Version : 2.2.008
Date : 15.02.2000

USER MANUAL

Model: METRON 2.2 C, CO, CR, D, S, SL, SU

Note

The user manual AMD 2.2 consists of all possible types of electronics.
The masks for the menu item frequency selection are only available if this option has been installed.

Different free-fall application and conveyor-belt application:

With the software version free-fall application some masks are not available in order to guarantee an appropriate operation.

Dear customer,

To begin with, we would like to thank you for your confidence in our metal detection system.

Prior to switching the system on, please read the user manual completely as this provides you with the expertise necessary for optimum operation and adjustment of the system according to your requirements. In addition, you learn all about the sophisticated options provided by the AMD 02 electronics as well as about the optional extensions.

If, contrary to expectations, you have any problems in operating your system, the TECTRONIX SYSTEMS team and our contractors will be able to assist you at any time.

The TECTRONIX SYSTEMS team is at your disposal from Monday until Friday between 8 a.m. and 5 p.m., tel. (604) 607-6028 or fax (604) 607-6026.

If a demonstration on site is required, we will respond as soon as possible offering national and international services.

Enjoy your TECTRONIX SYSTEMS metal detector.

Yours truly,

TECTRONIX SYSTEMS INC.®

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Surrey, BC
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Spare parts and accessories E

Technical Data

Power Supply	**:**	85 to 265 V AC 50 to 60 Hz
Current consumption	**:**	max. 0,75 A
Fuse	**:**	2 A passive
Type of protection	**:**	IP 54 or IP 65
Temperature range	**:**	0° C to 60° C
Humidity	**:**	to 100%
Power cable	**:**	app. 1.8 m cable with plug (two pole and earthing pin) (US-Version with US-Standard plug)

Safety

Before doing any repair or maintenance work on the system be particularly careful to:

- ⇒ **Unplug the mains plug !**
- ⇒ **Remove the pressure connection !**
- ⇒ **Check for surplus voltages at switch exits !**

Work on the system should only be carried out by trained and authorized personnel.

Maintenance

All electronic components of the metal detector are maintenance-free.

Using the system according to regulations

The function of the system is exclusively to detect metals in bulk goods. This excludes the following products:

- ⇒ **those enclosed in metal or part-metal containers**
- ⇒ **those which conduct electricity**
- ⇒ **those which intentionally contain metal additives**

Products which have one of the above mentioned properties must only be detected after consulting the manufacturer, as they can influence the sensitivity of the detector in a negative way.

The system is not allowed to be operated:

- ⇒ **in areas with explosion risk (available as special system)**
- ⇒ **other than the specified protection method**
- ⇒ **outside the allowed temperature range**

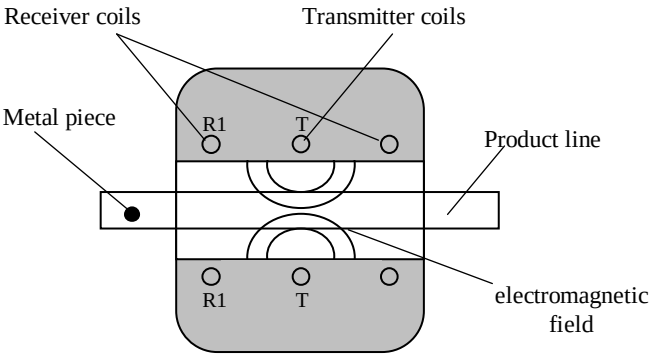
Operating the system improperly can cause damage to the machine and can also result in injury or death.

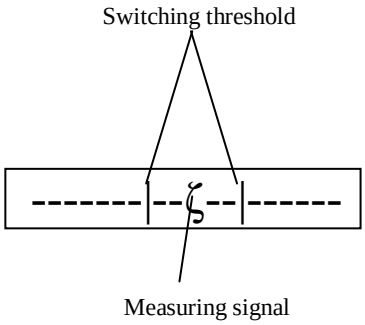
Changes regarding the design of the system must not be carried out prior to consulting the manufacturer.

It is necessary that the instructions given in the user manual regarding operation, maintenance and servicing are followed and only trained and authorized personnel carry out necessary work.

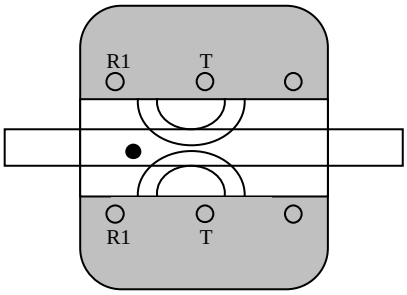
Principle of Operation

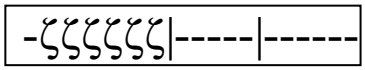
- Metal detection:



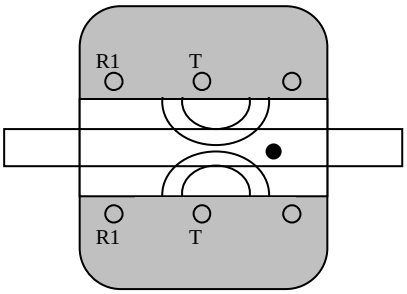


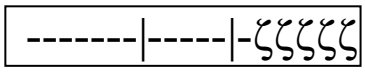
If a metal part enters the detector, the measuring signal turns towards one direction.



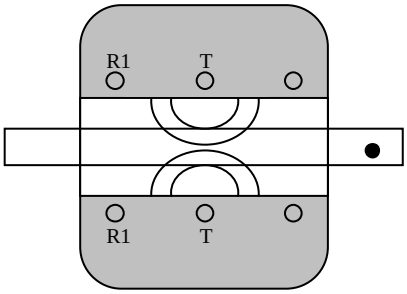


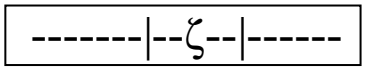
If a metal part leaves the detector, the measuring signal turns towards the opposite direction



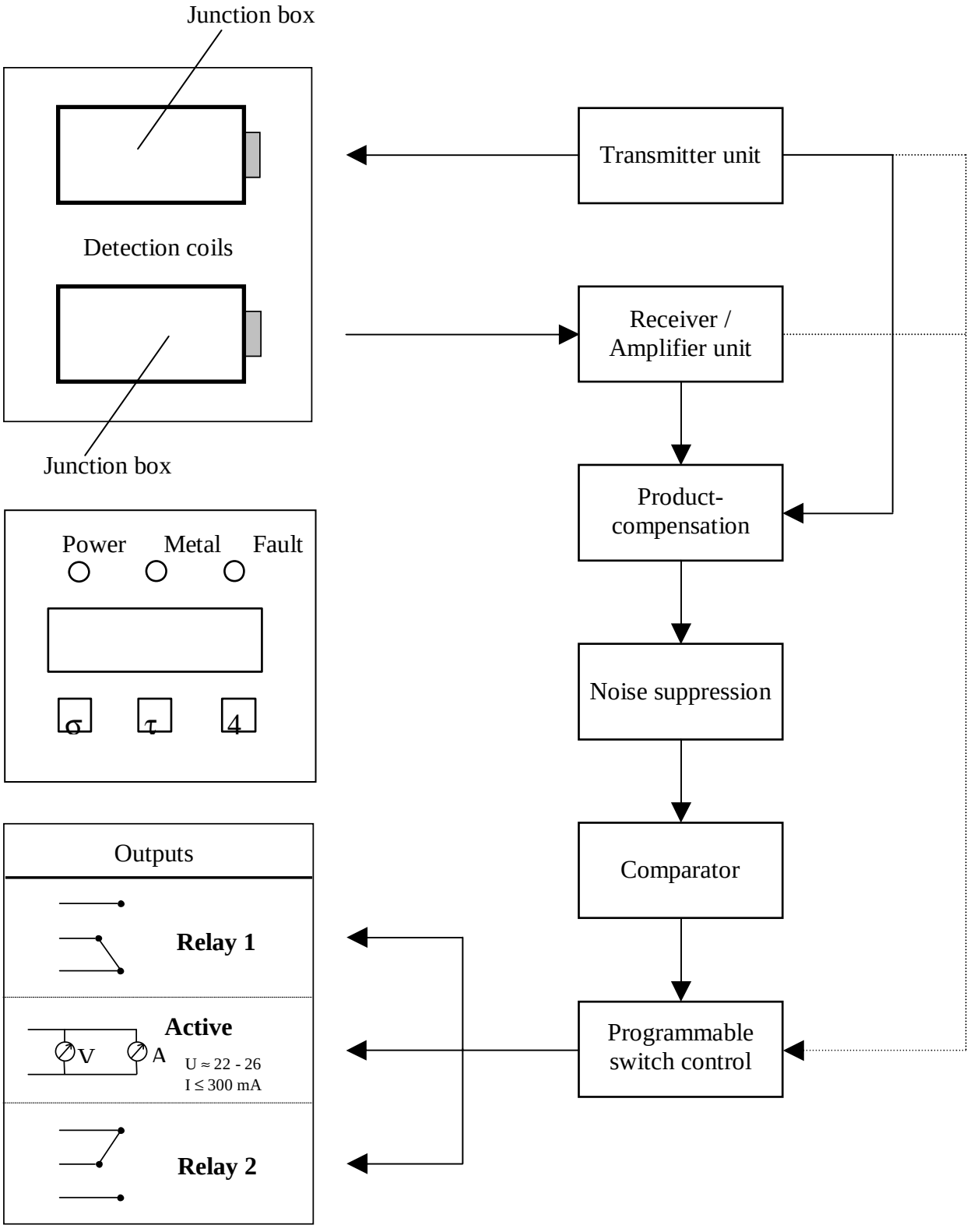


Exceeding both thresholds values, metal is indentified.





- Block diagram:

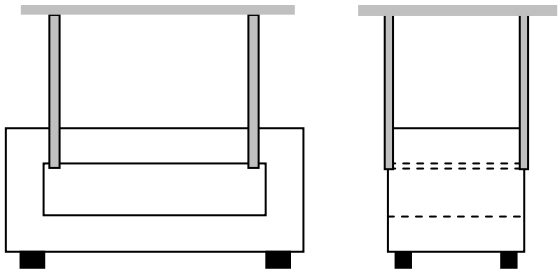


Transport

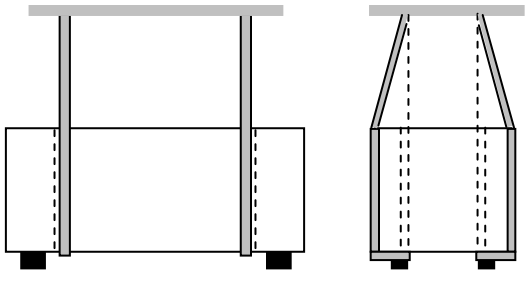
For transporting equipment please note the following points:

- ⇒ **Lifting devices have to be used for goods which are moved by persons if the customary weight limit has been exceeded**
- ⇒ **Lifting devices must be attached according to the drawing below (please note your type of coil !)**
- ⇒ **Lifting devices should only be mounted and transported by trained and authorized staff**
- ⇒ **During transport, safety regulations which are currently in operation have to be observed**

- Mounting of C-Coil :



horizontal assembly



vertical assembly

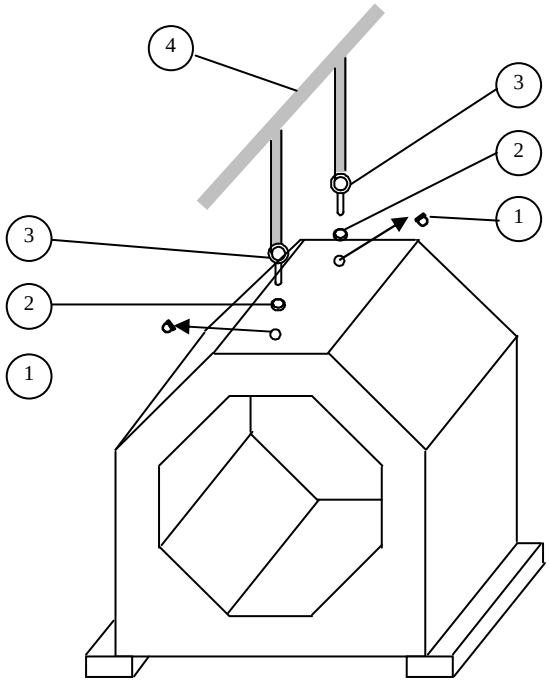
- Mounting of CO-Coil :

Remove inspection plugs ①

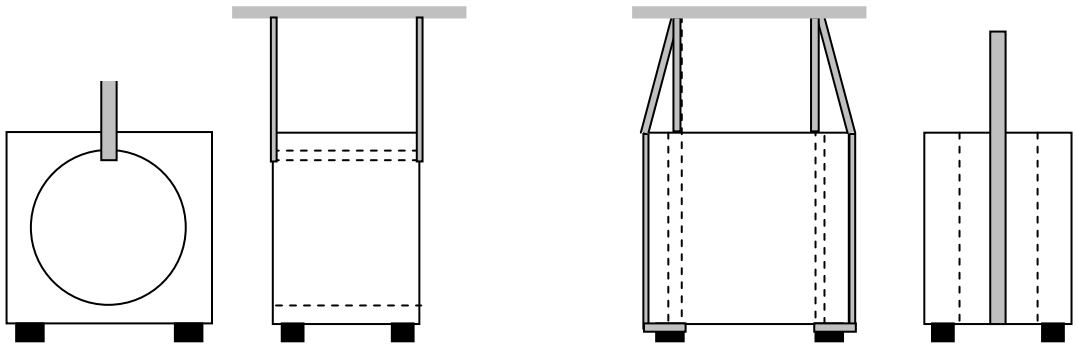
Mount disks ② and ring bolts ③

Attach lifting device ④ to ring bolts ③

Remove ring bolts ③ again and insert inspection plugs ①



- Mounting of CR-Coil :



horizontal assembly **vertical assembly**

- Mounting of D-Coil :

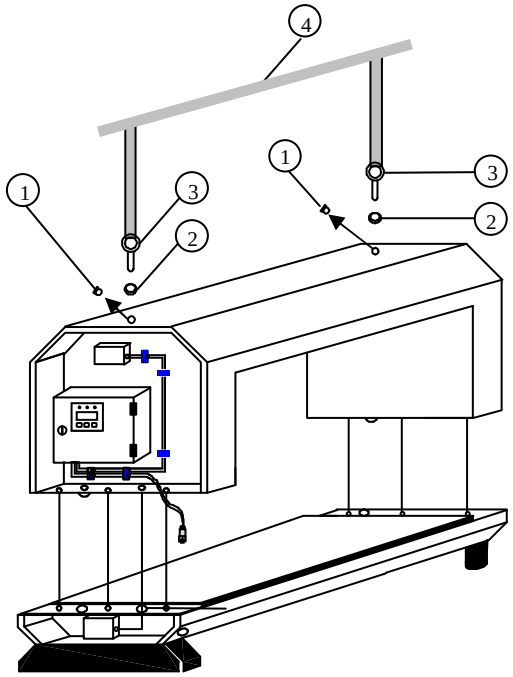
- Upper part or upper and lower part mounted

a) Remove inspection plugs ①

b) Mount disks ② and rings bolts ③

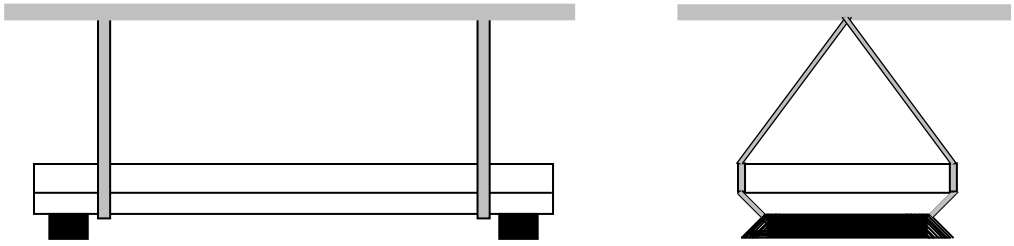
c) Attach lifting device ④ at ring bolts ③

d) Remove ring bolts ③ again and insert inspection plugs ①



- lower part – see S-Coil

Mounting of S-Coil :



Installation advice

Electrical part:

- Do not install electronic detection kit inside the control consoles
Stray fields can trigger off faults

- Connecting cables should be laid separately
Connector cables are a part of the metal detector and have to be protected from Noise.

