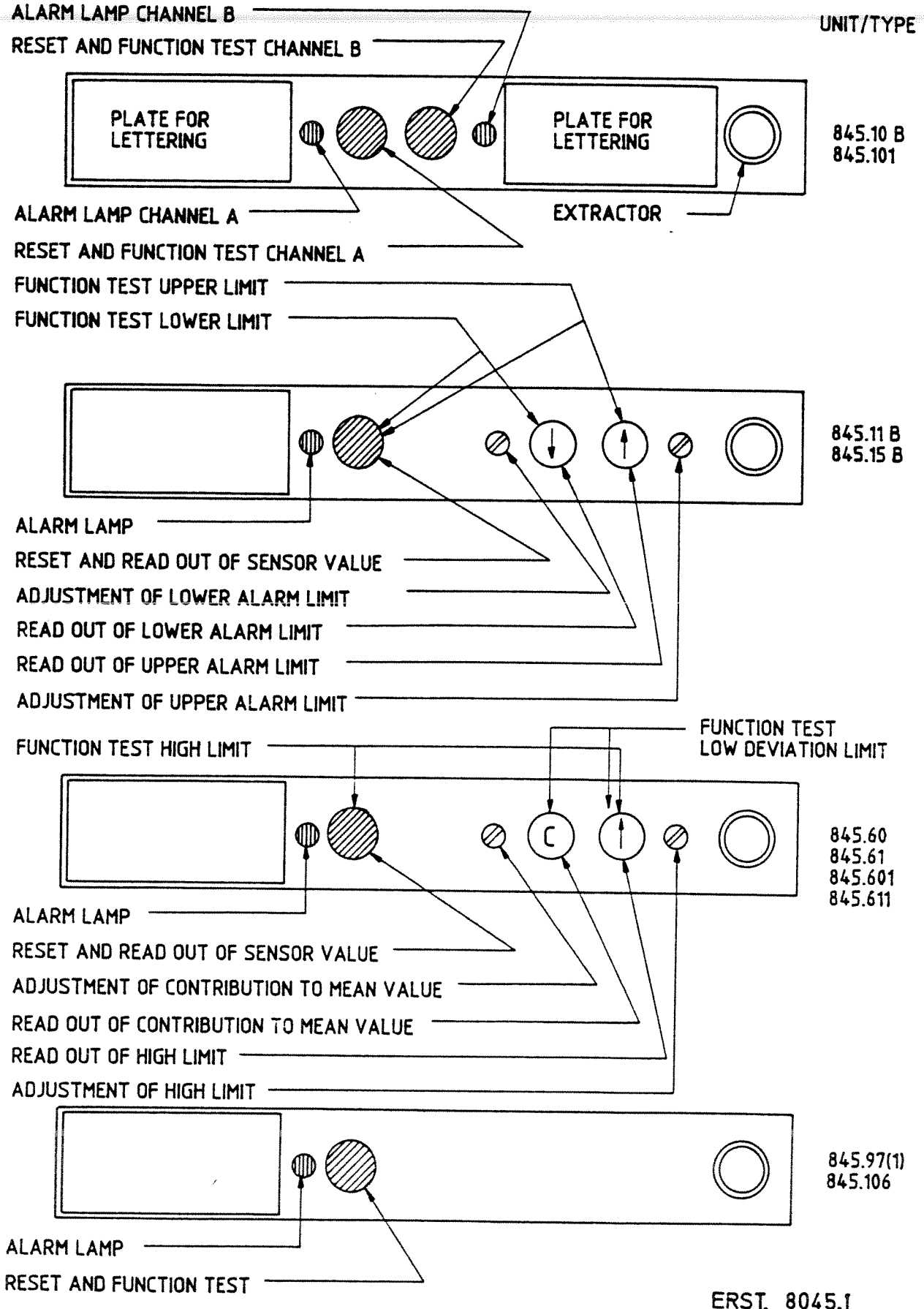
845.601/611
If the modules type 845.601/611 are used, the sensor reading will be:

Compensating box temperature + 24.1 x p
Example: Compensating box temperature 40°C, voltage between A and B 19.8mV.

Correct temperature reading:
24.1 x 19.8 + 40 = 477 + 40 = 517°C

12. DRAWINGS

DRAWING	NO.
Outline Front Plates	4166330013
Outline Front Plates	4166330014
Binary Alarm Modules Summary	4175330001
Analog Alarm Modules Summary	4175330002
Connection Diagram for Boxes	4162330008
Connection Diagram for Modules, Sheet 1, 2 and 3	4157430003 - 1 to 3
Connection Diagram for NiCr-Ni Modules with External Compensation	4157200213
Connection Diagram for Group Alarm, Sheet 1 and 2	4157430002 - 1 to 2
Alarm Limits for High Temperature Modules	4174040001
Diagram for Power Supply, type 468E-041	4157200080
Diagram for Power Supply, type 849.041	4157200189
Diagram for Group Alarm Panel 1-6	4157200134
Diagram for Group Alarm Panel 7-12	4157200207
Outline of Box	4166330018
Outline Group Alarm Panel	4165330024
Outline Power Supply 468E3-041	4165330006
Outline Power Supply 849.03 + 849.041	4166330015



ERST. 8045.1

	940107	Dato	15.11.78	NB:	Målestok	Dim.
	10.10.84	Tegn.				Matr.
	01.08.80	Godk.				
Anvendes	Rettet	Indf.				Finish

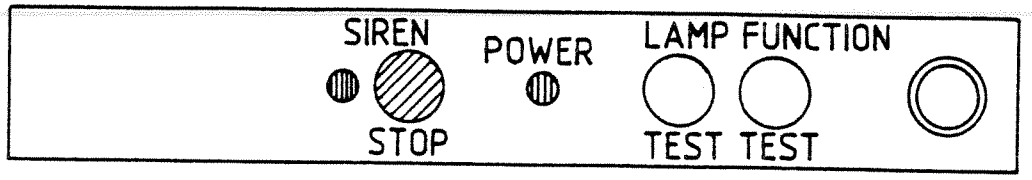
A/S DEIF, Deadyrvej 2
DK-7800 Skive, Denmark

Monitoring and Alarm System 845
Front Plates of Units
Explanation of Functions

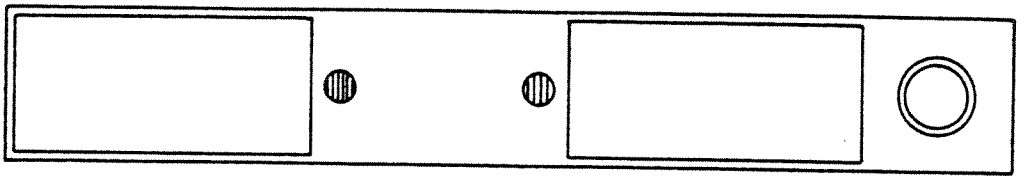
Nr. 4166330013A

OMT. D.23.06.88 J.N.J.

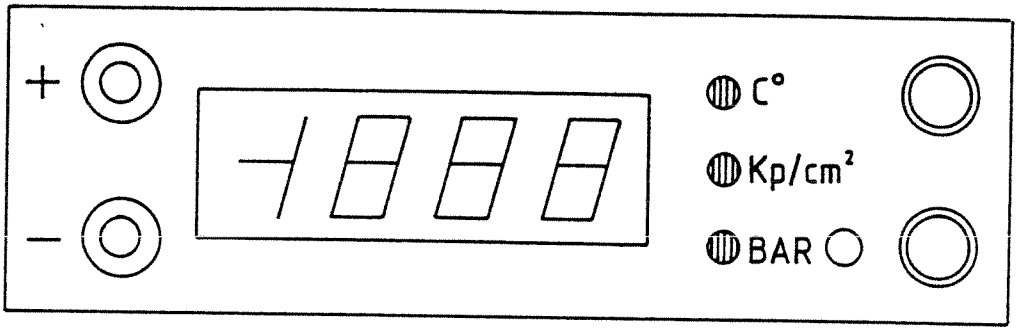
UNIT/TYPE



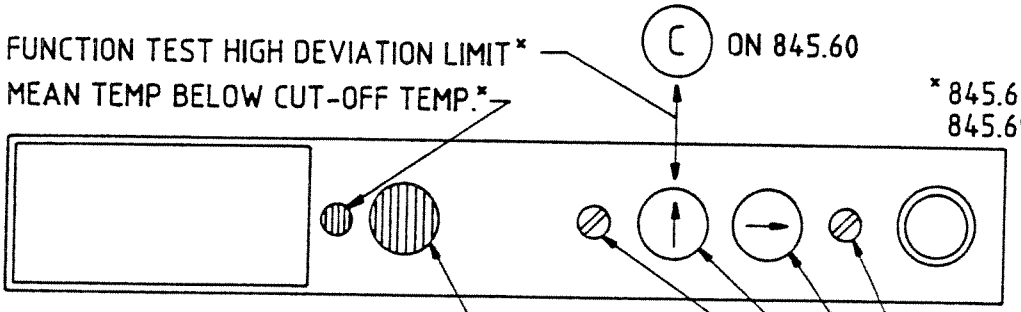
845.20



845.25



845.31



* 845.69B ONLY
845.691

845.69 B
845.691

ERST. 8045.2

	940107	Dato	15.11.78	NB:	Målestok	Dim.
		Tegn.	E.Z.			Matr.
		Godk.				
Anvendes	Rettet	Indf				Finish

OMT. D.23.06.88 J.N.J.

DEIF

A/S DEIF, Daadyrvej 2
DK-7800 Skive, Denmark

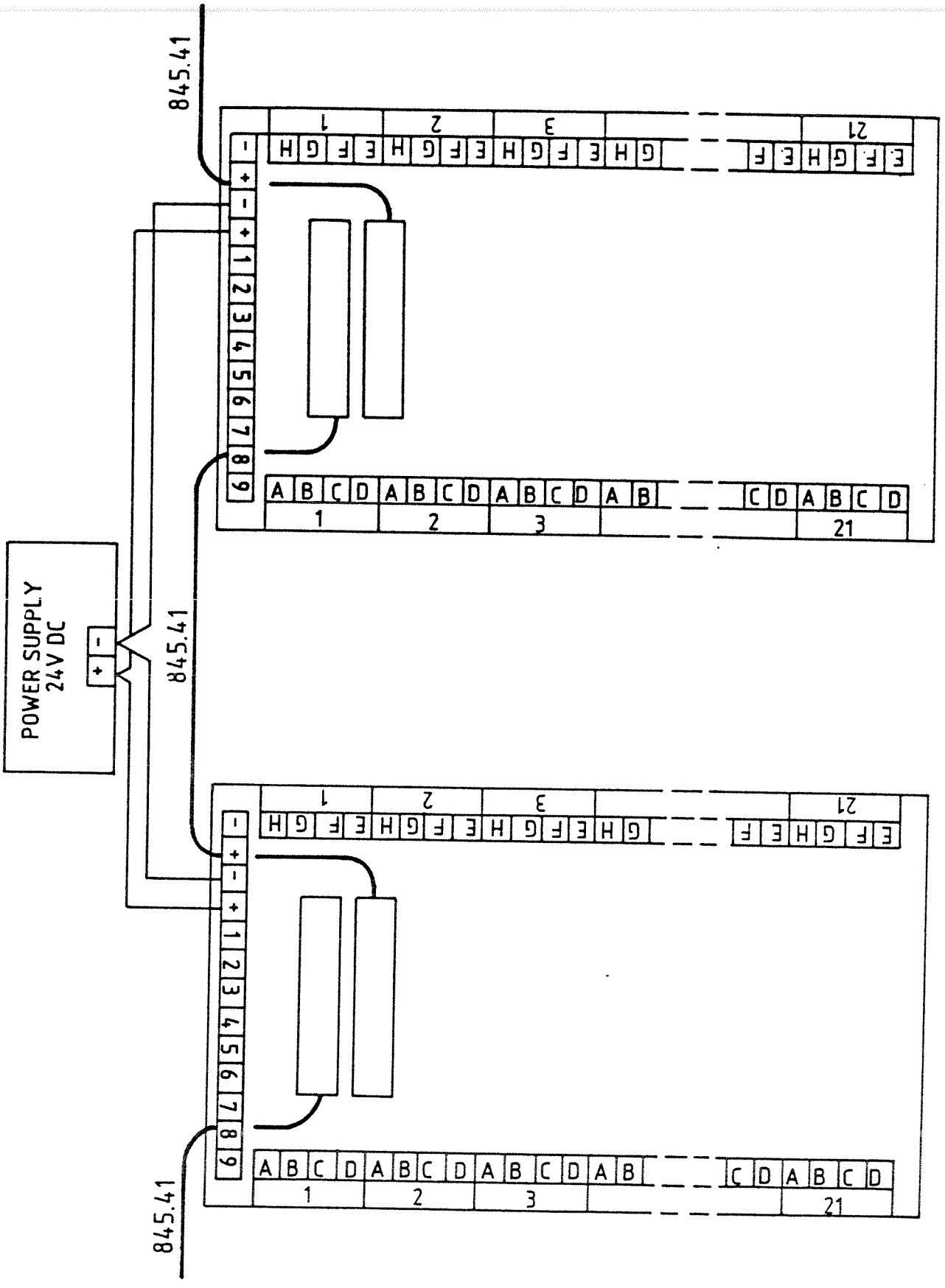
Monitoring and Alarm System 845
Front Plates of Units
Explanation of Functions

Nr.

4166330014 A

TYPE NO.	SWITCH TYPE	DELAY SEC.	REMARKS
845.10B	NORMAL CLOSED	1	Standard
845.10BDL	NORMAL CLOSED	1-25	Standard
845.10E2	NORMAL CLOSED	1	External lamp output 2x80mA without group output
845.10E2DL	NORMAL CLOSED	1-25	External lamp output 2x80mA without group output
845.102DL	NORMAL CLOSED	1-25	External lamps 2x80mA without group output. Aut. reset of flashing light at horn acknowledgement
845.107DL	NORMAL CLOSED	1-25	Group alarm signal only at unacknowledged alarm
845.101	NORMAL OPEN	1	Standard
845.101DL	NORMAL OPEN	1-25	Standard
845.101HDL	NORMAL OPEN	1-25	Return delay $\leq$ 1 sec. used for cyl. lubricating equipment

TYPE NO.	SENSOR TYPE	INPUT FOR 1V OUTPUT	INPUT RANGE	ALARM LIMIT RANGE	REMARKS
845.11B	Pt100	100°C	+200/-100°C	+150/-15°C	
845.113	Pt300	100°C	+200/-100°C	+150/-15°C	3 x Pt100
845.114	Pt100	100°C	+200/-100°C	+200/-15°C	
845.115	Pt100	100°C	+200/-100°C	+50/-50°C	
845.116	Pt100	600°C	+1000/-100°C	+900/-90°C	
845.117	Pt100	100°C	+200/-100°C	+150/-15°C	
845.60B	NiCr-Ni	600°C	+2000/-100°C	0/700°C	To be used in connection with type 845.69B/691. NiCr-Ni cable connection required. Internal compensated.
845.61	NiCr-Ni	600°C	+2000/-100°C	0/700°C	NiCr-Ni cable connection required. Internal compensated.
845.601	NiCr-Ni	600°C	+2000/-100°C	0/700°C	To be used in connection with type 845.69B/691. Compensation box required. See drawing 8245.601A
845.611	NiCr-Ni	600°C	+2000/-100°C	0/700°C	Compensation box required. See drawing 8345.601A.
845.69B		600°C		0..∞ deviation	Mean temperature measurement input from 845.60B/-601 units.
845.691		700°C		0..∞ deviation	Mean temperature measurement input from 845.60B/-601 units.
845.15B	4..20mA	20mA	4..20mA	1..25mA	Sensor type: EMP 2, GT7.
845.15BDL	4..20mA	20mA	4..20mA	1..25mA	Sensor type: EMP 2, GT7 Delay: 1..25 secs.
845.151	1..5mA (16V)	5mA	1..5mA	0.25..6mA	Sensor type: GT1.