- Do not expose the detection coil to strong electromagnetic fields (especially during strong power / supply fluctuations)
Field-interferences trigger off faults

- Connecting contacts 9/8/7 (Self-monitoring)
Checking of the self-monitoring function is essential for an optimal protection of the system.

- If possible, do not disconnect the metal-search device from the power supply system
Constant operating conditions enable more sensitivity adjustments.

- When welding, please disconnect the electronic board from the network if the coil or the electronic board are mounted on the equipment.

Mechanical part:

- Install the detection device without vibration
The sensitivity can be adjusted higher in safe operating conditions.

- Pay attention to an electrical insulated installation
Conducting connections trigger off electromagnetic short circuits, resulting in detection errors.

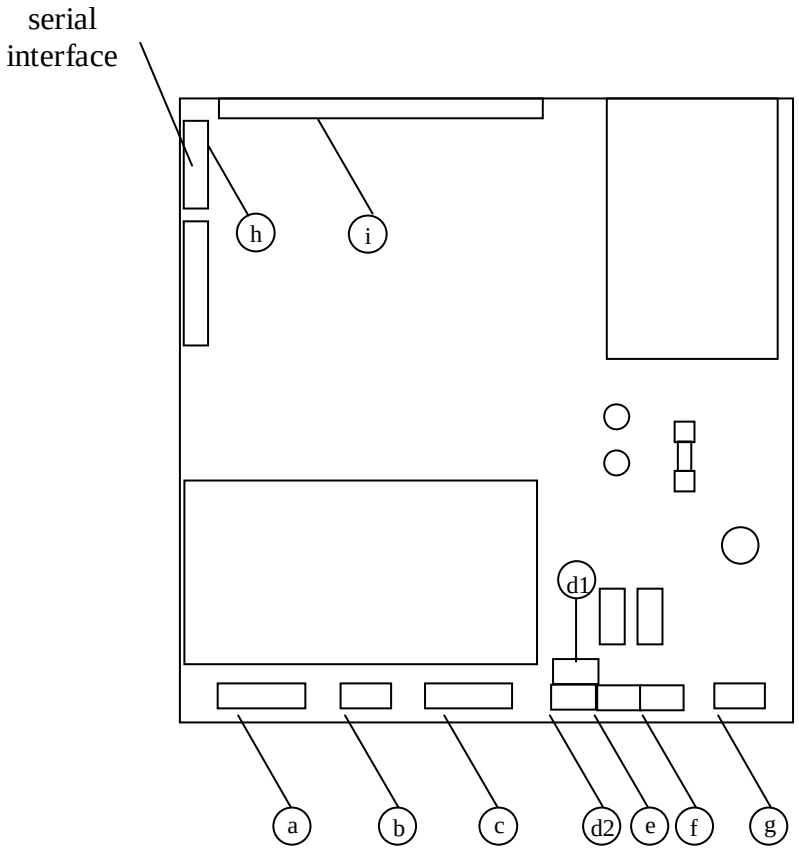
- Install the detection device at an angle of less than 45° degress
If an angle of more than 45° degrees is required please contact the manufacturing company.

- Do not touch the sensor surface of the detector (area inside the coils)
Contact with the mechanical parts leads to detection errors

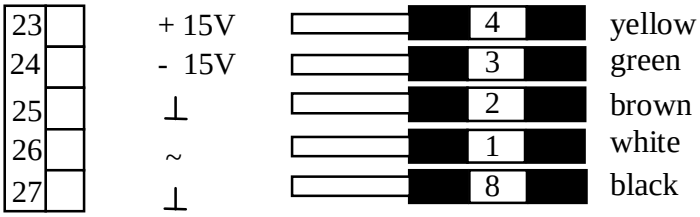
- Don't use anti electrostatic belt material
Conductive components have an effect on the metal detector

- The centering pins in divisible coils may not be disconnected

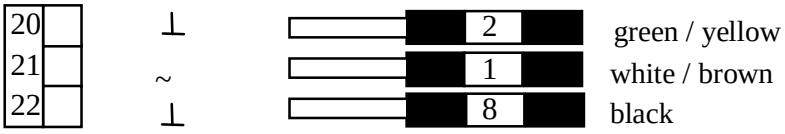
Connections for the Electronics



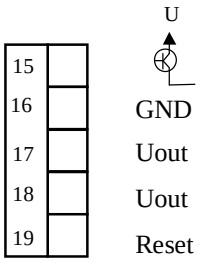
a) Receiver



b) Transmitter

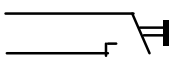


c) Active output / Reset



Active output

I_{max} = 300 mA => see page B7/7



Attention: Connect only floating relay contacts => see page B7/5

At the connections 15/17/18 and if necessary, at the printed circuit board, the outputs 1-4 (see chapter D2) must not exceed 300 mA.

The metal detected information can be reset manually by connecting connection 18 with 19. If an additional possibility for resetting is required, another contact can be added in parallel.

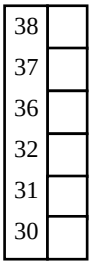
ATTENTION: maximum length of cable is 5 m !!!

If required, ask for modification instructions or send the electronics back to the manufacturer.

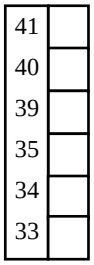
d) Option plug

The assignment is dependant on the settings of the functional blocks (for more information, see chapter D „Extension option functional block“).

d1)



d2)



e) Relay 1

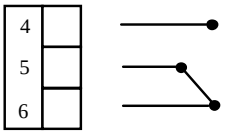
Output “Relay 1” can already be taken by other accessory units; e.g. warning unit (see chapter D)

Contact load:
$U \sim$ = 250 V
I_{max} = 3 A

As a standard, relay 1 is applied to signal a metal function (metal relay).

Basic adjustment and adjustment options (free programming) see chapter B6 operating level 2 - system setup.

Voltage free state:



Contacts 5 - 6 closed

The information “metal detected” can either be reset manually (manual reset, connection 18 and 19) or automatically (comp. chapter B6).

f) Relay 2

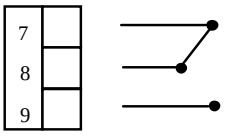
Output “Relay 2” can already be taken by other accessory units; e.g. warning unit (see chapterD)

Contact load:
U ~ = 250 V
I_{max} = 3 A

As a standard, relay 2 is applied to signal a function (fault relay).

Basic adjustment and adjustment options (free programming) see chapter B7 operating level 2 - system setup).

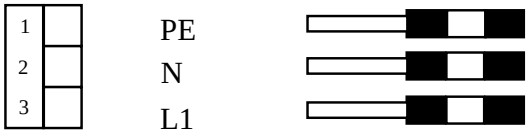
Voltage free state:



Contacts 8 - 7 closed

The information on failure can only be reset manually (manual reset, connection 18 and 19).

g) Power-supply system



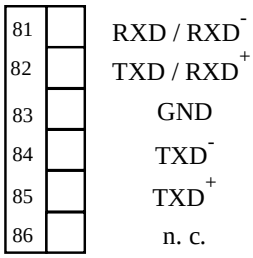
Variable : 85 to 264 V AC
50 to 400 Hz
or : 100 to 375 V DC
Fuse : 2 A passive

Special Version

Variable : 15 to 54 V AC
50 to 60 Hz
or : 20 to 75 V DC
Fuse : 2 A passive

When switching on the device the plug must be plugged in and when switching it off the mains plug must be unplugged.

h) Serial interface



The serial interface can be used as RS 232 or RS 422 according to the requirements of the customer.
It is supplied as RS 232 as standard.

i) Plug socket for option circuit board

Power Supply Section

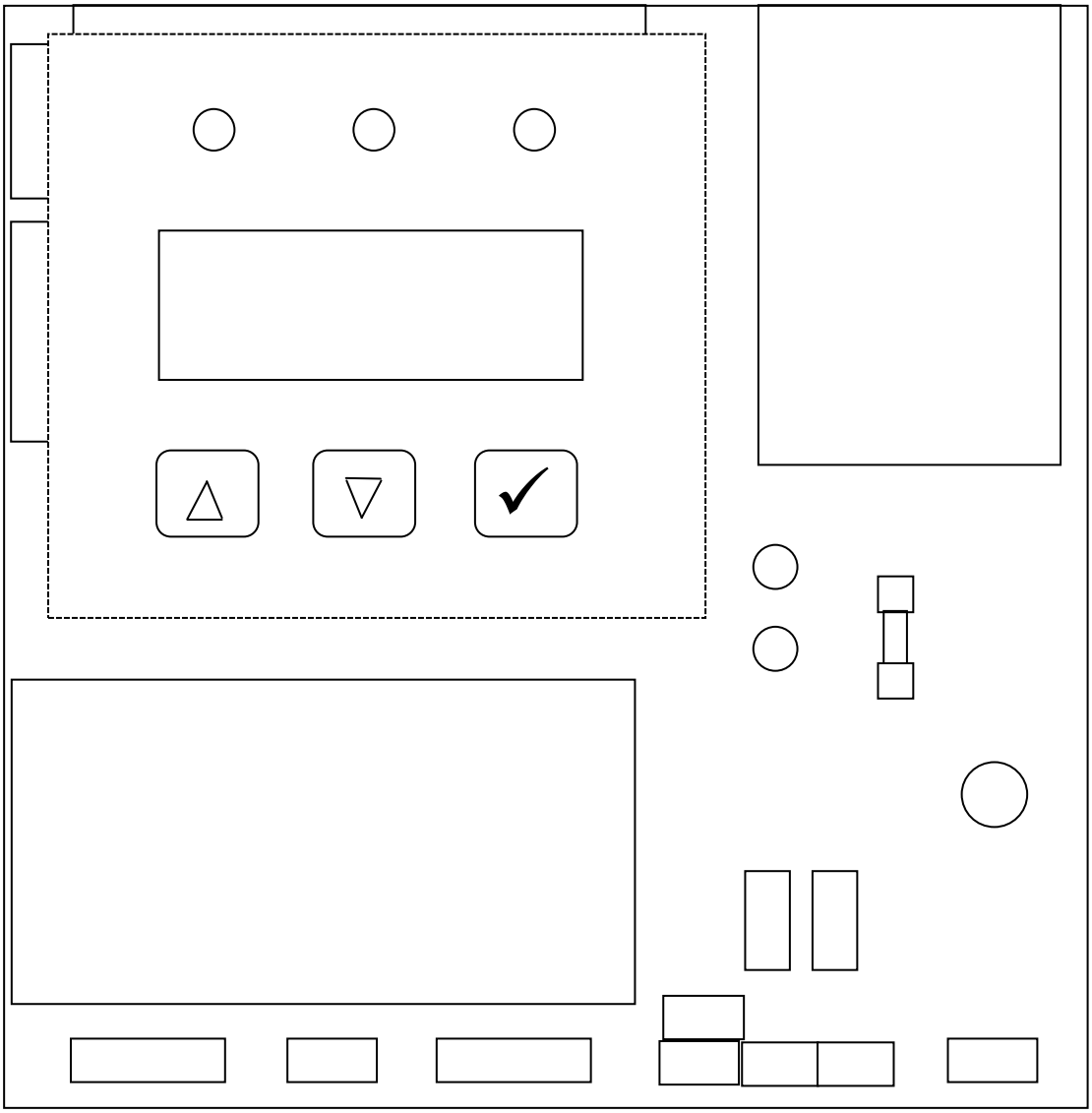
Variable : 85 to 264 V AC
50 to 400 Hz
or : 100 to 375 V DC

Fuse : 2 A passive

Special Version :

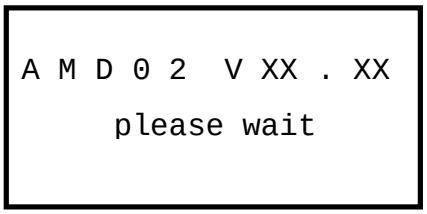
Variable : 15 to 54 V AC
50 to 60 Hz
or : 20 to 75 V DC

Fuse : 2 A passive



B) Setup and Product Changes

Initial Setup



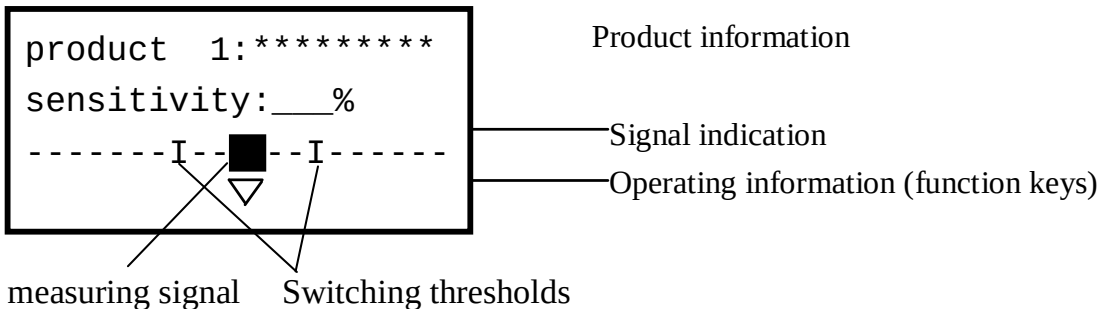
Once put into operation, the unit adjusts itself to the environmental conditions. During the setup procedure, a self-diagnostic programme is running and outside interferences are registered. After this the operating menu, shown below, appears.