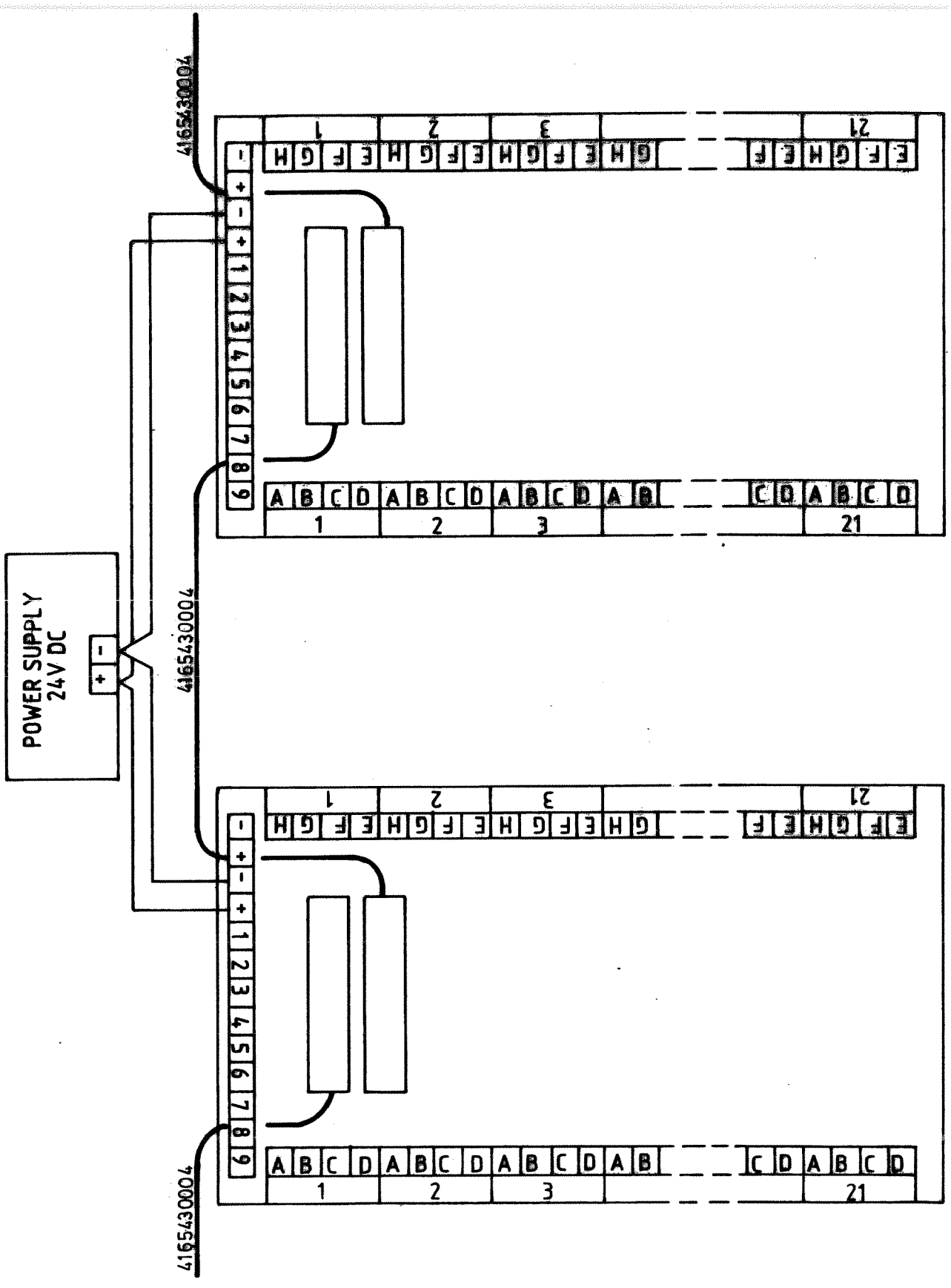
OMT.9.10.87

	22.12.83	Dato	15.11.78	NB:	Målestok	Dim.
	29.10 80	Tegn.	EZ			Matr.
	27.4.79	Godk.				
Anvendes	Rettet	Indf.	EZ			Finish

A/S DEIF, Daadyrvej 2
DK-7800 Skive, Denmark

Monitoring and Alarm System 845
Connections between the Boxes
Connection Diagram

Nr. 8245.7A

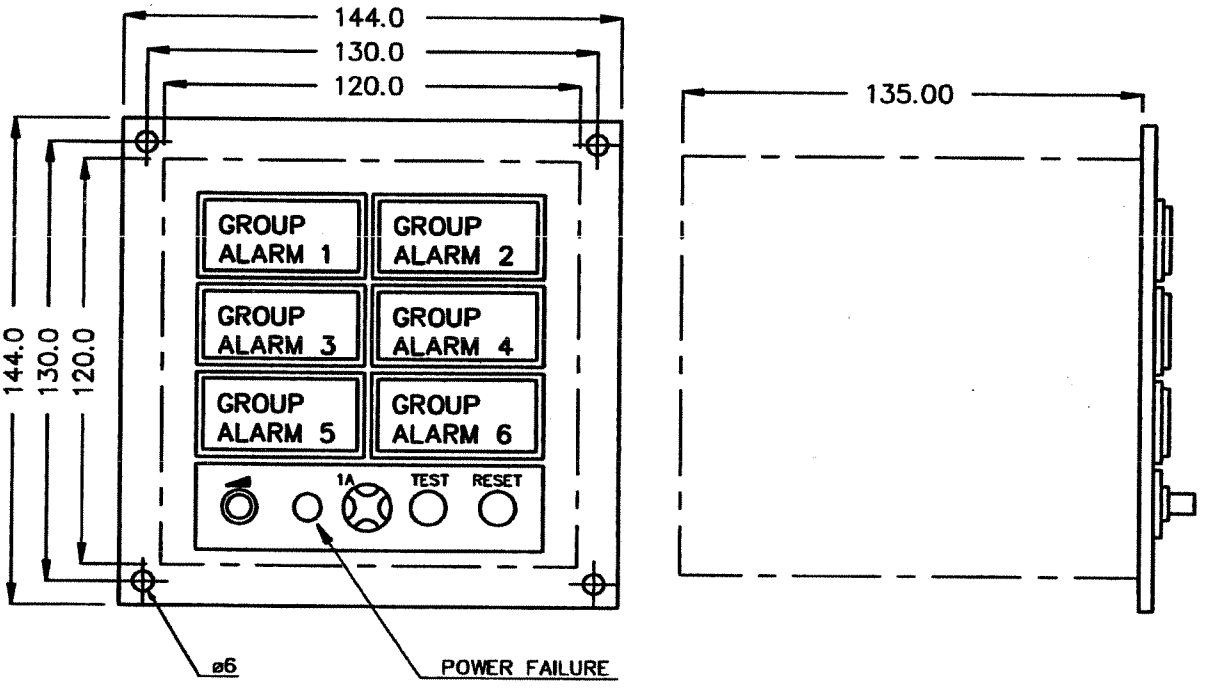


		Dato	940607	NB:	Målestok	Dim.
		Tegn.	AR			Matr.
		Godk.	IK			Repl. No. 8245.7A
Anvendes	Rettet	Indf.				Finish

DEIF
A/S DEIF, Daadyrvej 2
DK-7800 Skive, Denmark

Monitoring and Alarm System 845
Connections between the Boxes
Connection Diagram

Nr. 4162330008A



ITEM	TYPE NR.
4 GROUP ALARMS	869.25/4
6 GROUP ALARMS	869.25/6

TOL.: ±0,2

ALARM TEXT TO BE SPECIFIED

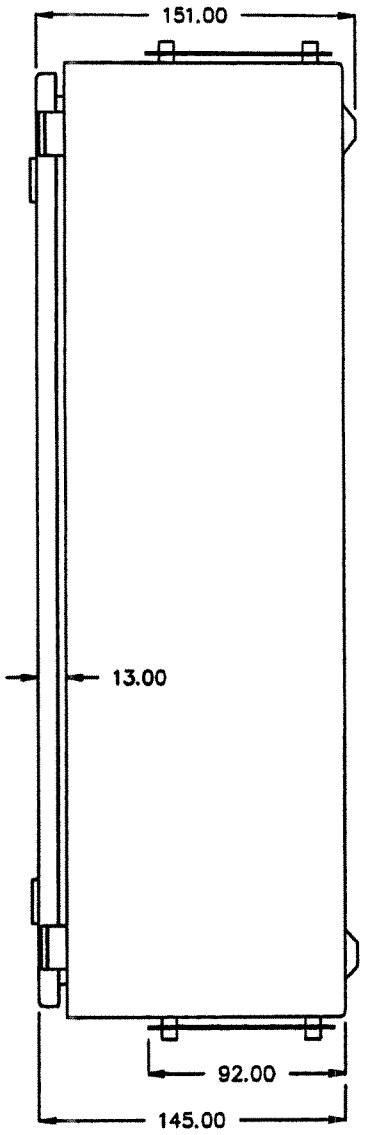
REV.	DATE	INIT.	APP.
A	941006	AR	EJ
B			
C			
D			
E			
F			

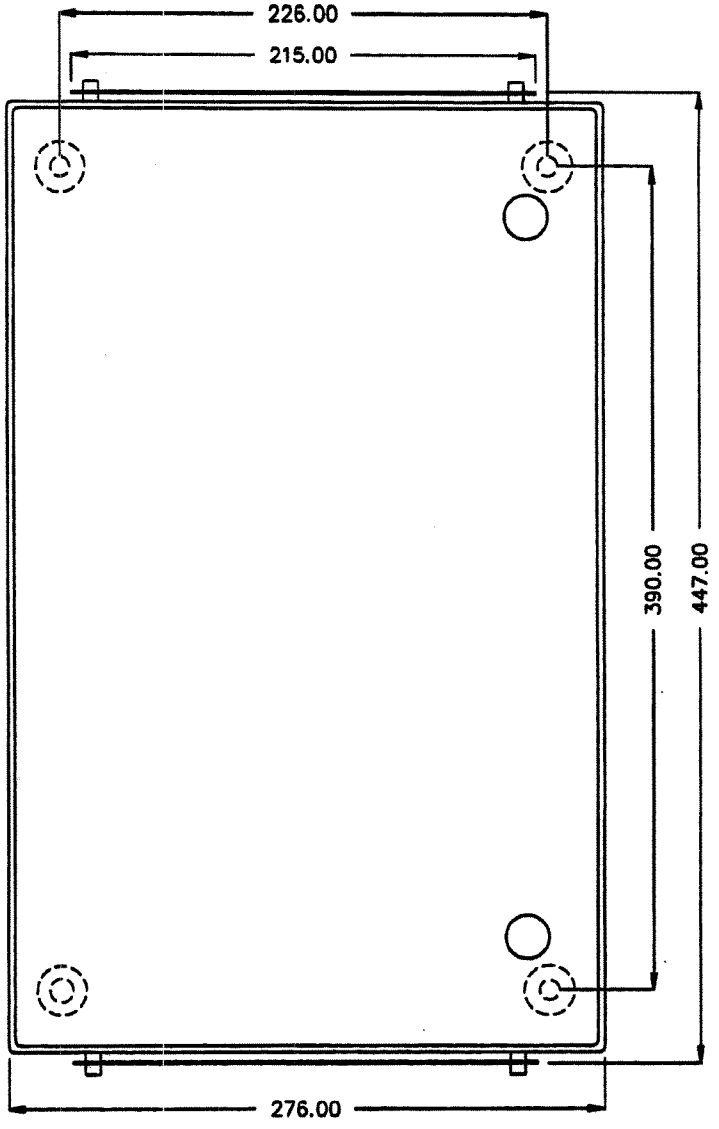
A/S DEIF, 2 DAADYRVEJ
DK-7800 SKIVE, DENMARK

Extern Alarm System
Group Alarm Panel
Outlines

COPYRIGHT

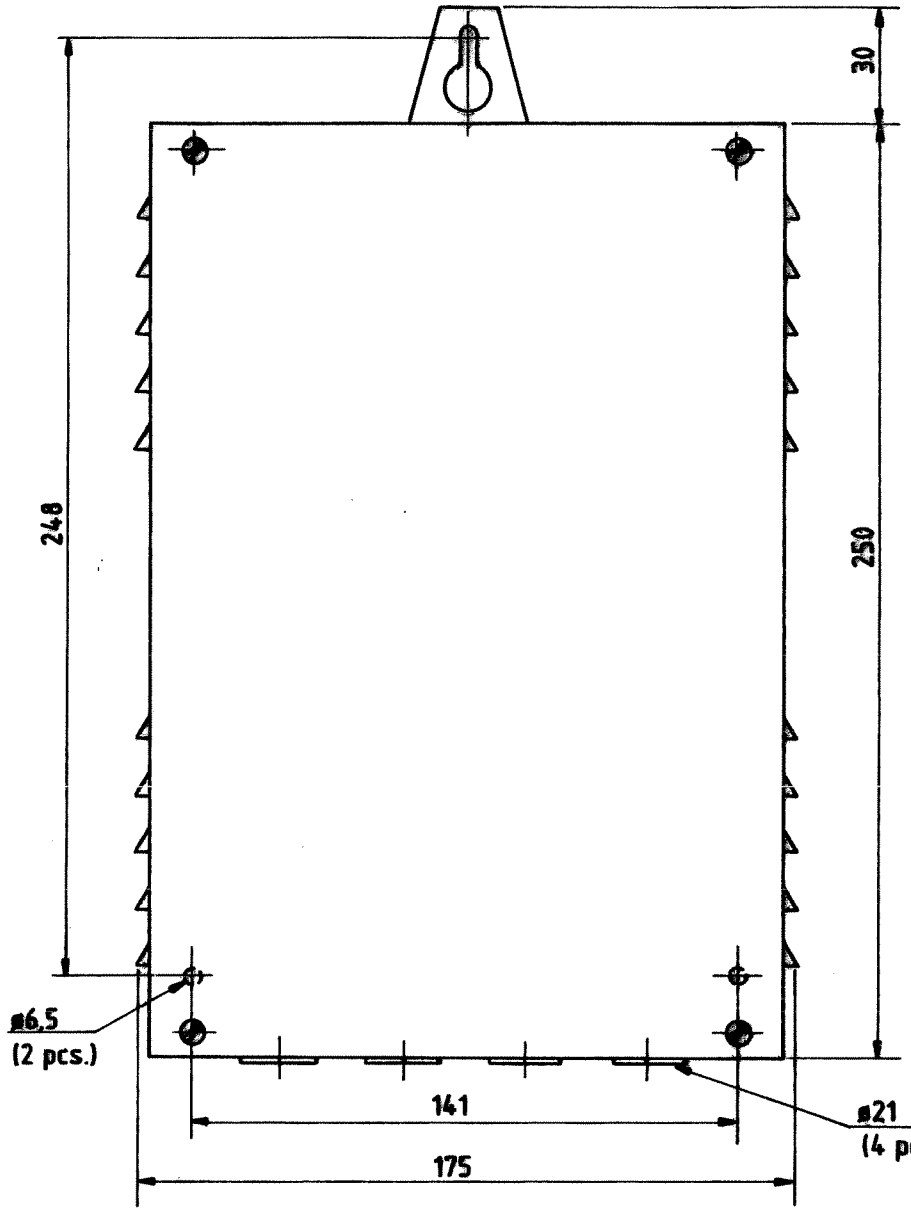
MATR. : –
FINISH : –
SCALE : 1:2 PLT 1:1.1
REPL.NO. : 8069.25
DRAW. NO. 4165330024
REV. A
PAGE 1 OF 1

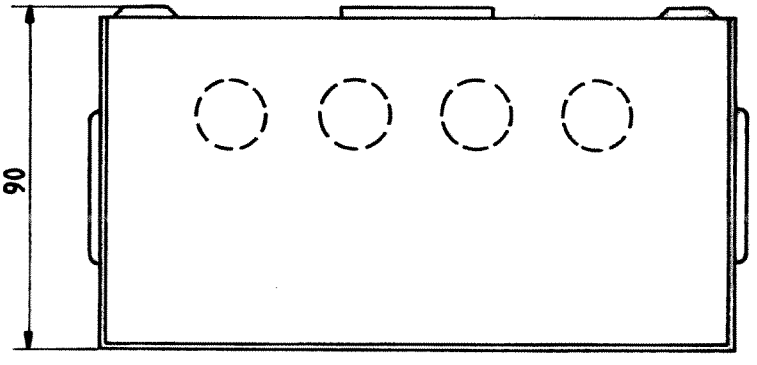




TOL: ±0.2

DATE : 930924 NAME : D.H. APP.BY : PS	A/S DEIF, DAADYRVEJ 2 DK-7800 SKIVE, DENMARK	MATERIALS : FINISH :
REV. DATE A E B F C G D H	BOX-HLN 1550 POWER SUPPLY 468.E3-041 OUTLINES	SCALE : 1:2,5 FILE NAME : – DRAW. NO. 4165330006 REV. A
	COPYRIGHT	PAGE OF





OMT. 19.10.89 I.W.