During this setup time, any disturbances caused by mechanical influences should be kept at a minimum! The consequence of such disturbances is a reduced maximum sensitivity.
Examples of disturbances of this kind are:

- conveyor belt running through the detector.
- metal parts moving in the vicinity of the search coil (diverter gates, rollers ...)
- Touching or coming in contact with the detector in any way.

Compare therefore "Switching on response" in chapter B8 operating level 3.

Operating Mask



The operating menu shows the most important functions according to each product number. Further instructions on how to proceed are shown in the tasks menu.

Selecting the "Down arrow" key provides access to a pass code protected area, which allows you to adjust the settings. This ensures that only qualified operators can make adjustments to the system settings.

Switching between the individual tasks can be accomplished by selecting this key.

Setting up a metal detector for operation (Metron 02 Series)

General information :

Our company's aim is to deliver metal detectors preset as much as possible to customers. This is only possible if you have specified your product or your product range when placing an order. As this is not always possible we have enclosed a scheme describing the best way of putting a metal detector into operation. Only the process is explained; for individual explanations regarding menu points please refer to the user manual.

Step 1 :

After mechanical assembly, first of all only the metal detector will be put into operation. In this state the detector is only exposed to external influences (peripheral interferences). In the case of spurious releases it is necessary to locate the source of interference and make it interference-free. For this, if possible, all systems must be switched off so that the measuring signal of the metal detector system is calm, subsequently the equipment can be put into operation again.
Check the measuring signal after each step in order to locate sources. If it is not possible to suppress the interference you must reduce the sensitivity (see chapter B6/5) until there are no more spurious releases.

Step 2 :

The next step is to put the processing equipment and the conveyor into operation without products. In this state the influence of the conveyor becomes perceptible to the metal detector. For this also applies: if there are any spurious releases you must try to locate the source of interference and make it interference-free. For this the production line, as described above, is gradually put into operation.
Here in spite of peripheral interferences, where making it interference-free involves a big effort, a solution can found in any case. Sensitivity can be reduced temporarily until there are no more spurious releases.

Step 3 :

Now start the complete production line. During the set-up period only metal-free products should be used. Further processing method depends on the current situation. If there is a triggering while the product runs through the coil continue with point 4 otherwise with point 5.

Step 4 :

Your product is conductive and therefore influences the metal detector without metal being in the product. In this case you must first of all carry out „**Automatic product learning**“. For this please not pages B6/7 to B6/11 of the user manual.

Step 5 :

When product learning has been finished, **sensitivity** is adjusted, see pages B6/5. In case you have carried out step 5 without step 4 and now recognise that all products are triggering, return to step 4.

Step 6 :

After the two settings it is recommended to enter a **product name** (see B6/14).

Step 7 :

If a rejection device is integrated into the production line the drive has to be adapted by means of the **rejection parameter** (see B6/15).

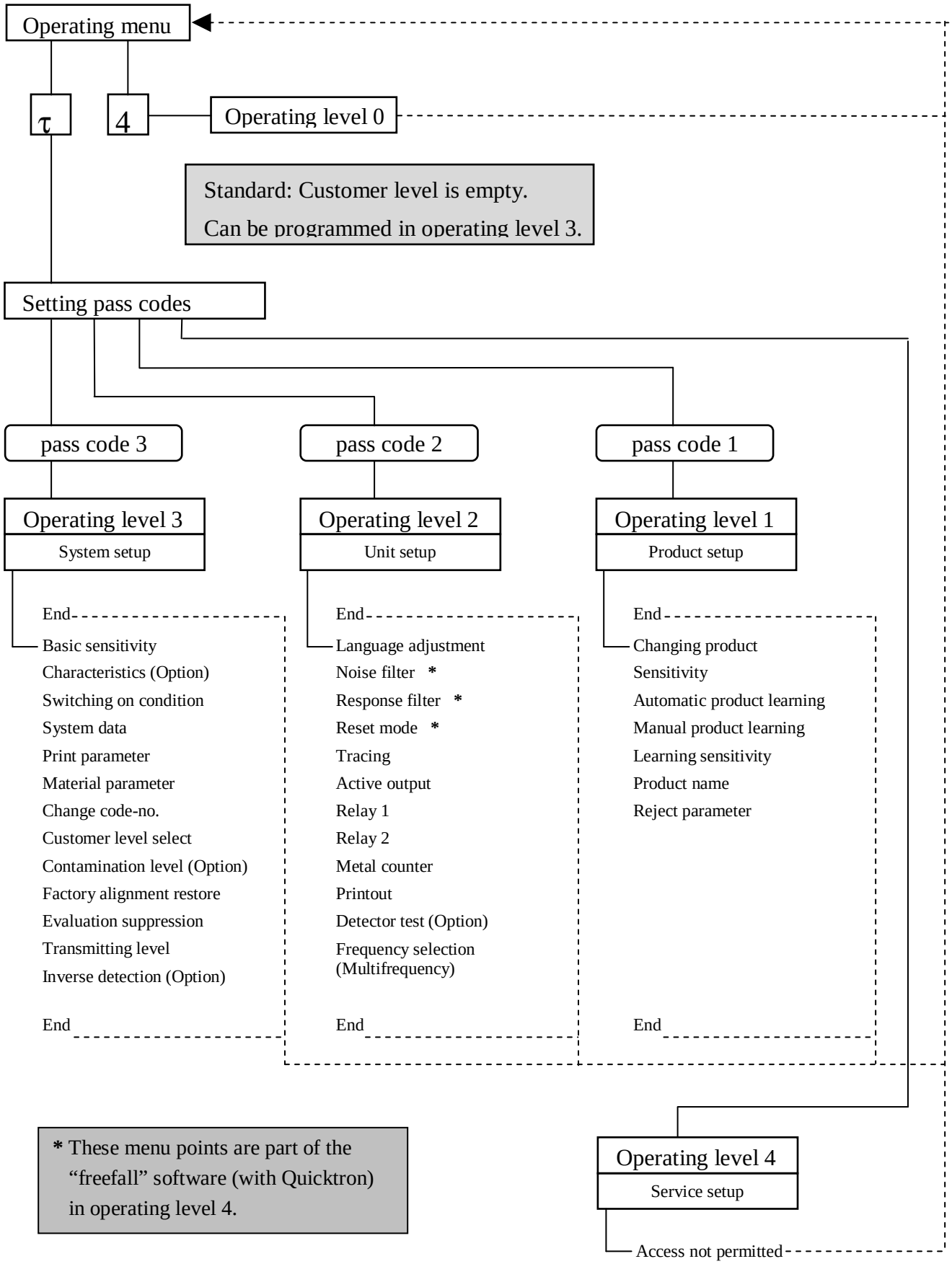
Step 8:

The menu points “**noise filter**” and “**response filter**” (see page B7/3 and page B7/4) of operating level 2 should only be used if there are problems with step 1 or step 2 whose cause can not be stopped. Usually these points remain with the manufacturer’s settings.

End:

All the other possible settings are made in order to adapt the metal detecting system to the production process and to realize application-related functions and evaluations.

Operating levels



Operating level 0 - Custom. Level

Custom level has made it possible to adapt the operation of the metal detector to the users specifications. This customer specific can be entered without any access code.
It should be designed in such a way that some of those functions installed enable quick access or access without special expertise.
With the original manufacturer's settings, the custom level is empty, because it should be impossible to change anything without a deeper knowledge of the metal detector.
Installation of custom level is carried out in "operating level 3".

After defining the desired functions in custom level you proceed according to the following system:

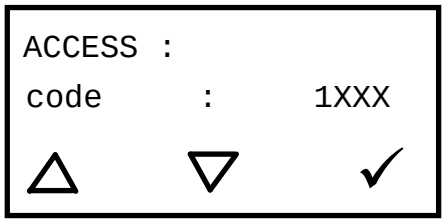
After pushing the "OK-button", it takes you into operating level 0.

The different functions listed in "operating level 0" will be described in operating level 1 and 2.

Use the “arrow down” and “arrow up” buttons to select the function inside “operating level 0” which you wish to change.

Use the “OK-button” to enter the chosen function

Setting pass codes



After selecting the "arrow down" key you enter the "setting pass code" mask (shown on the left).

To guarantee a constant detection accuracy, pass codes have been designed to prohibit any changes to the settings. The different codes can be found in the back of the operating manual.

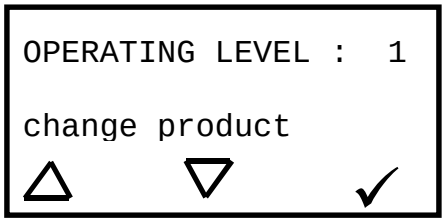
With the “arrow down” and “arrow up” keys you can select the required figure

With the “OK-key” you confirm the figure entered and then jump to the next figure. The pass code is automatically verified after entering the fourth digit. It is not possible to return to a previous figure.

Only by entering the proper pass code, you can gain access to level 1, 2 and 3. If a wrong code number is entered, the system recognizes this and shortly returns to the operating menu.

Operating level 1 - product set up

- General:



After selecting the pass code for operating level 1, the following display appears.

In operating level 1 all functions are entered which are essential for each particular product.

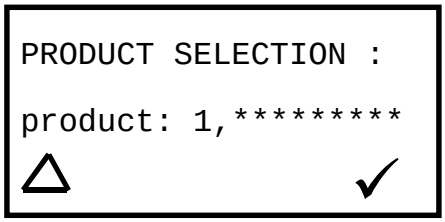
With the “arrow down” and “arrow up” keys you can choose the function you wish to set from the selection list.

Use the “OK-key” to select the function you wish to set.

These are the functions which can be set in (level 1):

- Product changing
- Sensitivity
- Auto product learning
- Man. product learning
- Learning sensitivity
- Product name
- Reject parameters

- Product changing



For selecting the product the following display appears.

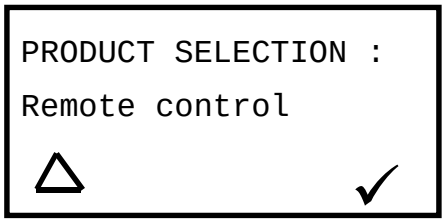
It is possible to store up to 49 different products.

All product-specific data items are stored to the corresponding product numbers. In detail these are:

- Sensitivity
- Result of the learning process
- Learning sensitivity
- Product name
- Rejection parameter
- Basic sensitivity

Activating the extended option “remote control”

Selecting the function “product changing”, the following masks appear on display:



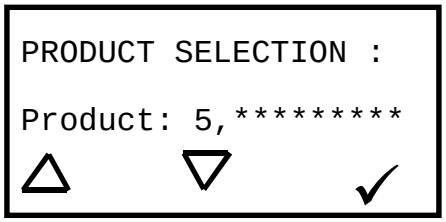
With the function “Remote control” it is possible to select products 1-4 by means of trigger inputs. The setting “Remote control” is activated as a standard.

The assignment of trigger inputs is defined as follows:

	Terminals' number
Product 1	31 + 32
Product 2	34 + 35
Product 3	37 + 38
Product 4	40 + 41

Attention: connect only voltage-free!

For additional information see chapter D (functional blocks).



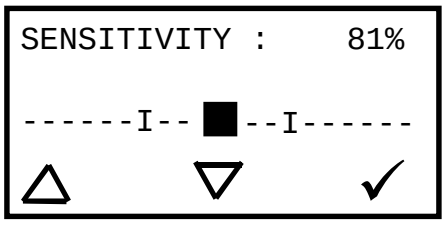
If more than 4 products are required or if you want to select products without the remote control, you can select products 5-49 manually at the electronic display by using the "up arrow" and "down arrow" keys. When selecting products 5-49, the remote control is deactivated.

Attention:
If several contacts are closed at the same time selection will take place according to a priority distribution in order to avoid a constant product change between these products. The lowest contact has the highest priority i.e. if contacts 1 and 3 are closed, product 1 is selected, if contact 2 and contact 3 and contact 4 are closed, product 2 is selected.
If a product change has been executed by means of an external contact and this contact opened again, the detector remains at this product (unless another contact has also been closed).
If no contact is closed when the system is switched on, the latest product which has been active when the system was switched off, will be used.

Use the “arrow down” and “arrow up” keys to search for the desired product.

Use the “OK-button” to select the function you wish to set.

- Sensitivity



When adjusting the sensitivity, the following information is displayed.

The metal detector indicates the signal
„metal“, if the measuring signal exceeds both switching thresholds.

For adjusting the sensitivity two different criteria are available:

1) Select the smallest piece of metal which should be detected and pass it through the detector. Increase the sensitivity until the metal signal exceeds the thresholds.

2) Pass the product through the detector and increase the sensitivity to the point where the metal signal is just below the threshold and does not detect the signal. A sensitivity adjustment higher than 95% makes sense at special cases only (if requested see chapter D).

▽

△

Use the “arrow down” and “arrow up” keys to select the required value.

✓

Use the “OK-key” to save the chosen sensitivity value.

When changing the product settings, it is recommended that the detector should be set to “automatic reset”. During this time an increased amount of metal detections appear which have to be continually erased by doing a manually reset. If you have set the maximum sensitivity according to point 2 as described above, you should proceed to chapter “learn product”.