ERST. 8049.03

		Dato	21.09.76	NB:	Målestok	Dim.
		Tegn.	J.J.		1:2	Matr.
	940107	Godk.				
Anvendes	Rettet	Indf.				Finish

A/S DEIF, Dasdyrvej 2
DK-7800 Skive, Denmark

Power Supply Unit 849.03 and 849.041
110 or 220V AC / 24V DC 2,5 Amp.
Outlines

Nr. 4166330015A

OMT. D.23.06.88 J.N.J.

A/S DEIF, Daadyrvej 2
DK-7800 Skive, Denmark

DEIF

Anvendes				940105
Rettet	31.03.81	01.12.81	Dato	15.11.78
Indl.	Godk.	Tegn.	E.Z.	

NB:

Denne tegning må ikke kopieres eller videregives til tredie person.

Målestok

Dim.

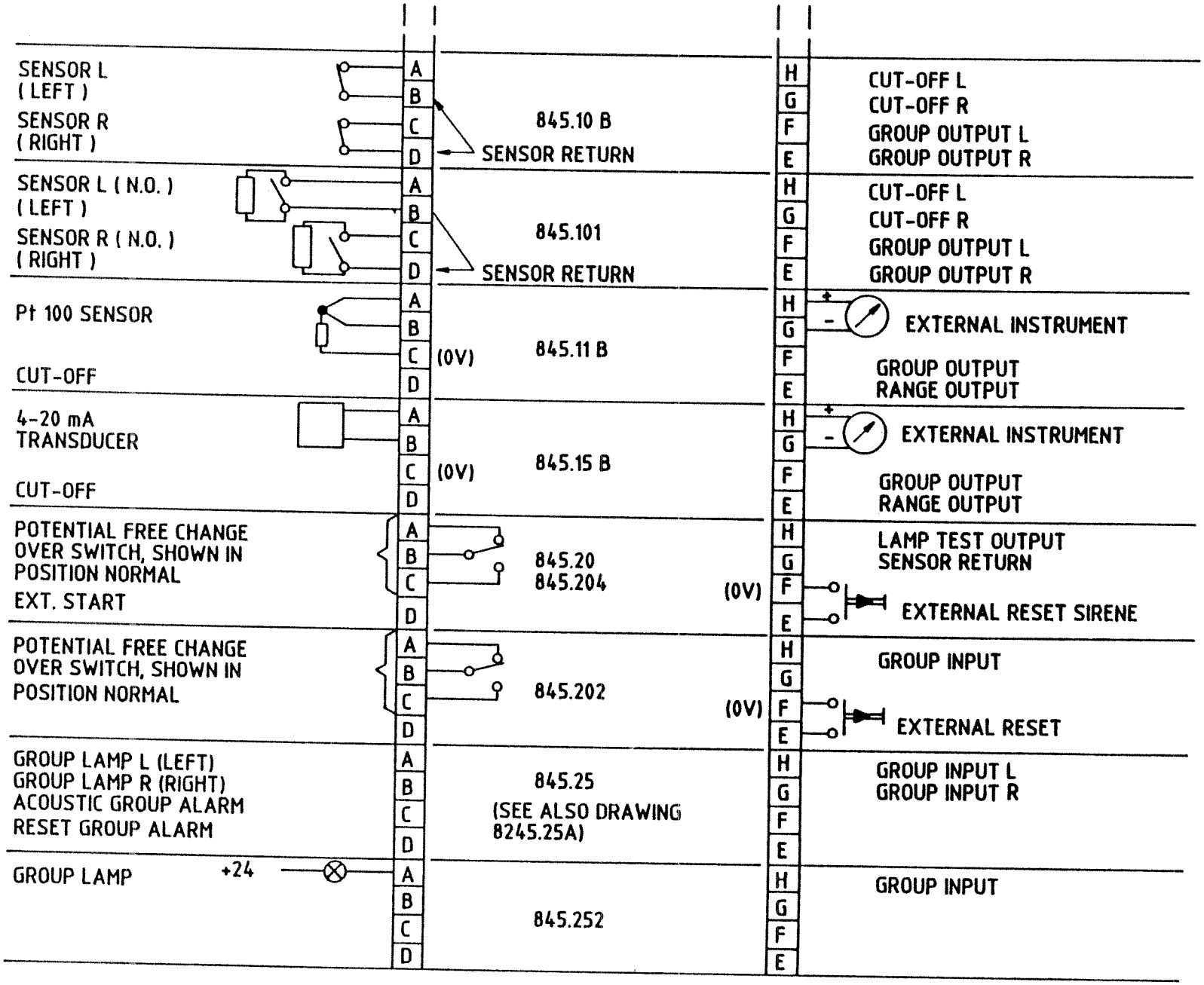
Finish

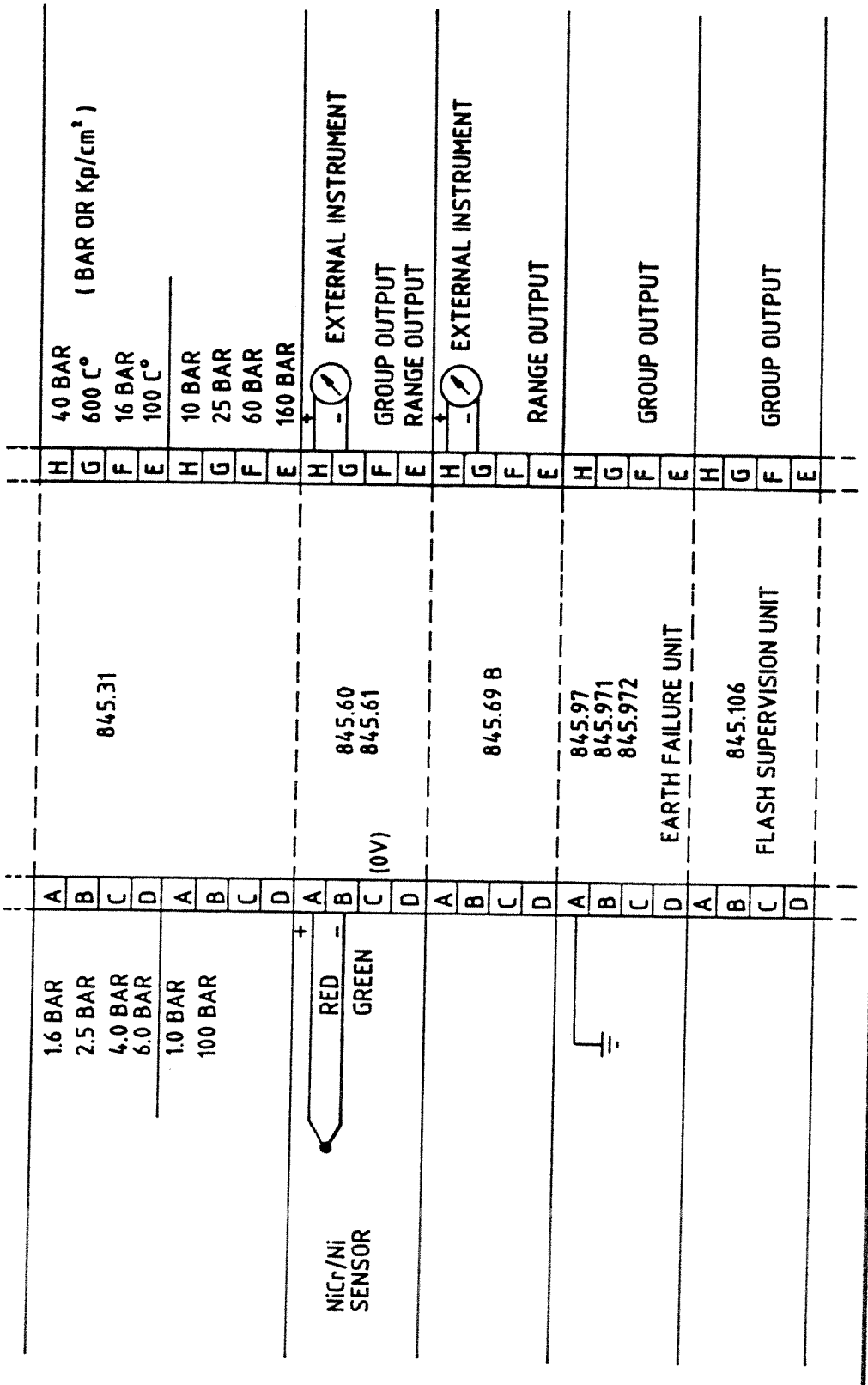
Matr.

Nr.