Product learning

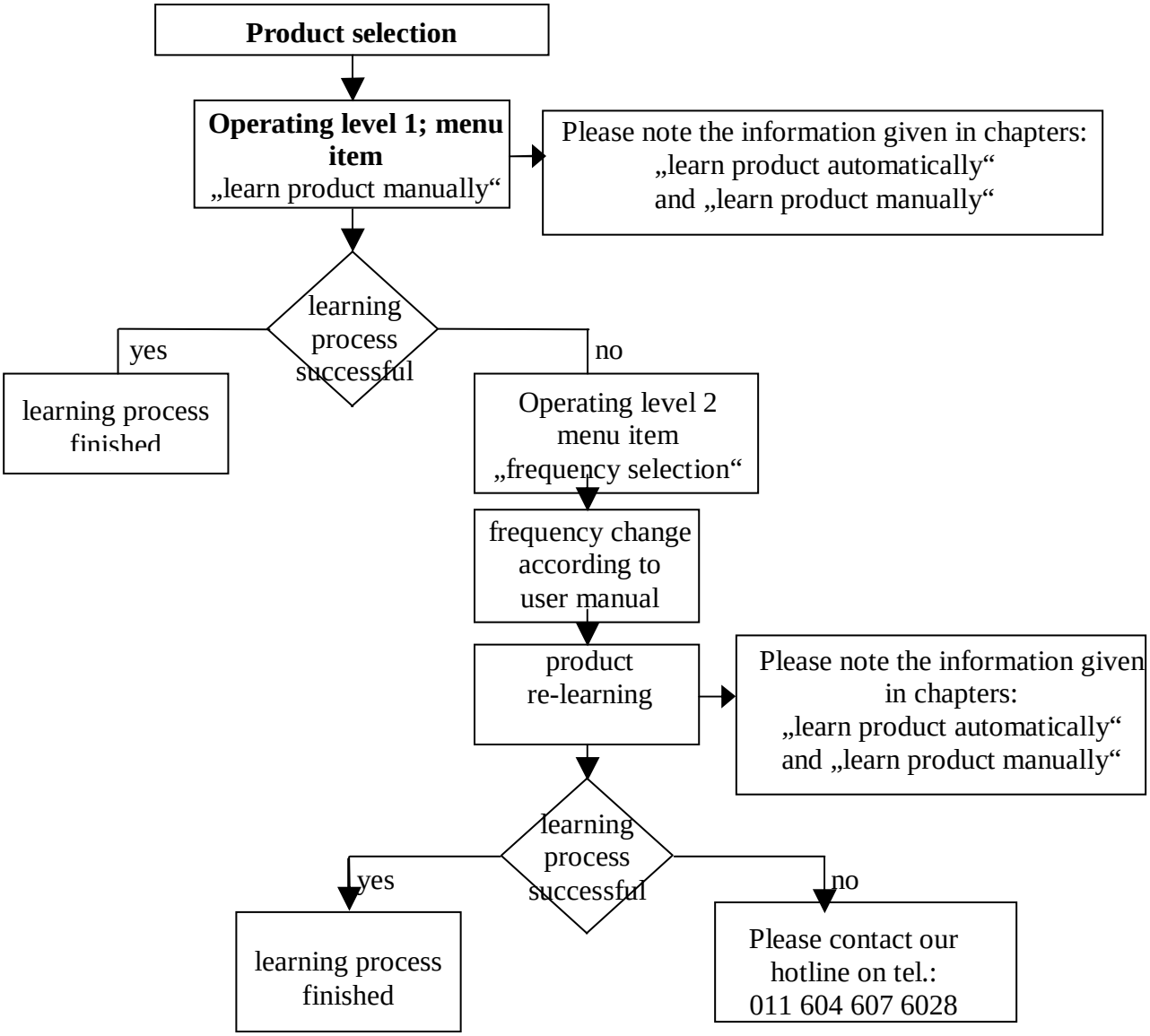
Note:

With standard electronic refer to chapters „automatic product learning“ and „manual product learning“.

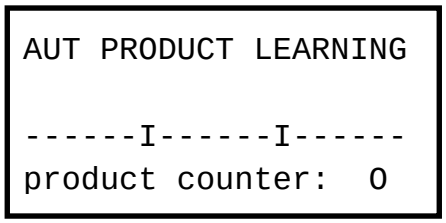
The function diagram applies only to „multifrequency“ performance.

With „automatic product learning“ and „manual product learning“, the original manufacturer’s frequency setting applies when the product is selected for the first time. This is the standard frequency set when put into operation. The frequency which is activated with „product learning“ refers only to this product.

We recommend the following process for selecting frequency:



- Automatic product learning



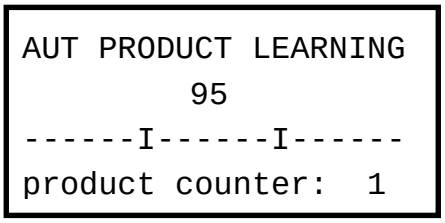
At the beginning of the automatic learning process the following display appears.

This learning process is required, if the “metal detected” signal already appears when conveying metal-free products. Further on, this will be called "product effect". This adjustment is also called "product compensation"; i. e. the metal detector suppresses the influence of the product. After a successful "learning process" the detector is optimized to get minimum deflection by the "learn product". The evaluating electronics AMD 02 can do it automatically for you.

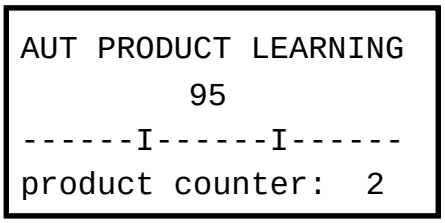
Further on, we always refer to packed products. For applications with bulk material or in free fall, you have to ensure that interruptions do exist along the product flow (e.g. accumulations with bulk materials).

The regular learning process will be described first. Normally you convey three product packages through the metal detector installation and receive on the display the process shown below.

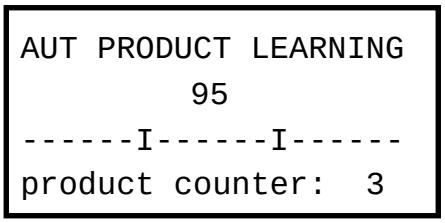
Normal case:



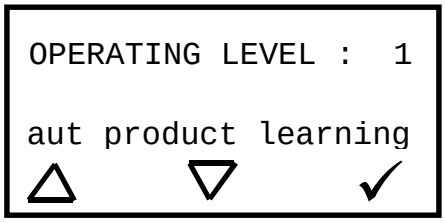
After the first product package is identified, the data is displayed. In this example the product specific compensation value is 95.



After identifying the second product package the product counter increases to 2.



After the second product package is identified the learning result is displayed for three more seconds.



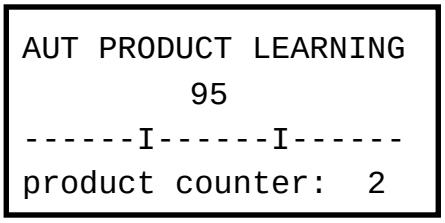
If the electronics accepts the learning process the function "learn product auto." will is left automatically.

Use the „arrow down“ and „arrow up“ keys for further selection in operating level 1.

Use the „OK-key“ to enter the selected function.

Depending on the product various operating conditions can occur:

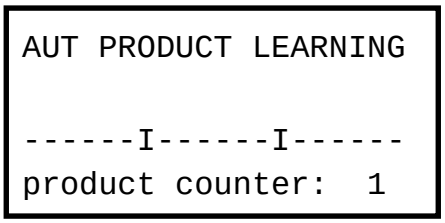
a) You convey only one product and the product counter increases to 2:



Double detection of one product

In some special double detection can be caused by product interference. With a long product packages consisting of several single items each single item's detected, which means the double detection is fine.
But if the case described above appears which homogenous substances, you have to go and adjust the function learn sensitivity in this operation level.

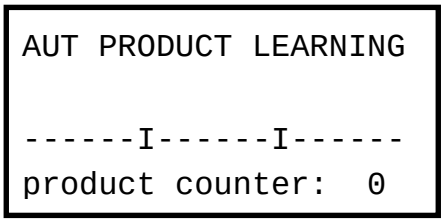
b) You convey the first product and no product specific value is displayed:



After the first product package has been detected, only the product counter increases but no product specific compensation value appears.

The first product causes a deflection, which exceeds the limit of resolution limit. The evaluation electronics now automatically enlarges the measuring range. The following product will be detected with new parameters. If the measured value is OK, it is displayed and the function "aut. product learning" is continued as described above. The electronics can enlarge the measuring range seven more times. If measuring is still not possible, the fault message "product effect too high" will appear.
Compare therefore chapter "faults and problems".

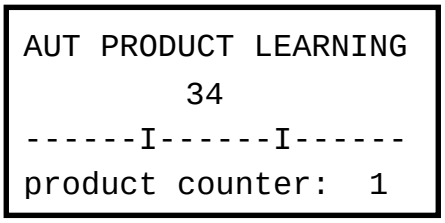
c) You convey the first product and neither product compensation value nor product Counter changes:



The product package is not identified

The product effect is too small for an automatic compensation. Increasing the product effect is possible by increasing the conveyed quantity. If this is not possible, e.g. the geometric size of the detector makes it impossible to convey a higher quantity of the product, the "learn sensitivity" has to be changed.

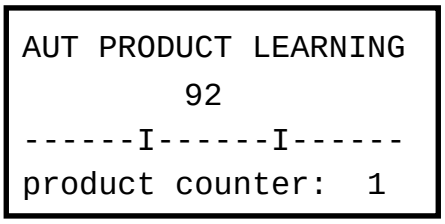
d) The detector begins to measure even without a product:



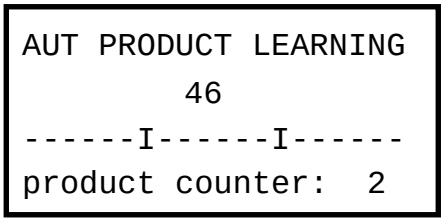
Learn value without any conveyed product

The electronic system detects
external disturbances and evaluates these as product values. These could be for example, shaking or electromagnetic disturbances. In this case the learn sensitivity has to be changed.

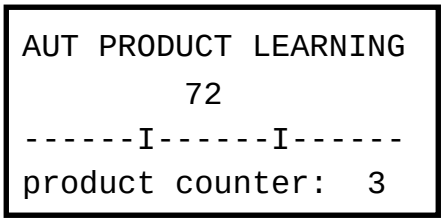
e) The learn values differ considerably from each other:



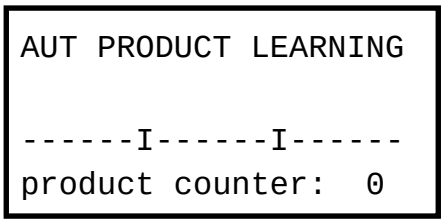
Product No. 1



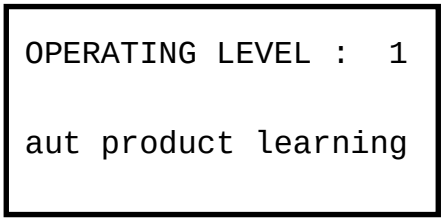
Product No. 2



Product No. 3

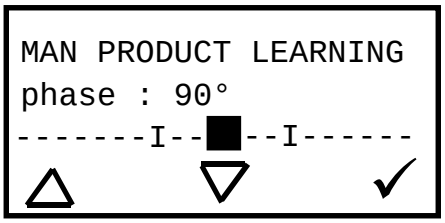


In case that after three products no useful learning values have been received, the first three learning values will be cleared and the learning procedure will be started again. If there is no result after nine products, the electronics leave the function "aut. product learning"



The learning results of the product are either influenced by external interferences or the signal path produced by the product is not clear. In both cases changing the "learning sensitivity" can help.

- Manual product learning



It is also possible to execute the learning process in manual mode.

The possibility of using the manual mode is only used in special cases. As described in chapter "learn product auto." the learning procedure always works faultless by, when every product has a similar corresponding measuring value. For this process, the assisting function "learning sensitivity", is available.
Nevertheless if no useful learn results can be achieved, the learn procedure must be done manually. The adjusting mask shows the current learn value. The optimum learn value is achieved when the signal on the display hardly moves.
The sensitivity must be reduced if the signal is still exceeding the threshold, even if the optimum learn value is adjusted.

The value set here refers only to the product material and **not** to the product quantity.

▽

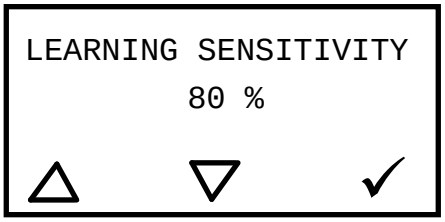
△

With the „arrow down“ and „arrow up“ keys you change the learning value. The changes at the learning value are stored immediately and will be used for the next test.

✓

Use the „OK-button“ to store the selected value.

- Learning sensitivity



The learning sensitivity is only used detecting products. The sensitivity to metals is completely independent of it.

There are two criteria for adjusting the learn sensitivity:

1) While the conveyor belt system is running without any products the product counter must not increase!

2) If a product package runs through the detector, the product counter must increase by one digit!

Procedure for adjustment:

Reduce the learn sensitivity until criteria 1), as described above, has been achieved.
If the product gets still detected, the function "aut. product learning" is working.
If the product package does not get detected the learn sensitivity has to be decreased step by step.

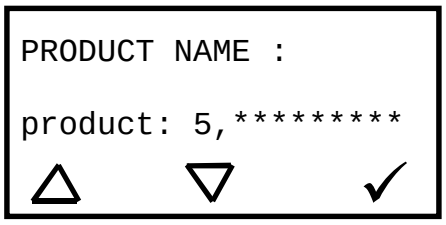
If it is impossible to find any learning sensitivity which fulfils both criteria, the product has to be learned manually. This adjustment process refers to all the problems which might appear during the automatic learning process.

▽ ▲ Use the „arrow down“ and „arrow up“ keys to select the requested value.

✓ The „OK-button“ stores the selected value of the learning sensitivity

The effects of the changed learning sensitivity can only be examined in the chapter "automatic product learning". In case it is impossible to fulfill criteria one and criteria two, you should try to localize and minimize the disturbances.