Monitoring and Alarm System 845
Inputs and Outputs of Units
Connection Diagram

4157430003A





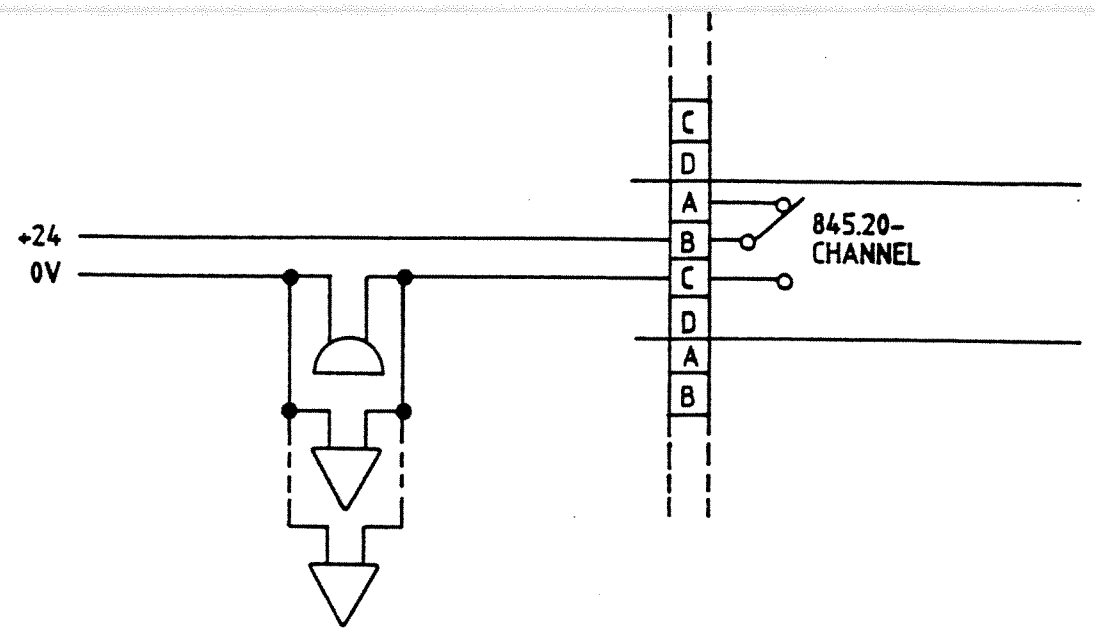
	940105	Dato	15.11.78	NB:	Målestok	Dim.
	01.12.81	Tegn.	E.Z.			Matr.
	31.03.81	Godk.				
Anvendes	Rettet	Indf.				Finish

A/S DEIF, Daadyrvej 2
DK-7800 Skive, Denmark

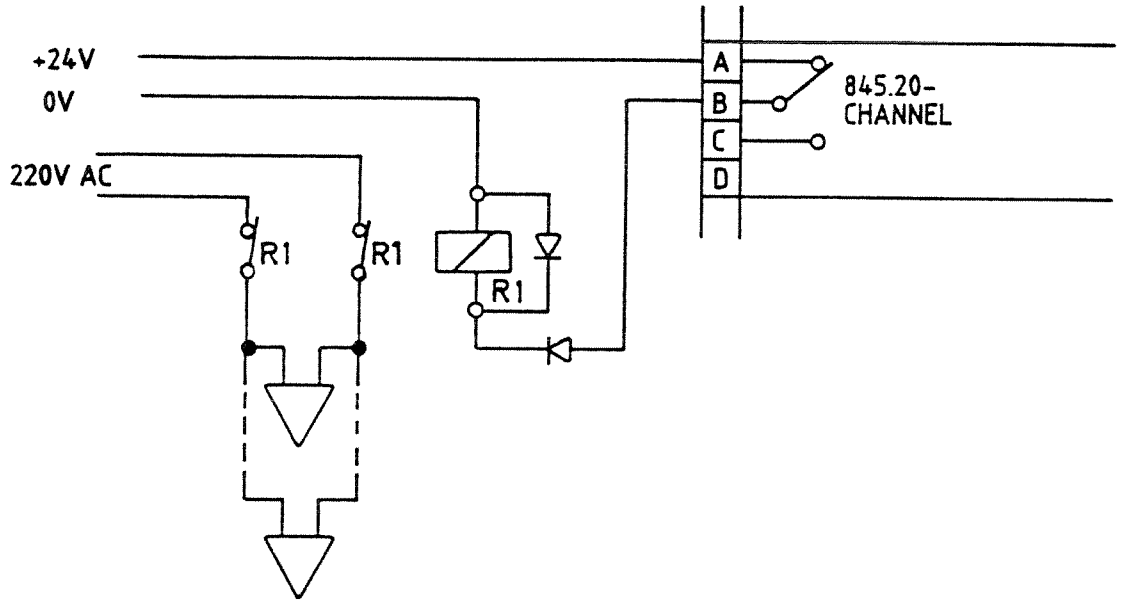
Monitoring and Alarm System 845
Inputs and Outputs of Units
Connection Diagram

Nr. 4157430003A

OMT. D.23.06.88 J.N.J.



MAX. LOAD 24V DC/3A
NO ALARM AT 24V POWER FAILURE



ALARM AT 24V POWER FAILURE

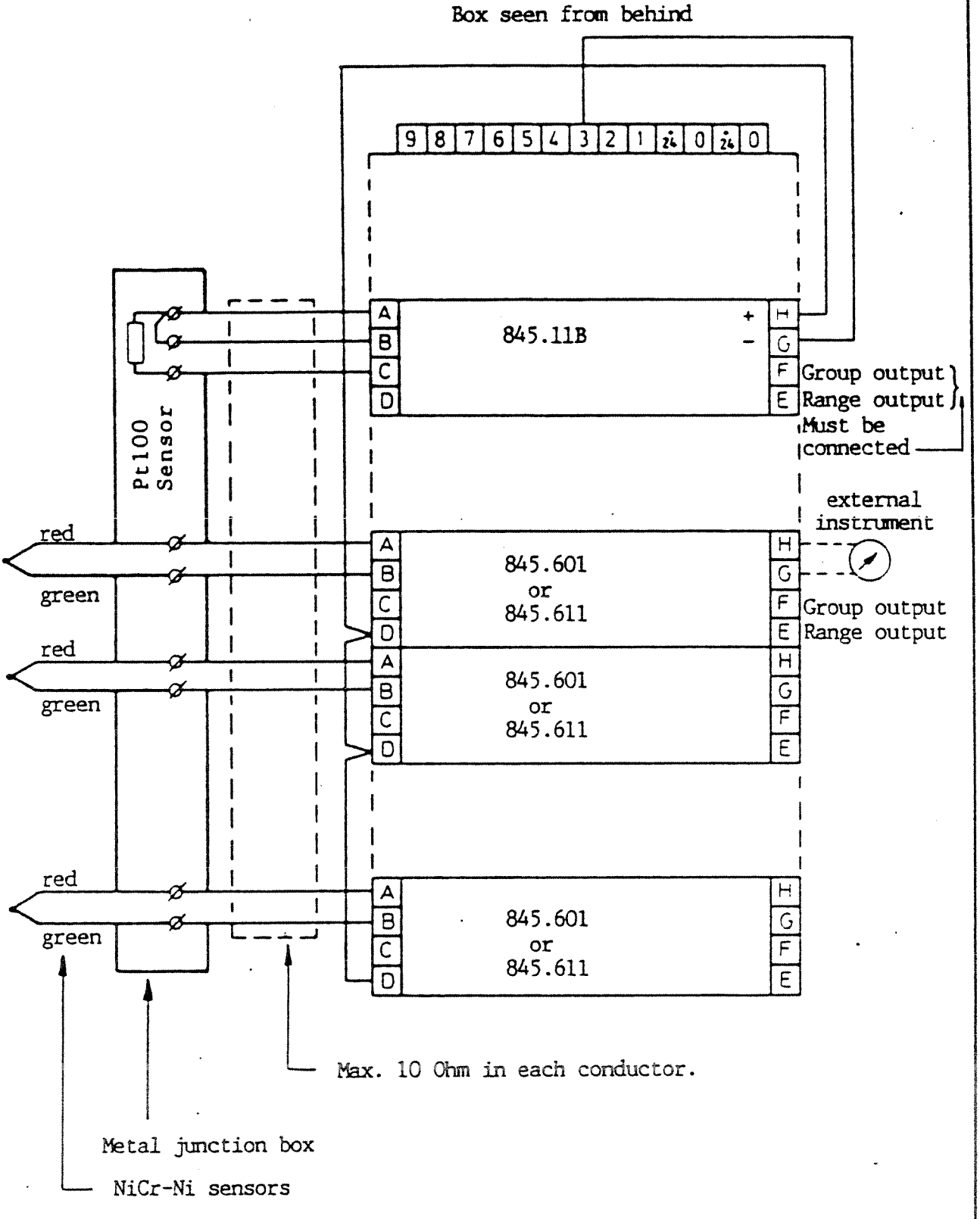
OMT. 01.09.89 I.W

		Dato	14.05.79	NB:	Målestok	Dim.
		Tegn.	E.Z.			Matr.
	940105	Godk.				
Anvendes	Rettet	Indf.				Finish

A/S DEIF, Dadyrvej 2
DK-7800 Skive, Denmark

Monitoring and Alarm System 845
Example of Sound Procedure
Diagram

Nr.
4157430003A



		Dato		NB	Målestok	Dim
		Tegn				Matr
	9.9.82	Godk				
Indsendes	Retter	Init				Finish

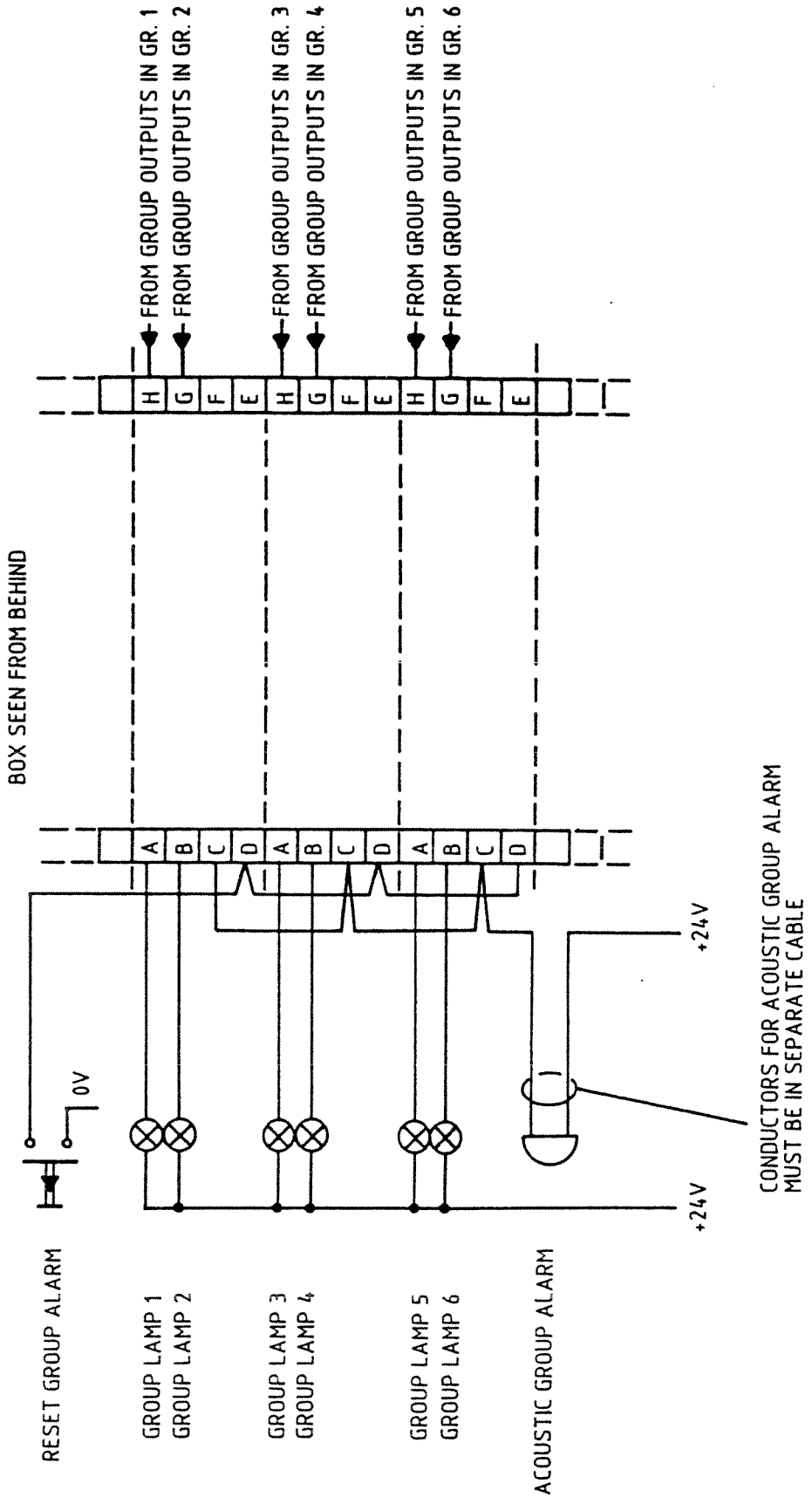
Denne tegning må ikke kopieres eller videregives til uvedk. personer