-Product name



A name / code consisting of nine digits can be entered for each product.

For an optimized detecting process various products and their product specific values can be stored in the "learn product ..." functions. All letters (small and capital) of the alphabet and all ten numbers are available for marking the different names.
After selecting the function "product name" the currently active product number is displayed. Now you can change product digits and thus enter several names without changing the product. After the first "OK" confirmation you enter the range of the product names.

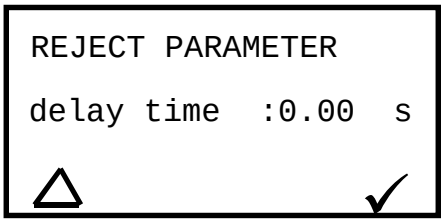
Use the “arrow down” and “arrow up” keys to select the requested character.

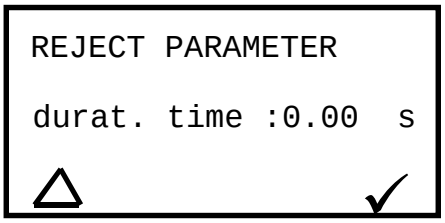
Use the “OK-button” to confirm the selected character and to jump to the next digit. The confirmation of the last digit finishes the input process. A return to the last digit is not possible

If you want to change a code which has already been set the first digit/letter has to be changed (pressing “arrow down” or “arrow up” is accepted as an alteration), subsequently you can adjust any digit/letter.
Attention:
When changing the product number within “product name” you execute a product change.

- Rejection parameter

When in this or the following chapters the term „metal signal“ or just „metal“ is mentioned, it refers to the signaling at he exits of the evaluation electronic.





The metal delay is only activated in the software version „conveyor belt“.

The metal delay can be set in the region of 0 - 30 sec. and the metal duration in the region of 01 - 30 sec.

If the functional switching circuit 3 or 4 is activated (extension option), the convoyer belt can be shifted to clock operation.

Adjustment range of the clock values:

Delay time : 0 to 10.000
Duration time : 1 to 300

Depending on the selected reset mode in operation level 2, you can program the delay time and the duration time for each product.

Delay time: The adjusted figure represents the time delay between metal detection and triggering the outputs. The delay time can be adjusted in the „reset by hand“ mode as well as in the „auto reset“ mode.

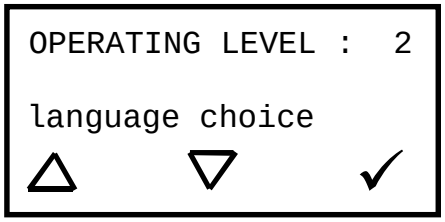
Duration time: The duration time indicates how long the information „metal“ is set at the output of the electronics (it is only possible to adjust the duration time in the auto reset mode).

Use the „arrow up“ key to select the desired number.

Use the „ok-button“ to store the selected value.

Operating level 2 - Detector setup

- General



After setting the pass codes for operation level 2 the following display will appear.

In operating level 2 all parameters essential for the adjusting of the detector for the manufacturing process are set.

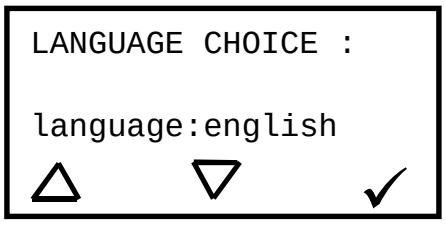
Use the „arrow down“ and „arrow up“ keys to select from the list for the desired function the parameter.

Use the „OK-button“ to go into the selected function.

In operating level 2 can be adjusted:

- language choice
- noise filter
- response filter
- reset mode
- tracing
- active output
- relay 1
- relay 2
- metal counter
- printout
- detector test (Option)
- frequency selection (multi-frequency performance)

- Language choice:



On all model Metron 02 metal detectors, you can select the displayed language.

It is therefore guaranteed that all the necessary information is shown in the language of the user's choice.

Our standard range consists of:

- German
- English
- Italian
- Dutch
- French
- Spanish

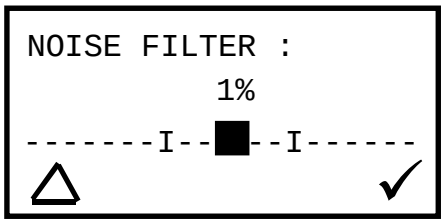
Other languages are also available.

Use the „arrow down" and „arrow up" keys to search in the list for the desired language.

Use the „OK-button" to confirm the selected language.

- Noise filter:

The noise filter is only available for the software version „conveyor belt“.



With the aid of the noise filter, you can eliminate high-frequency the importance of interferences from the measuring signal. The setting depends on the conveying speed.

The optimum adjustment for the noise suppression is described below:

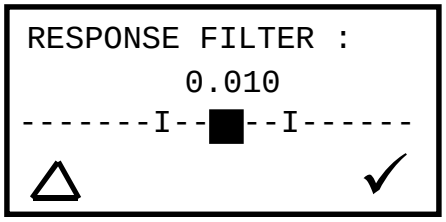
- Adjust the noise suppression to 1%
- Reduce the sensitivity to such an extent that a particular metal part can only just be detected
- Increase the noise suppression step by step until the piece of metal is no longer detected
- If you reduce the noise suppression now by 3%, you will reach the optimum value.

For the adjustment described above, please use a large piece of metal as external interferences are then relatively small.

Use the „arrow down“ and „arrow up“ keys to select the desired value.

Use the „ok-button“ to store the selected noise suppression value.

- Response filter:



With the response filter you can check the temporal behavior of the measuring signal.

As described in the chapter "sensitivity / Operating level 1", the measuring signal has to exceed for the detection of the signal both threshold-values in order to detect metal. To control the time the following fact is taken into consideration.

If a metal part is conveyed through the detector, the measuring signal moves over both threshold values. Depending on the conveying speed the signal remains for a certain amount of time both thresholds. This length of time is a control criteria and shows that the metal detection has been correctly executed
The adjusted value, as described in the chapter „Response filter“, represents the minimum length of time required above both thresholds. The response filter is set to high if the test piece clearly passes the threshold and there is no metal signal.

▽ △

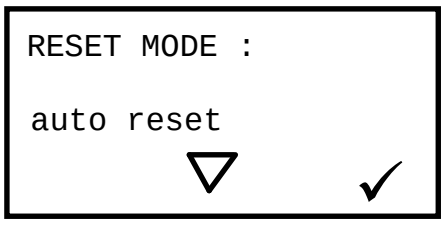
Use the „arrow down“ and „arrow up“ keys to select the desired time.

✓

Use the „OK-button“ to store the settings of the response filter

- Reset mode:

The reset mode is only available for the software version „conveyor belt“.



It is possible to reset a signal in the auto mode as well as in the manual mode.

If not different by requested, the detectors are all delivered in the auto reset mode.

Auto reset mode:
The time controlled metal message is used for the automatic rejection mode of products containing metal products. For this, you can adjust the time delay and the duration time of the rejection process at the function „Rejection parameter“ in operating level 1.

Manual reset mode:
Working in this manual reset mode, you can only delay the metal signal, e.g. conveying a piece of metal through the detector. The duration of rejection is set to an infinite value.
You restart the unit by pushing the „Ok-button“ or with an external reset button (compare chapter A3).

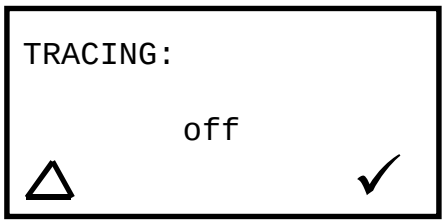
Besides running the detector in time controlled mode it is also possible to run the detector in distance controlled mode. For the exact triggering of the rejection unit the triggering signal can be transmitted to the unit (compare chapter D).

Use the „arrow down“ key to select the desired reset mode.

Use the „Ok-button“ to confirm the selected reset mode.

- Product tracing:

Product tracing is only available for the software version „conveyor belt“.



Slow changes in the influences to the product are learns automatically.

Tracing can only be used, if you receive sensible measuring values during the „automatic product learning“ mode (compare chapter B6/7).
Fast changes in the effect of products can not be adjusted with this function, as these the changes could also be caused by metal parts.
This function is mainly necessary if there are products which change their physical properties due to temperature fluctuations (cold and frozen products).

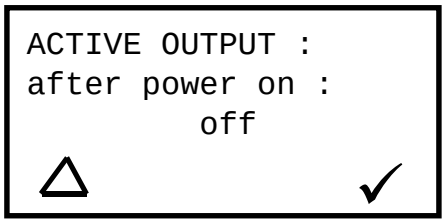
Use the „arrow-up“ key to chose the desired tracing features.

Use the „Ok-button“ to confirm your selection.

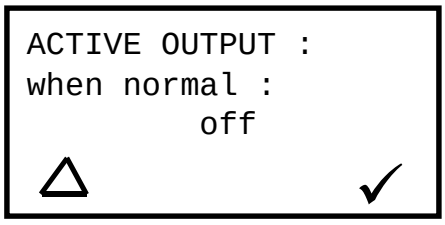
- Active output

The standard electronics AMD 02 contains one active output (24 V ungeregelt / 300 mA).
Depending on the task, it can be necessary, that the connected unit after a metal piece is detected has to be set on voltage or to ground.
Please consider that the output uses open collector technology (chapter A3).

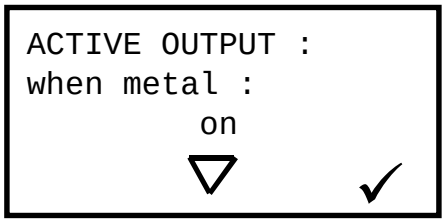
The active output (connection: 17/16/15) can be programmed for several operating conditions of the system.



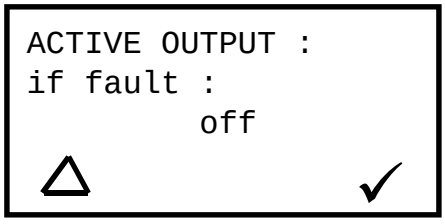
State of the active output during adjustment, when the system has been switched on.
(Original manufacturer's setting: OFF).



State of the active output during the system's normal operating.
(Original manufacturer's setting: OFF).



State of the active output when metal is detected. The active output switches parallel to the standard „metal output" (connection: 6/5/4).
(Original manufacturer's setting: ON).



State of the active output after a fault occurs.
(Original manufacturer's setting: OFF).

"off" breaks the circuit at the output

"on" closes the circuit at the output

Using the „arrow down“ and „arrow up“ keys to pre adjust the functions.

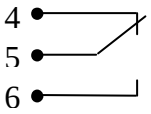
Using the „Ok-key“ to confirm the function

- Relay 1

The relay 1 (connection: 6/5/4) can be programmed for different operating states of the unit.

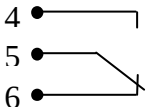
```
RELAY 1  :
after power on :
        on
```

State of relay 1 during adjusting, when the system has been switched on.
(Original manufacturer's setting: ON)



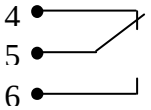

```
RELAY 1  :
when normal :
        off
```

State of relay 1 during the system's normal operation.
(Original manufacturer's setting: OFF)



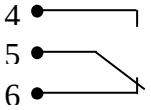

```
RELAY 1  :
when metal :
        on
```

State of relay 1 when metal is detected.
(Original manufacturer's setting: ON)




```
RELAY 1  :
if fault :
        off
```

State of relay 1 after a fault occurs.
(Original manufacturer's setting: OFF)



„off" breaks the circuit at the output

„on" closes the circuit at the output

Using the „arrow down“ and „arrow up“ keys to pre-adjust the functions.

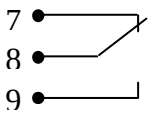
Using the „Ok-key“ to confirm the function.

- Relay 2

The relay 2 (connection: 9/8/7) can be programmed for different operating states of the unit.

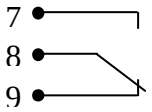
```
RELAY 2  :
after power on :
        off
```

State of relay 2 during ajusting, when the system has been switched on.
(Original manufacturer's setting: OFF)



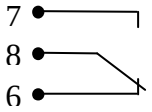

```
RELAY 2  :
when normal :
         on
```

State of relay 2 during the system's normal operation.
(Original manufacturer's setting: ON)



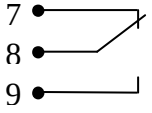

```
RELAY 2  :
when metal :
         on
```

State of relay 2 when metal is detected. Relay 2 switches parallel to the standard „metal output" (connection: 6/5/4)
(Original manufacturer's setting: ON)




```
RELAY 2  :
if fault :
         off
```

State of relay 2 after a fault occurs.
(Original manufacturer's setting: OFF)

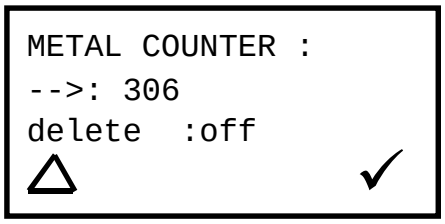


"off" breaks circuit at the output
"on" closes circuit at the output

Using the „arrow down“ and „arrow up“ keys to pre-adjust the functions.

Using the „OK-key“ to confirm the function.

- Metal counter



The metal counter offers a simple way of controlling the quantity of metal detections.

The metal counter increases its value with each metal detection.

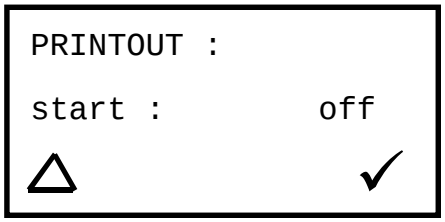
The metal counter can only be set to zero by confirming the function "delete : on".

△ With the „arrow down“ and „arrow up“ buttons the function „delete metal counter“ can be set on an off.

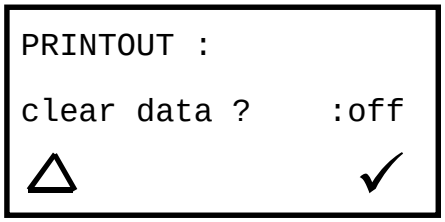
✓ With the „OK-button“ the counter value’s set to zero or remains at the current value (according to the selection). The function will be left immediately after.

- Printout:

The function "printout" can only be selected, if the "print parameter" is set to "on" in operating level 3.



If the function "printout" is set to "start: on" all data of detected metals (maximum 50) will be transferred to a preset protocol number (operating layer 3).
Manufacturer’s setting of this display is "'off".



This second display is set by the manufacturer to "off".
The function "clear data" should only be activated when you ensured that the print-out of the data was successful.

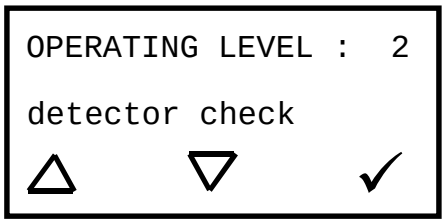
ATTENTION:
If the record data is not deleted, then the oldest detection data is overwritten by new metal detection data when the maximum amount of detection data has already been stored (max. 50).

△ Use the „arrow up“ key to select printout

✓ Use the „OK-button“ to confirm the selected value.

- Detector test (Option)

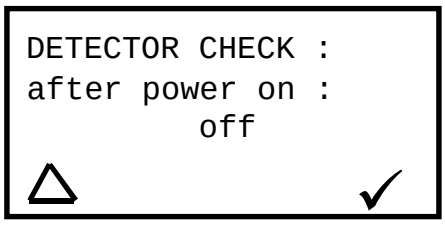
The function „detector test“ is an option and only accessible if it has been released.



With the function „detector test“ you can ensure that the detector is tested according to quality control regulations. If this is not the case the system connects to fault state.

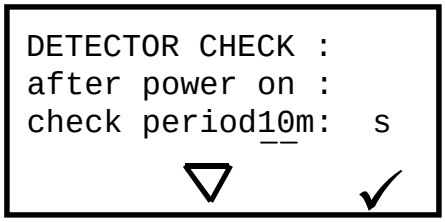
When the test is to be activated can now be set. It is possible to execute testing after the system has been switched on as well as during the production.

- Setting of the parameters:



Here you can activate whether the prompt for a detector test should appear automatically after switching on.

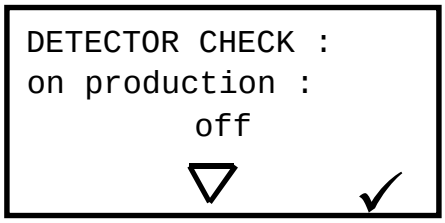
(Original manufacturer’s setting: off)



After switching on, the duration of the test can now be set. The test duration is the maximum time allowed for the execution of the testing.

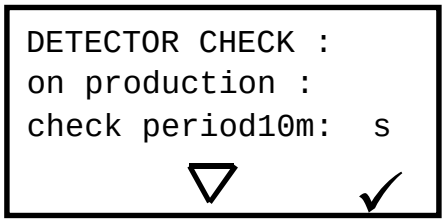
min. test duration: 10 sec.
max. test duration: 10 min. 59 sec.
Resolution: 1 sec.

(Original manufacturer’s setting: 10 min.)



Here you can activate whether the prompt for a detector test should appear automatically during the production.

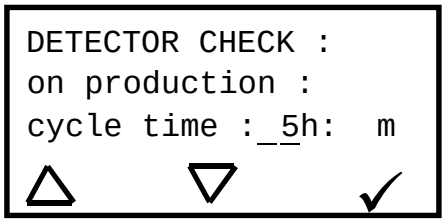
(Original manufacturer's setting: off)



Here you can set the test duration for the detector test during the production.

min. test duration: 10 sec.
max. test duration: 10 min. 59 sec.
Resolution: 1 sec.

(Original manufacturer's setting: 10 min.)



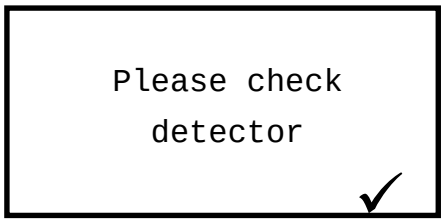
The cycle time indicates when the testing will be repeated.

min. test duration: 1 min.
max. test duration: 10 Std. 59 min.
Resolution: 1 min.

(Original manufacturer's setting: 5 h)

- Process of the detector test

The process of the detector test after switching on is identical to the detector test during production.



As soon as this message appears on the option circuit board output 4 is set (see chapter D2 - for example a signal for flashing light or horn).
This prompt has to be confirmed with the quit key so that the test duration will be started and output 4 will be reset.
During testing a test object must be led through the detector.
If a metal message is triggered off the detector operates fine.

If during this testing period no metal signal is detected the fault message „no metal detected“ will appear. After this fault message has been confirmed the test duration will start again as long as metal has been detected.

If a fault appears after several tests, see chapter D.

▽

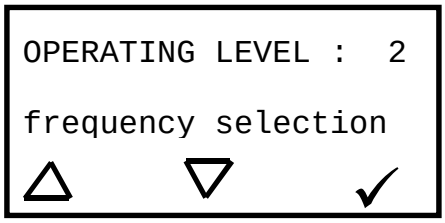
△

Use the „arrow down“ and „arrow up“ keys to select the desired duration.

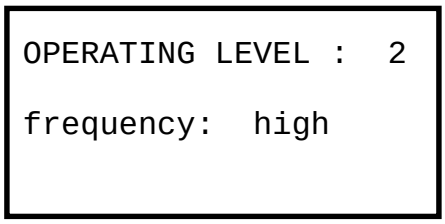
✓

Use the „OK-button“ to confirm the duration and jump to the next setting.

- **Frequency selection** (refers only to multi-frequency):



To select the frequency the following is displayed.



If „high“ is set as the present frequency, you can switch over to the lower frequency with the „arrow down“ key.

```
OPERATING LEVEL :  2
frequency:  low
```

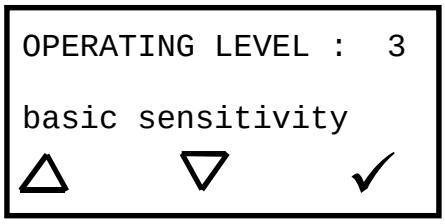
If „low“ is set as the present frequency, you can switch over to the higher frequency with the „arrow up“ key.

With the „arrow down“ and „arrow up“ keys you can select the desired frequency.

With the „ok“ key you confirm the frequency selected.

Operating level 3 - System setup

- General:



After having set the pass code for operating level 3, the following display appears.

Functions in operating layer 3 are necessary for some special applications.

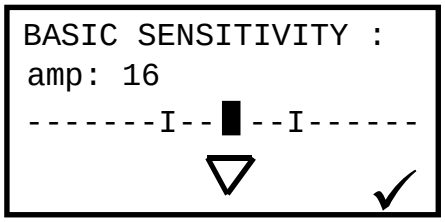
Use the „arrow down“ and „arrow up“ keys to select the desired function out of the below given list of functions

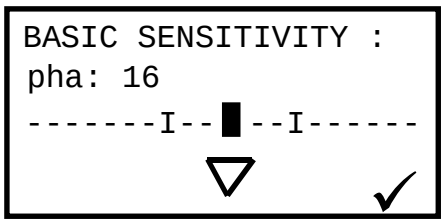
Use the „OK-button“ to enter the selected function

In operating level 3 you can select:

- Basic sensitivity
- Characteristics (Option)
- Switch-on condition
- System data
- Print parameter
- Metal parameter
- Change code-no.
- Custom. level selection
- Contamination level (Option)
- Factory alignment restore
- Evaluation suppression
- Transmitting level
- Inverse detection (Option)

- Basic sensitivity





With the function "basic sensitivity it is possible to preset the sensitivity. Two parameters can be used for adjusting the basic sensitivity: "amplitude and phase".

The basic sensitivity can be adjusted with in the range of "1" to "16".

Adjustment 1: minimum sensitivity
Adjustment 16: maximum sensitivity

Please always adjust both parameters to similar values, when you change the basic sensitivity.

The basic sensitivity can be changed with the function "automatic product learning" in operating level 1. If the influence of the product is big for the signal to no longer be evaluated, the basic sensitivity has to be reduced by one step.
If the measuring signal still can not be evaluated at level "1", the error signal" product effect too high!" will appear.

If the basic sensitivity changes, the new adjusted values represent the maximum basic sensitivity allowed for this product. After you have changed to another product number, the basic sensitivity will be set to "16" again.

Use the „arrow down“ key to select the desired basic sensitivity

With the first push of the „OK-button“ you change from „amplitude“ to „phase“. With the second push you return to operating level 3.

If you find reduced "basic sensitivity" values caused by "automatic product learning“ you can keep the values by pressing the „OK“ key twice
If you want to continue working with the maximum basic sensitivity, increase the values to "16" again.

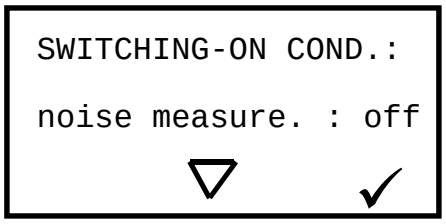
- Characteristics (Option):

The function „characteristics“ is an option and **only** accessible if it has been released.

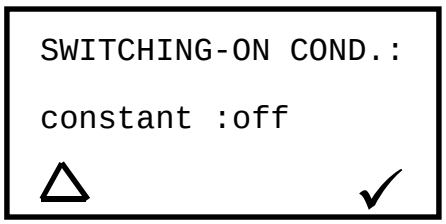
The function „characteristics“ enables a specific detection of metal types and thus also a sensitivity adjustment depending on the type of material. This guarantees, with ALUTRON (extraction of metal foils) considerably better sensitivity results than before and allows the use of all-metal detectors in these areas. Other applications can compensate for the differences in sensitivity resulting from physical conditions and the type of metal or change according to the project. The measurement results appear in un-coded text in the printer’s record.

- Switching-on condition

For advanced noise suppression it is possible to make the electronic system store the noise during the switched on state. These values will be evaluated automatically and can improve the detector



If you want to dampen permanent noise, set "noise measure : on".
If you set "noise measure : off", you will come back to operating level 3.

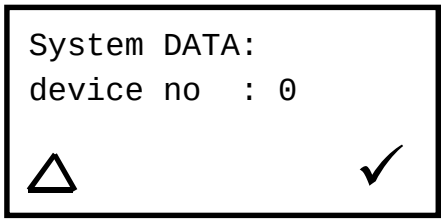


If you can not exclude irregular disturbances, then set "constant.on".

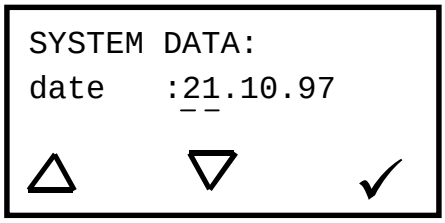
With the „arrow down“ and „arrow up“ keys you can change the respective display values.

With the „ok-key“ you can change between off/on

- System data:

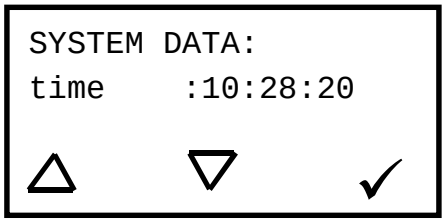


At first a device number can be entered which, amongst others, has the function of differentiating printed data.
100 different device numbers can be allocated (0 to 99).



Now the current date can be set.
The order corresponds to the order generally used in Europe:

DAY : MONTH : YEAR



Now the current time can be set.
The order corresponds to the order generally used in Europe:

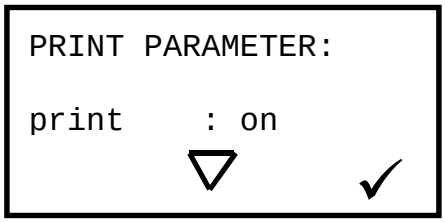
HOUR : MINUTE : SECONDS

With the „arrow down“ and „arrow up“ keys you can change the respective values.

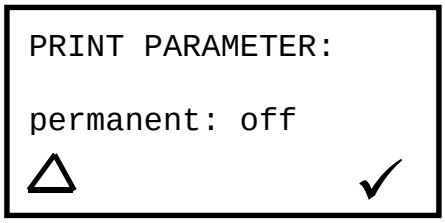
With the „ok-key“ you confirm the respective value and jump to the next date or time selection.

- Print parameter:

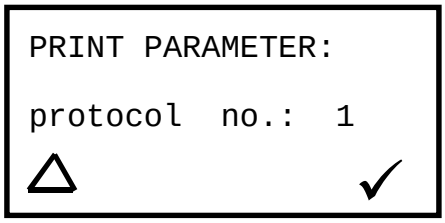
For a print-out of the metal detector's stored data, the following steps must be taken.



To send the information to the printer „Print parameter" option must be set to „on".
By setting this option to „off", the following two steps are skipped and the „clear data" screen appears.



By setting the option „permanent" to „on", the printer will continuously print the current data. In order to do so the printer must be switched on and ready.
The metal occurrences are sent to a temporary store. There is a maximum off 50 detections which can be stored and printed.
The store is „Fi to" organized.



You can choose between 4 different record prints with different information contents.

All records have the same record header consisting of heading, device number, record name, date and time when the record was last requested, date and time of device ON and device OFF, as well as the amount of metal signals. Metal signals differ in individual records as follows.