DEIF

A/S DEIF, Paadyrvej 2

Monitoring and Alarm System 845
Cold Soldering Point for Thermo couple

IDENTICAL TO
4157200213A
8245601A

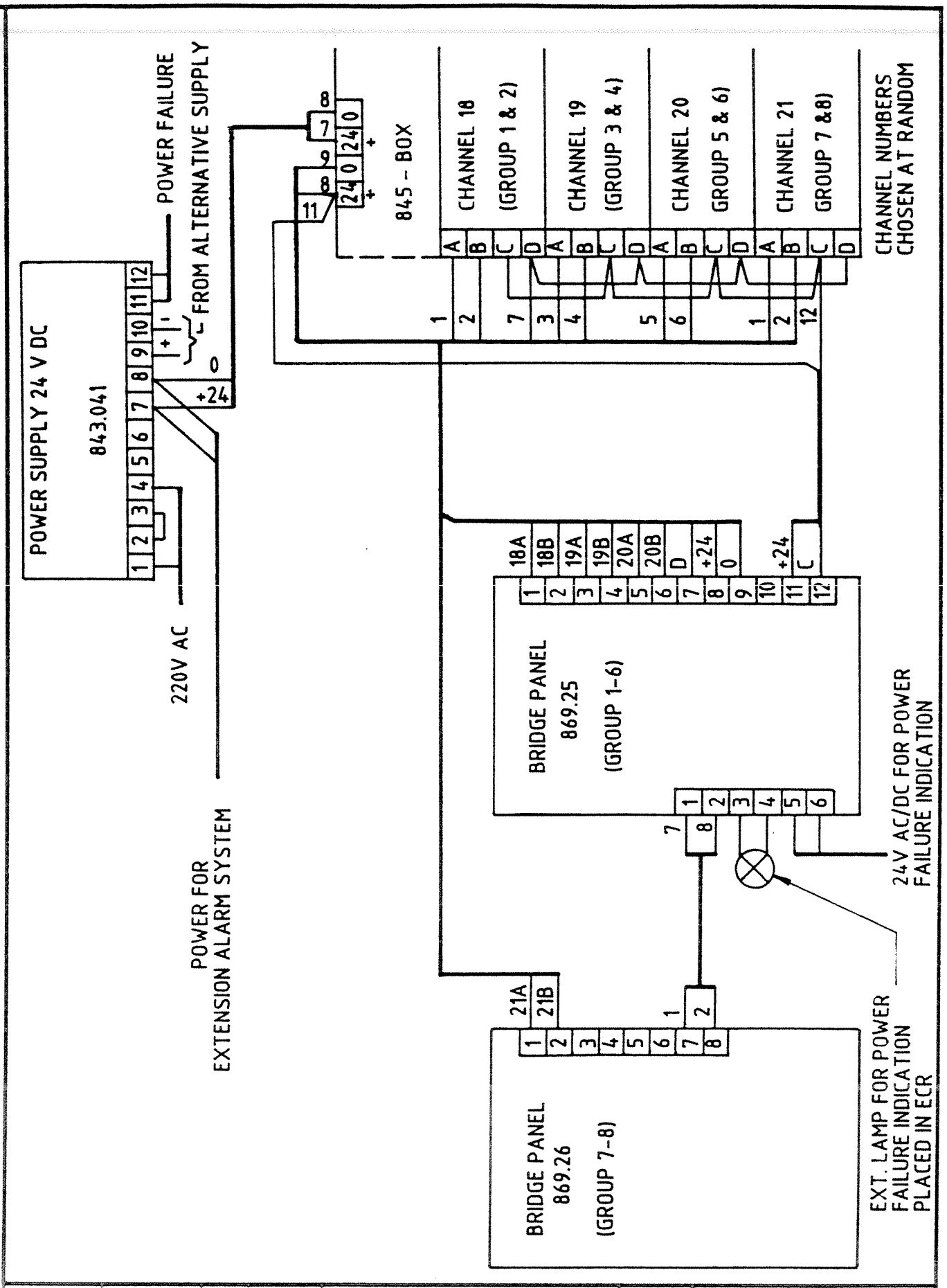


	24-9-85	Dato	24/9-85	NB:	Målestok	Dim.
	940105	Tegn.	dHa.	PRINCIP ONLY		Matr.
		Godk.				
Anvendes	Rettet	Indf.				Finish

A/S DEIF, Dasdyrvej 2
DK-7800 Skive, Denmark

Monitoring and Alarm System 845
Connections for Group Alarms
Diagram

Nr. 4157430002A



	OMT.9.10.87	Dato	28.9.79	NB:	Målestok	Dim.
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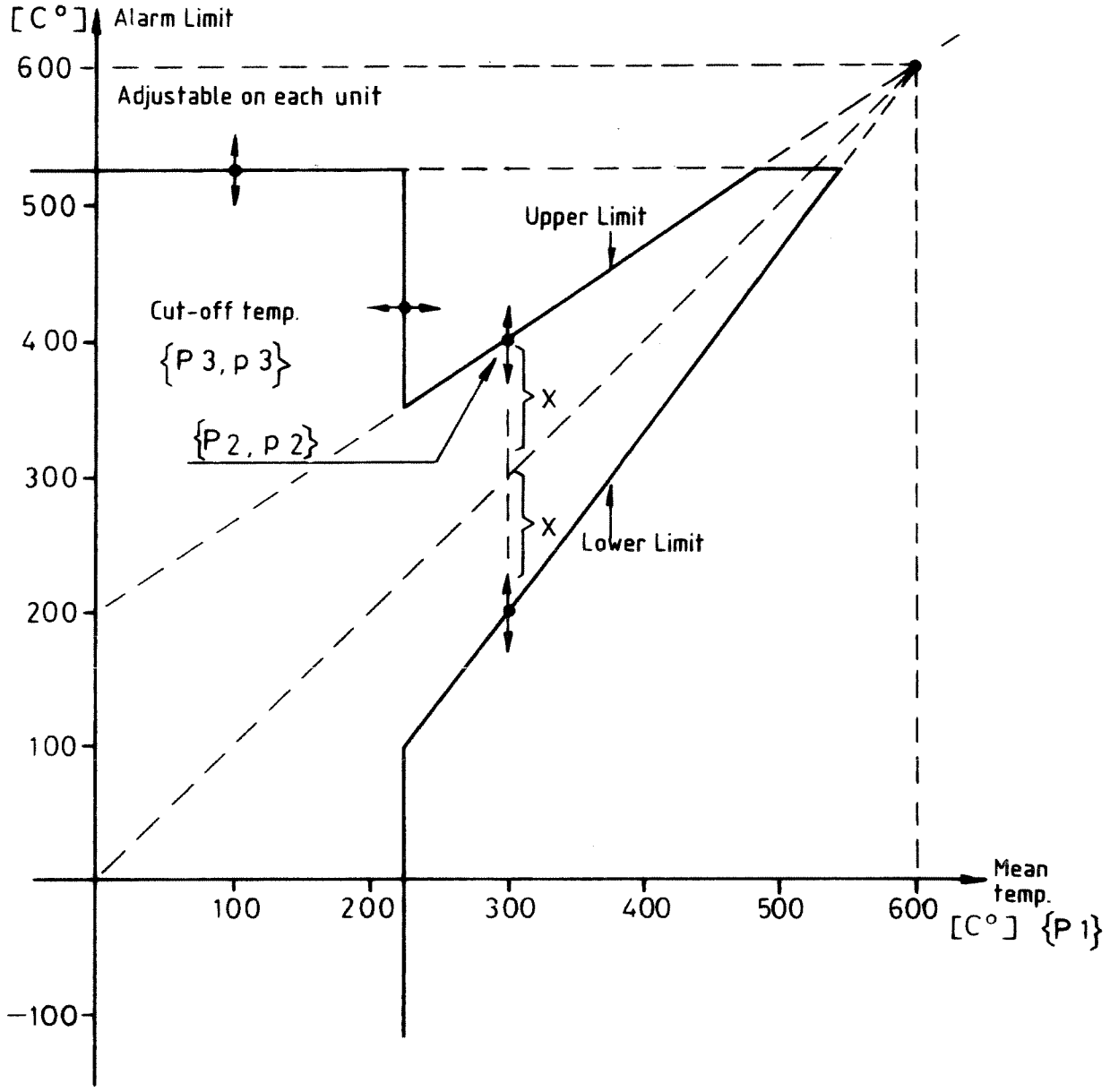
	29.10.80	Godk.				
Anvendes	Rettet	Indf.	E.Z.			Finish