Record-No. 1:

This record contains time, date material and intensity. For the material, the determined phase is printed out. The height of the bar's deflection at the display represents the signal strength.

record print

Metal detector no.	: 1	
Product name	: Sugar	
Report request	: 06.08.97	10:47:23
Last report request	: 06.08.97	10:47:04
Metal detector off	: 06.08.97	10:43:11
Metal detector on	: 06.08.97	10:43:33
Metal detections	: 18	

metal signals

Date	Time	Material	Intensity
06.08.97	10 : 42 : 39	022	090
06.08.97	10 : 44 : 24	010	662
06.08.97	10 : 44 : 31	002	216
06.08.97	10 : 44 : 50	122	1134
06.08.97	10 : 45 : 00	145	684
06.08.97	10 : 45 : 01	135	1443
06.08.97	10 : 45 : 04	135	1443
06.08.97	10 : 46 : 02	135	1443
06.08.97	10 : 46 : 17	005	197
06.08.97	10 : 46 : 17	001	037
06.08.97	10 : 46 : 18	005	217
06.08.97	10 : 46 : 34	005	173
06.08.97	10 : 46 : 35	002	045
06.08.97	10 : 46 : 36	005	222
06.08.97	10 : 46 : 40	005	203
06.08.97	10 : 46 : 42	184	167
06.08.97	10 : 46 : 45	180	046
06.08.97	10 : 46 : 48	184	253

Record-no. 2:

This record contains time, date material and intensity.

record print

Metal detector no.	: 1	
Product name	: Sugar	
Report request	: 06.08.97	10:50:23
Last report request	: 06.08.97	10:47:23
Metal detector off	: 06.08.97	10:43:11
Metal detector on	: 06.08.97	10:43:33
Metal detections	: 18	

Metal signals

Date	**Time**	**Intensity**
06.08.97	10 : 42 : 39	090
06.08.97	10 : 44 : 24	662
06.08.97	10 : 44 : 31	216
06.08.97	10 : 44 : 50	1134
06.08.97	10 : 45 : 00	684
06.08.97	10 : 45 : 01	1443
06.08.97	10 : 45 : 04	1443
06.08.97	10 : 46 : 02	1443
06.08.97	10 : 46 : 17	197
06.08.97	10 : 46 : 17	037
06.08.97	10 : 46 : 18	217
06.08.97	10 : 46 : 34	173
06.08.97	10 : 46 : 35	045
06.08.97	10 : 46 : 36	222
06.08.97	10 : 46 : 40	203
06.08.97	10 : 46 : 42	167
06.08.97	10 : 46 : 45	046
06.08.97	10 : 46 : 48	253

Record-no. 3:

This record contains time, date material and intensity. For the material, the determined type of material is printed out which has been entered into the mask „material parameter“ (see explanation in mask „type of material“). If a name has not been entered for the type of material only the phase is printed. The height of the bar’s deflection represents the intensity.

record print

Metal detector no.	: 1	
Product name	: Sugar	
Report request	: 06.08.97	10:51:12
Last report request	: 06.08.97	10:50:23
Metal detector off	: 06.08.97	10:43:11
Metal detector on	: 06.08.97	10:43:33
Metal detections	: 18	

Metal signals

Date	Time	Material	Intensity
06.08.97	10 : 42 : 39	022	090
06.08.97	10 : 44 : 24	010	662
06.08.97	10 : 44 : 31	002	216
06.08.97	10 : 44 : 50	122	1134
06.08.97	10 : 45 : 00	145	684
06.08.97	10 : 45 : 01	135	1443
06.08.97	10 : 45 : 04	135	1443
06.08.97	10 : 46 : 02	135	1443
06.08.97	10 : 46 : 17	005	197
06.08.97	10 : 46 : 17	001	037
06.08.97	10 : 46 : 18	005	217
06.08.97	10 : 46 : 34	005	173
06.08.97	10 : 46 : 35	002	045
06.08.97	10 : 46 : 36	005	222
06.08.97	10 : 46 : 40	005	203
06.08.97	10 : 46 : 42	184	167
06.08.97	10 : 46 : 45	180	046
06.08.97	10 : 46 : 48	184	253

Record-no. 4:

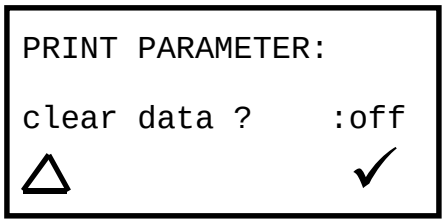
This record contains time, date, material and intensity. For the material, the phase and the determined type of material is printed out which has been entered into the mask „material parameter“ (see explanation in mask „type of material“). If a name has not been entered for the type of material only the phase is printed. The height of the bar’s deflection represents the intensity.

record print

Metal detector no.	: 1	
Product name	: Sugar	
Report request	: 06.08.97	10:52:07
Last report request	: 06.08.97	10:51:12
Metal detector off	: 06.08.97	10:43:11
Metal detector on	: 06.08.97	10:43:33
Metal detections	: 18	

Metal signals

Date	**Time**		**Material**	**Intensity**
06.08.97	10 : 42 : 39	022	022	090
06.08.97	10 : 44 : 24	010	010	662
06.08.97	10 : 44 : 31	002	002	216
06.08.97	10 : 44 : 50	122	122	1134
06.08.97	10 : 45 : 00	145	145	684
06.08.97	10 : 45 : 01	135	135	1443
06.08.97	10 : 45 : 04	135	135	1443
06.08.97	10 : 46 : 02	135	135	1443
06.08.97	10 : 46 : 17	005	005	197
06.08.97	10 : 46 : 17	001	001	037
06.08.97	10 : 46 : 18	005	005	217
06.08.97	10 : 46 : 34	005	005	173
06.08.97	10 : 46 : 35	002	002	045
06.08.97	10 : 46 : 36	005	005	222
06.08.97	10 : 46 : 40	005	005	203
06.08.97	10 : 46 : 42	184	184	167
06.08.97	10 : 46 : 45	180	180	046
06.08.97	10 : 46 : 48	184	184	253



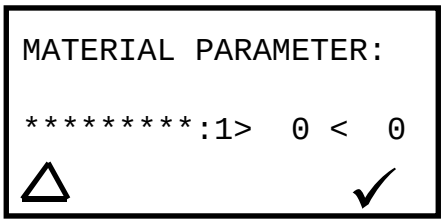
The last 50 detections are stored or they are already printed automatically.
If they are not going to be printed set this display to „delete data ? : on“.

With the „arrow down“ and „arrow up“ keys you can change the respective display values.

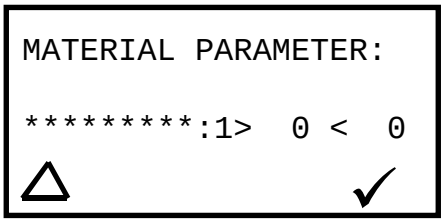
With the „OK-key“ you confirm the respective value and jump back to selection menu of level 3.

- Material parameter

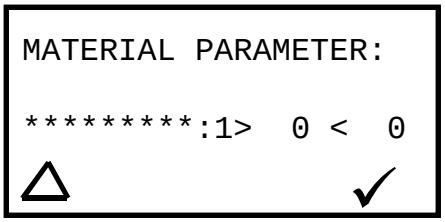
This function enables you to distinguish different types of metal impurities. The results of the metal impurities can be printed out and then evaluated.



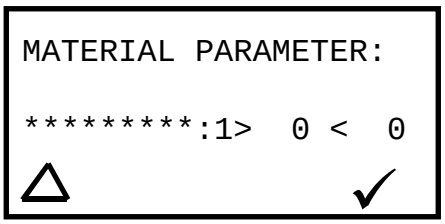
The first digit represents the metal number. Starting with the number one, there is one digit available, therefore nine different types of metals can be named and stored.



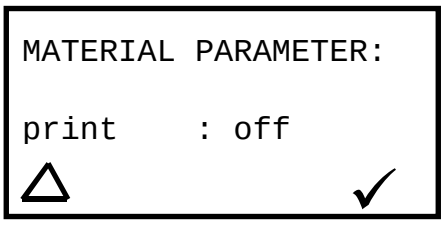
On the left hand side nine digits are available to name the different types of metal. With both arrow keys you can select the different letters and with the "OK-button" you can each letter is confirmed and stored.



The digit in the middle represents the first metal specific value. Please ask your next service office for your metal specific values.



The right digit represents the second metal specific value. Please ask your next service office for your metal specific values.



It is possible to print the results of metal parameter. Therefore set the "printer - on" with the arrow keys. You confirm it with the "OK-button" and go back to operating level 3 (please keep in mind that for any printout the printer parameter has to be set "print : on" in operating level 3).

material parameter

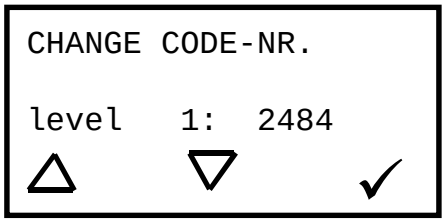
device no. :1
date :22.08.97
time :08:10:27

material	(>=)	-	(<=)
IRON	87		95
COPPER	58		63

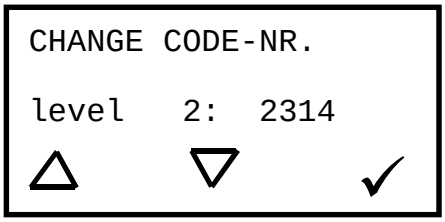
With the „arrow up“ key you search for the required sign.

With the „OK-key“ you confirm the sign set and jump to the next place. Confirming the last place ends the input process. Jumping back to the previous place is not possible.

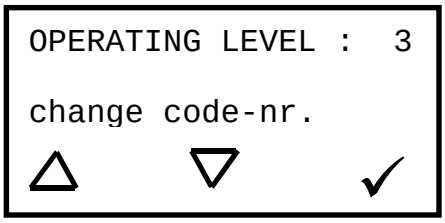
- Change code-no.:



After entering the function "Change code-no." you can see the current code number. It is possible to confirm the code digit by digit with the "OK-button". You can change it digit by digit with both arrow buttons.



After learning the first code no. you enter the second code number.



After confirming the last digit of "level 3" you leave the function "change code-no.".

Use the “arrow down” and “arrow up” keys to increase and decrease the current digits.

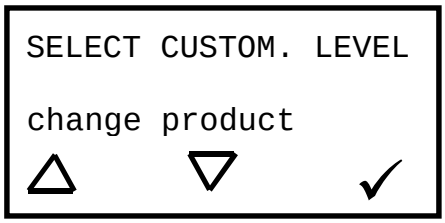
With the “OK-button” you confirm the current digit and go to the next one.

ATTENTION:
If you have lost the first or second code-no., you can still enter the third operation level with the third code-no. and check or change the codes. If you have lost the third code-no., please call your nearest service team for help.

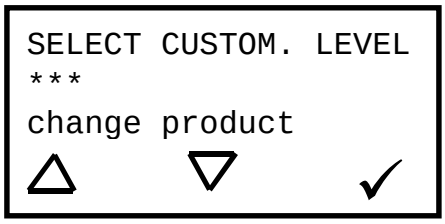
- Custom level select:

In order to tailor the application to customer's particular requirements, the user can put those functions which are used most into "Operating level 0". Please consider that "Operating level 0" can be entered without any pass-codes, therefore anybody has access to change the functions in "level 0".

This function "Custom. level select" enables you to mark every single function, beginning with the first function in "operating level 1" and ending with the last function in "operating level 2". Every marked function will appear in operating level 0.



The function "Product changing" is the first function in "operating level 1". It can be selected now with the "OK-button" or you can go to the next function with the "arrow down" and "arrow up" buttons.



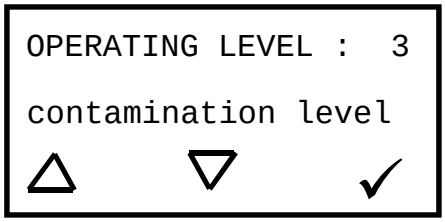
The three stars (***) signal that the current function is selected and therefore set into operating level 0.

With the „arrow down" and „arrow up" keys you go through all available functions.

With the „OK-button" you select (or clear) the selection and put the selected function into „operating level 0".

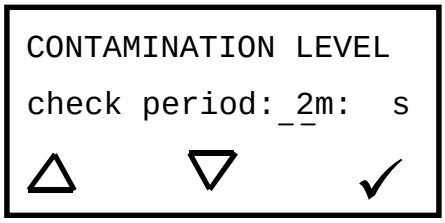
Leave customer level by selecting „end".

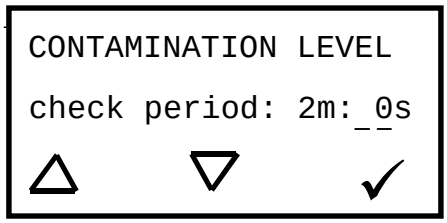
- Degree of contamination (Option)



Settings for controlling the degree of contamination of the product flow.
The degree of contamination is defined as the **number of metal parts** per **time interval**.

The function „Contamination degree“ is an option which is **only** accessible if it has been release.



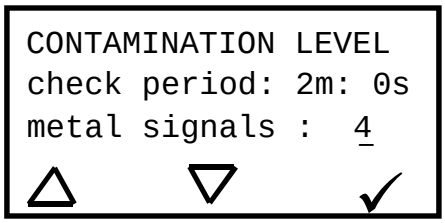


Adjustment of the control time:

The adjustment in minutes and seconds is executed separately.

min. control time : 10 sec.
max. control time : 29 min 59 sec.
resolution : 1 sec.

(original manufacturer’ setting: 2 min.)



Adjustment of metal signals:

Adjustment of the number of metal signals within the previously set control time.

min. amount of metal signals : 1
max. amount of metal signals : 50

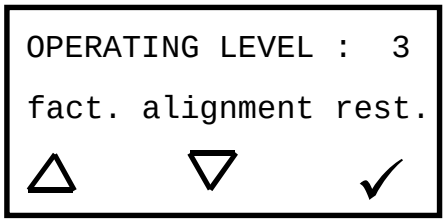
(original manufacturer’ setting: 4 metal signals)

If the set criteria in a system are reached a warning is sent and the fault relay switched on.

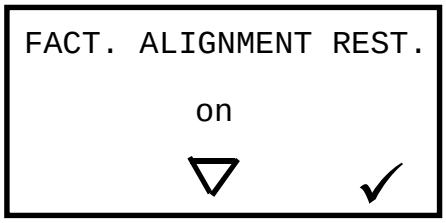
With the „arrow down“ and „arrow up“ keys, you can set the required numerical value.

With the „ok-button“ you confirm the numerical value and jump to the next adjustment range.

- Factory alignment restore



Settings for controlling the level of contamination in the product flow.
The level of contamination is defined by the **number of metal part** per **time unit.**

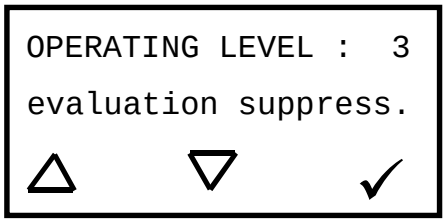


With this, electronics can be reset to the original or operational values.