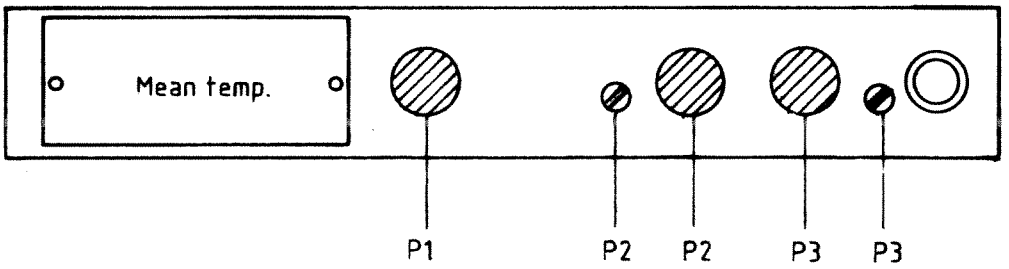
DEIF

A/S DEIF, Daadyrvej 2

Monitoring and Alarm System 845
Connections for Group Alarms
Diagram

Nr 4157430002A





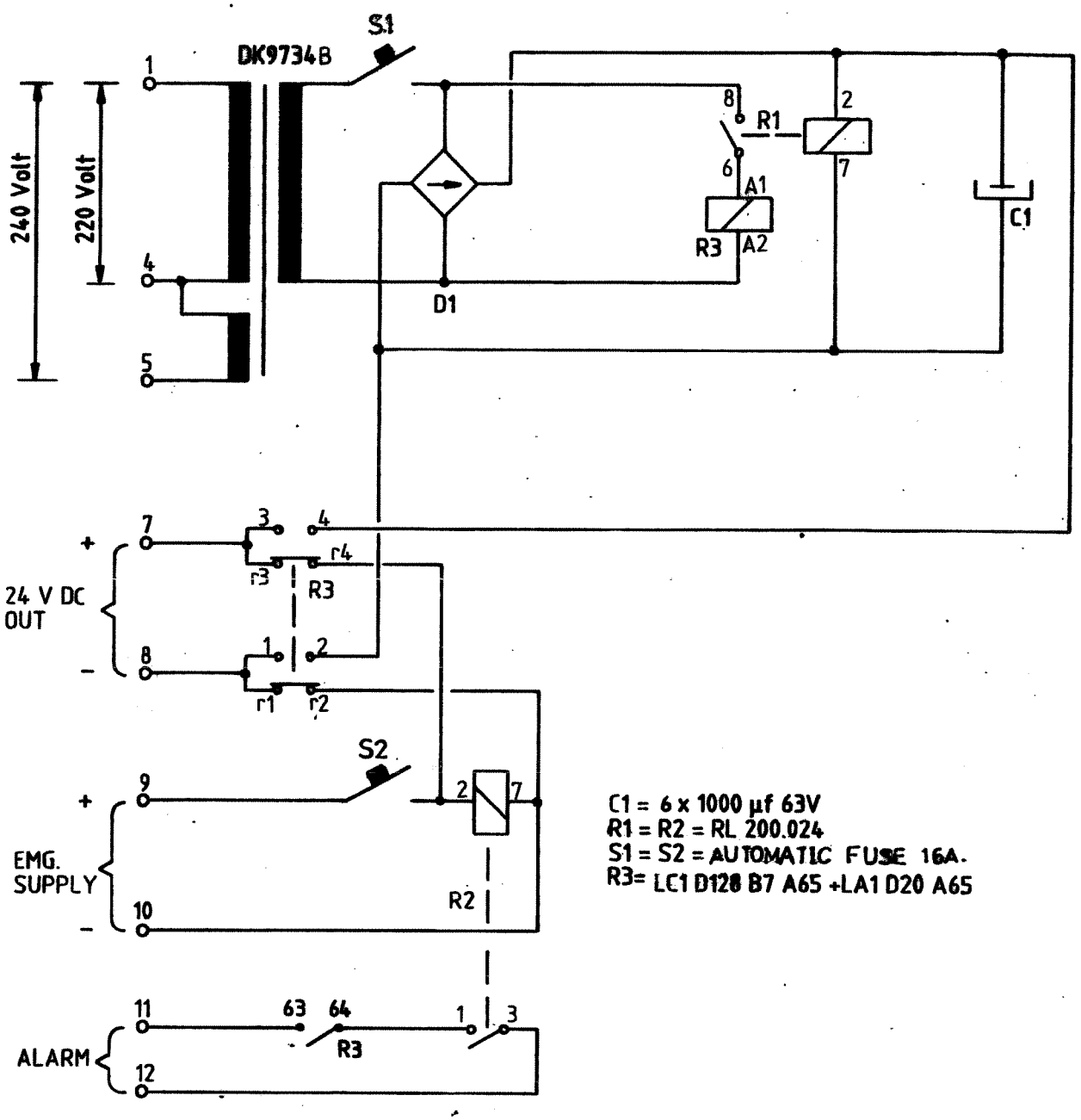
		Dato 17.11.78	NP	Målestok —	Dim —
		Tegn E.Z.			Mat —
	A 95a125 AR/FJ	Godk			Repl. No. 8045.69
Anvendes	Rettet	Indl			Finish —

DEIF

A/S DEIF, Dasdyrvej 2
DK-7800 Skive, Denmark

Monitoring and Alarm System 845
Exhaust Gas Temp. Supervision
Principle of Alarm Limits

Nr 4174040001A



C1 = 6 x 1000 µf 63V
R1 = R2 = RL 200.024
S1 = S2 = AUTOMATIC FUSE 16A.
R3= LC1 D128 B7 A65 +LA1 D20 A65

OUTLINES: DRAWING 8043.04

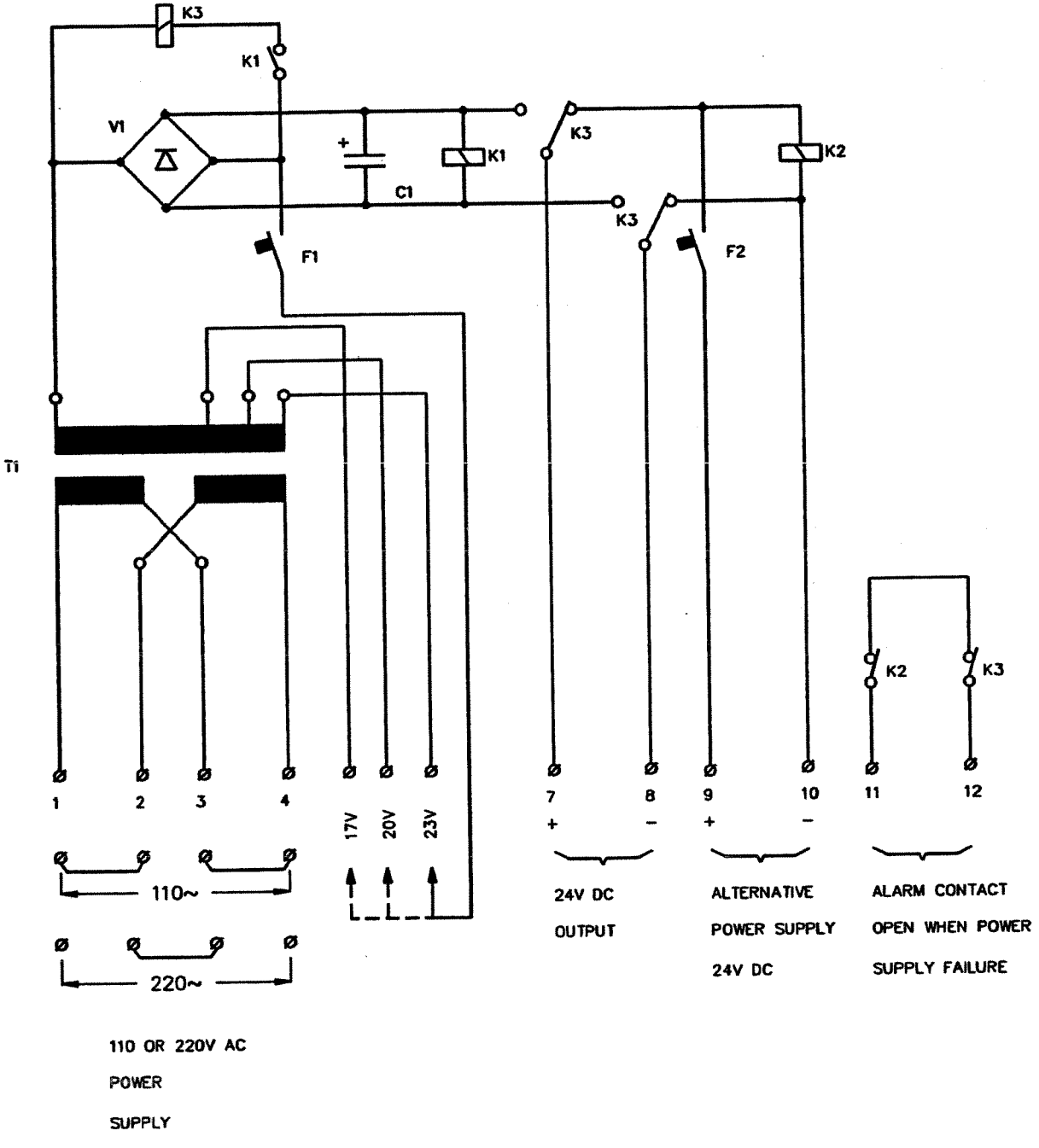
20.03.89 930428

27.01.89	25-9-86	Dato	3/4-86	NB: TYPE: 468.E3-041	Målestok	Dim.
24-10-86	25-6-86	Tegn.	A.B	220/240 V / 24 V		Matr.
30-9-86	14-5-86	Godk.		ac 1.5 A / dc 10 A		
	Rettet	Indf.		50/60 Hz / SIKR. 16 A		Finish

A/S DEIF, Deadyrvej 2
DK-7800 Skive, Denmark

Power Supply 468.E3-041
220V AC / 24V DC - 10 Amp.
Internal Diagram

Nr. 4157200080 A



REV.	DATE	INIT.	APP.
A	941115	AR	HJ
B			
C			
D			
E			
F			

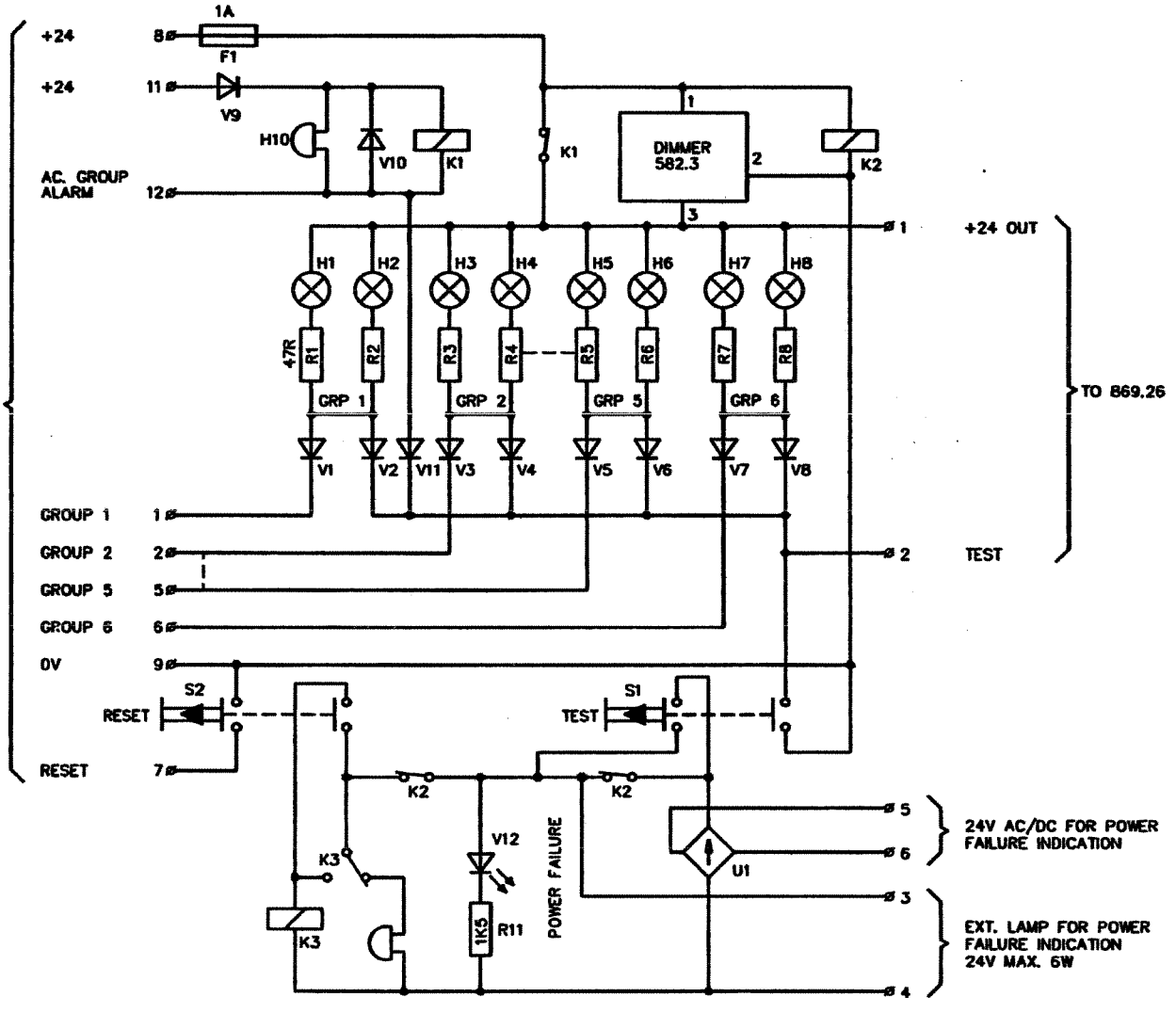
A/S DEIF, 2 DAADYRVEJ
DK-7800 SKIVE, DENMARK

MATR. : –
FINISH : –
SCALE : PLOT 1:1.25
REPL.NO. : 8249.041

849.041
STRØMFORSYNING/POWER SUPPLY

DRAW. NO. 4157200189
REV. A

PAGE 1 OF 1

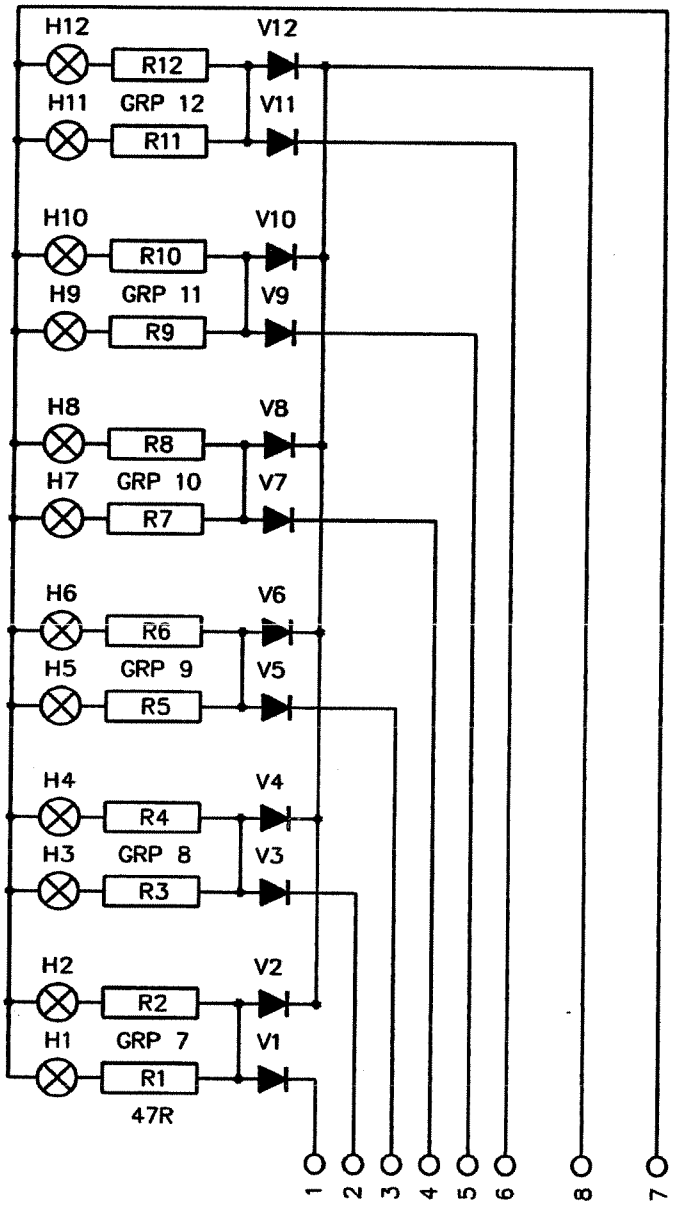


REV.	DATE	INIT.	APP.
A	950112	AR	JHC
B			
C			
D			
E			
F			

A/S DEIF, 2 DAADYRVEJ
DK-7800 SKIVE, DENMARK

EXTENSION ALARM SYSTEM
GROUP ALARM PANEL 869.25
DIAGRAM

MATR. : –
FINISH : –
SCALE : PLOT: 1=1.4
REPL.NO. : 8269.25
DRAW. NO. 4157200134
REV. A
PAGE 1 OF 1



FROM ALARMSYSTEM

FROM GROUP ALARMPANEL 826.25

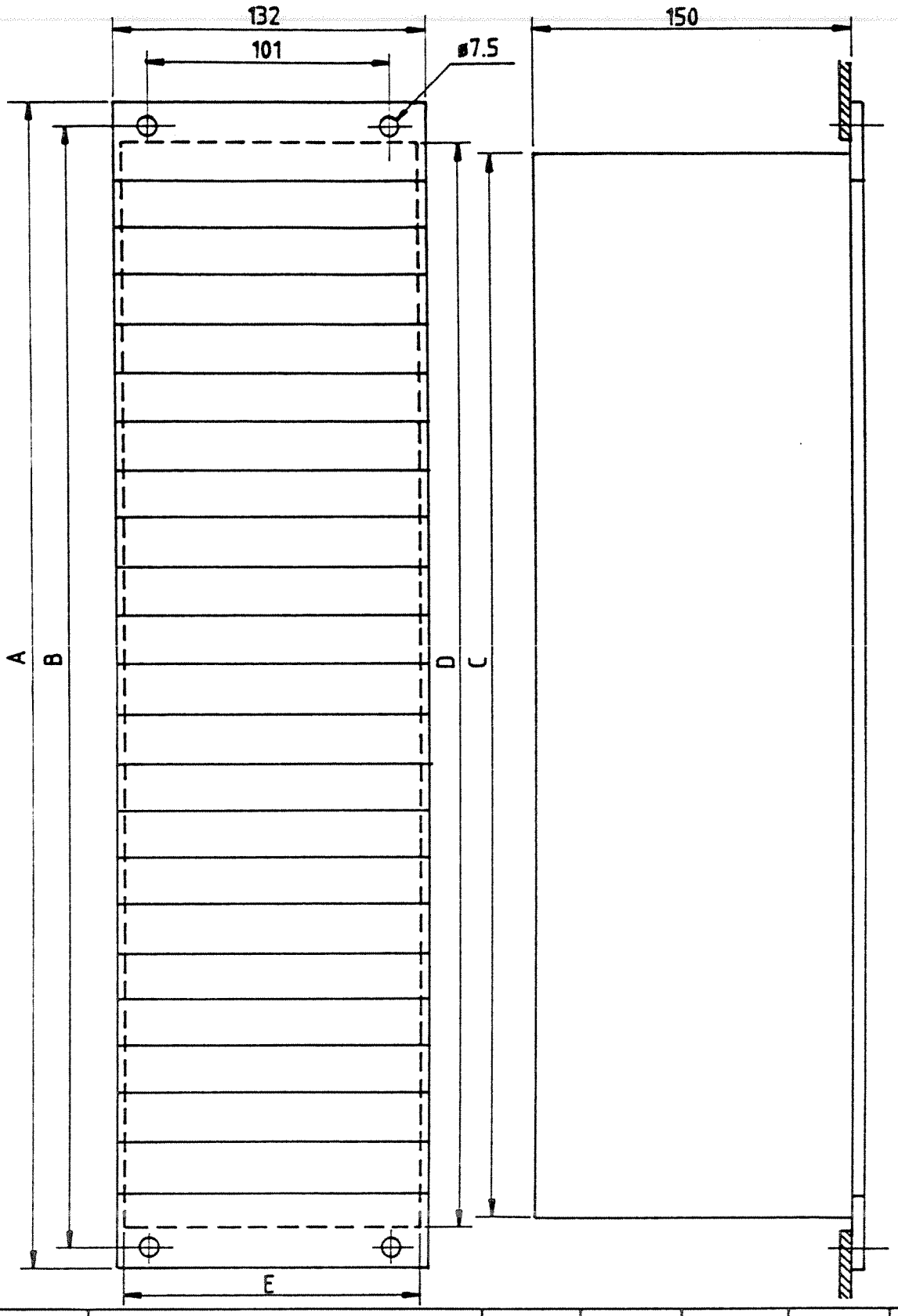
ADDITIONAL PANEL FOR 862.25

REV.	DATE	INIT.	APP.
A	950110	AR	JHC
B			
C			
D			
E			
F			

A/S DEIF, 2 DAADYRVEJ
DK-7800 SKIVE, DENMARK

EXTENSION ALARM SYSTEM
GROUP ALARM PANEL TYPE 869.26/6
DIAGRAM

MATR. : –
FINISH : –
SCALE : –
REPL.NO. : –
DRAW. NO. 4157200207
REV. A



TYPE		A	B	C	D	E
845.71	BOX FOR 21 UNITS	483	466	445	450	126
845.73	BOX FOR 12 UNITS	303	286	265	270	126

	OMT.9.10.87	Dato	27.11.78	NB:	Målestok	Dim.
		Tegn.	JJ		1:2,5	Matr.
	24.3.80	Godk.	HWH			
Anvendes	Rettet	Indf.	E.Z			Finish

A/S DEIF, Dadyrvej 2
DK-7800 Skive, Denmark

Monitoring and Alarm System 845
Box for Plug - in Units
Outlines

Nr. IDENTICAL TO
4166330018A
8045.7