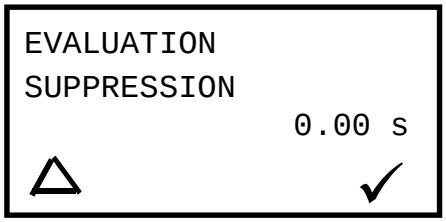
Select „on“ with the „arrow up“ and „arrow down“ keys.

You can confirm your selection with the „Ok-key“.

- Evaluation suppression



Metal detection can be suppressed for a set length of time using the evaluation suppression after the following:



The evaluation suppression is only active when a value larger than 0 is set.

▽

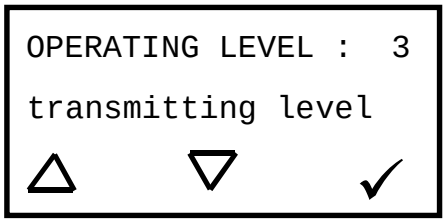
△

Select the „required time of suppression“ with the „arrow up“ and „arrow down“ keys.

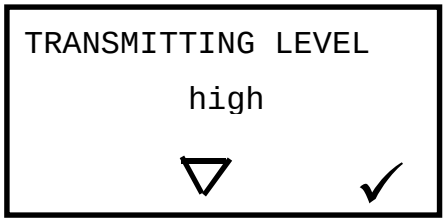
✓

You can confirm your selection with the „OK-key“.

- Transmitting level:



The output voltage of the transmitting output stage can be switched between two different voltages.



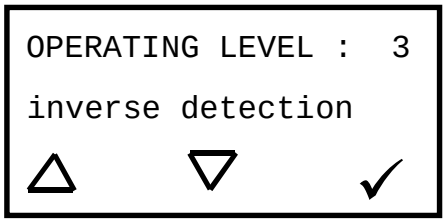
If the sensitivity is reduced to less than 70% due to a strong product effect than it is necessary to set the transmitting level to low.

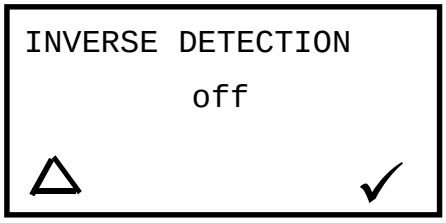
The default setting of the transmitting level is high.

Select the required setting with the „arrow down“ and „arrow up“ buttons.

You can confirm your selection with the „Ok-button“.

- Inverse detection (Option)





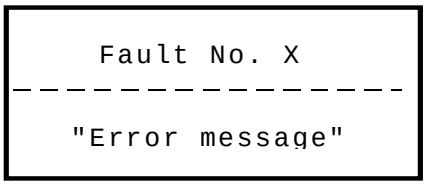
With inverse detection, all products, in which no metal is detected, are separated.
Products in which metal is detected, are not separated.

The „inverse detection“ function is an option and can **only** be used if enabled.

Set inverse detection on or off with the „arrow up“ and „arrow down“ button.

You can confirm your selection with the „Ok-button“.

C) Faults and problems
General troubleshooting of failures

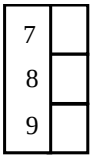


If the monitoring system identifies an improper operating state the scheme, as shown on the left, is displayed.

The electronic system AMD 02 monitors all component groups important for the function. If a measuring parameter leaves the set range the malfunction is displayed. In the following chapter the different error messages and procedures are shown and explained.

The voltage free contact „relay 2“ switches simultaneously with the message on the display (basic adjustment).

Function mode:



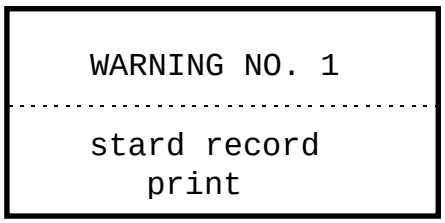
Dead:	contact 7 - 8 closed
Normal state:	contact 8 - 9 closed
Error state:	contact 7 - 8 closed

The unit will remain on error state until the displayed message is confirmed by the „OK-key“. After confirmation the system checks if the fault state was been eliminated. The error message apears again if the fault is not eliminated.

The displayed error message will be confirmed with the „OK-button“.

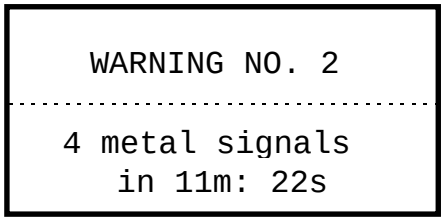
Warnings

- Warning No. 1:



The printer's data storage can print up to a maximum of 50 metal occurrences.
Registering 40, a warning appears, so that further occurrences can be recorded and no data will be lost.

- Warning No. 2:

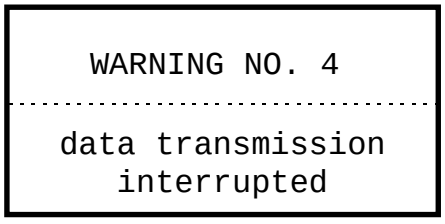


When checking the contamination degree of a product flow, a warning is sent when the set criteria are reached (number of metal occurrences per time interval).

- Warning No. 3:

- for servicing -

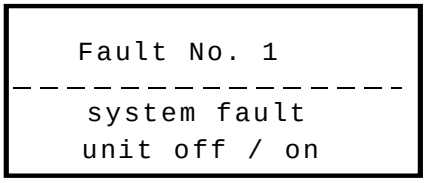
- Warning No. 4:



If the data transmission is interrupted, when the option „pc network“ is activated, the warning as shown in the diagram opposite appears.

Error messages

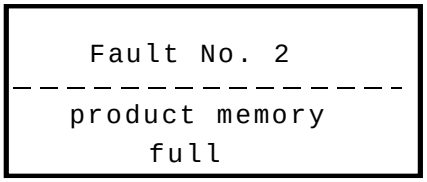
- Fault No. 1:



In addition to the system parameter of the electronic board the action of the CPU is also monitored.

If the fault message No. 1 appears the central processor unit (CPU) has been disturbed by outside influences. Please switch off the detector for a short time. Should this fault message appear frequently - see page D1.

- Fault No. 2:



The electronic system AMD02 intermediately records all metal signals until they are completely processed. With a full message buffer safe monitoring of the product flow is no longer possible.
=> Fault message.

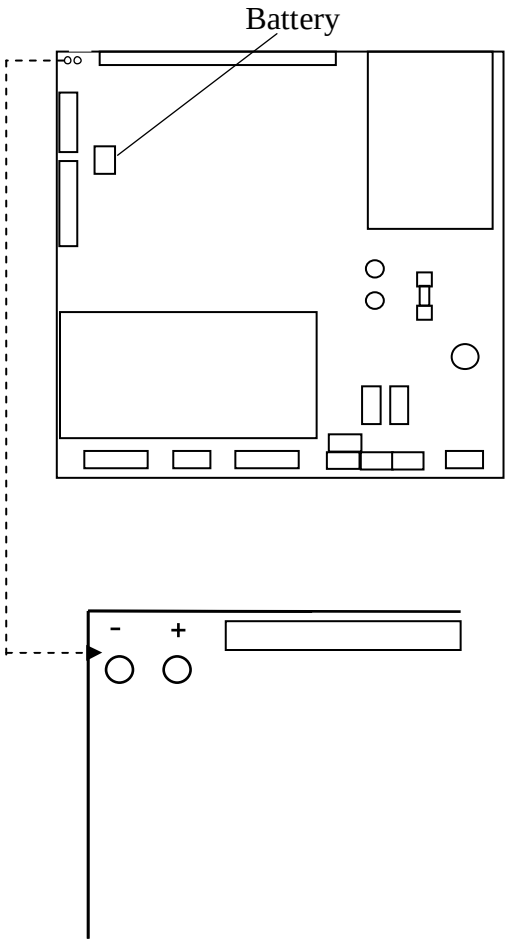
Under normal operating conditions this fault message is only possible in the case of extremely long pulse delays - see page D1.
If there is a fault message during the product- or device adjustment, please acknowledge it. In this case the fault message occurs due to system conditions.

- Fault No. 3:

The adjusted dates are power failure protected. For bypassing the dead state there is a battery on the electronics. The charging state is continuously monitored and if necessary a fault message is displayed.

Fault No. 3
exchange battery on the electronics AMD02

For safety do not exchange the battery before the power supply is disconnected.

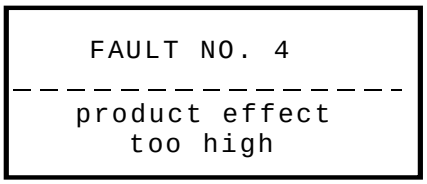


The battery is situated in the upper left area.

Next to the “simm base” are two soldering pads which are installed parallel to the battery connections. With two wires, please solder one of the two provided stand-by batteries to the connection points. Then remove the used battery from the board and insert the second stand-by battery. Finally, remove the wires again.

After pushing the “OK-key” the unit continues working without any loss of data.

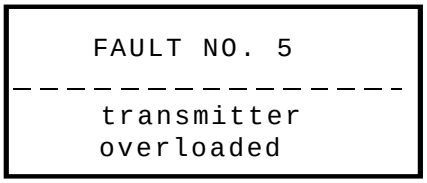
- Fault No. 4:



The electronic system AMD 02 can compensate automatically for the product effect. If the product is too big it appears on display

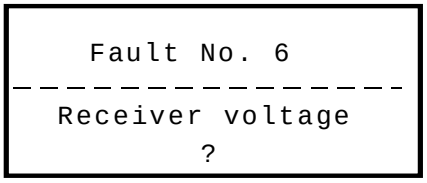
The height of the product effect depends directly on the mass. By reducing the mass, the product effect becomes less If there is still a fault signal or a reduction is impossible - see page D1.

- Fault No. 5:



The evaluation electronics AMD 02 also controls the output voltage. After confirming, the system readjusts itself.

- Fault No. 6:

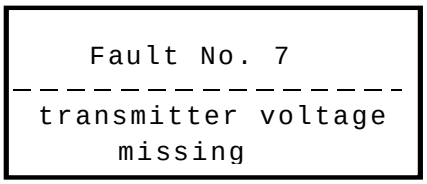


The electronic system AMD 02 controls the receiver voltage which comes back from the detector.

- Please control according to chapter A3 the connection of the transmitter and receiver.
- Please check if there is a big metal part inside the detector opening

If it is not possible to acknowledge - see page D1.

- Fault No. 7:

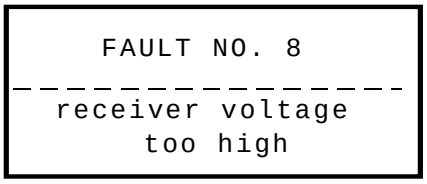


The electronic system AMD 02 monitors the transmitter voltage which comes from the detector head.

Please check the connections on the transmitter according to chapter A3.

If it is not possible to acknowledge - see page D1.

- Fault No. 8:



The evaluation electronics AMD 02 controls the receiver voltage

After confirming, the system readjusts itself

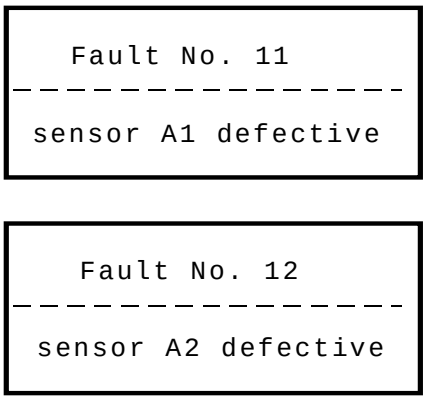
- Fault No. 9:

- not reserved -

- Fault No. 10

- not reserved -

- Fault No. 11/12:

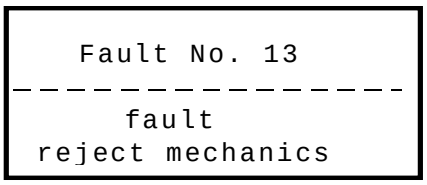


For the distance controlled rejection sensors are used to determine the position. These monitor each other. If one transmitter is out of order, it will be displayed

- Check the function by means of the LED-Display at the transmitter.
- Check the function on the optional circuit board on the board AMD 02.
- Check the function voltage supply of the sensors.

If it is not possible to acknowledge - see page D1.

- Fault No. 13:

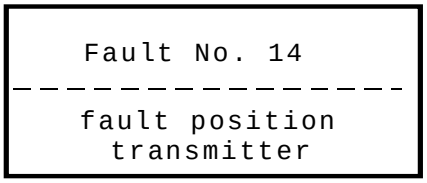


The electronics AMD 02 monitor the reject process on metal detectors with a reject device.

- Check if the sensor is fixed securely on the pneumatic cylinder (standard state LED on / Rejector LED out).
- Check the power supply of the sensor
- Check the function by means of LED on the sensor
- Check the function by means of LED on the optional board.
- Check if the reject duration is adjusted for too short a duration.

If it is not possible to acknowledge - see page D1.

- Fault No. 14:

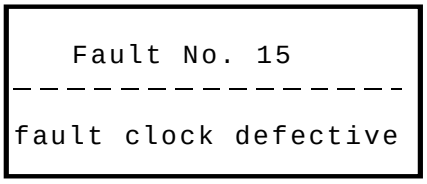


The electronics recognize problems with the exact registration of the metal parts.

Does the position transmitter turn positively with the conveying direction. Check the connecting cable.

If it is not possible to acknowledge - see page D1.

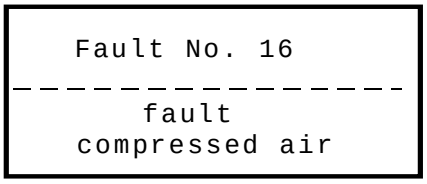
- Fault No. 15:



The time- and date function on the board is wrong/disturbed.

See page D1.

- Fault No. 16:

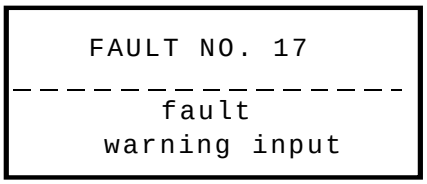


Together with the reject systems the compressed-air is monitored.

- Check the adjusted compressed-air values on the pressure controller.
- Check the connecting cable.
- Check the compressed-air circuit breaker.
  => Fault message must be to acknowledge.

If it is not possible to acknowledge - see page D1.

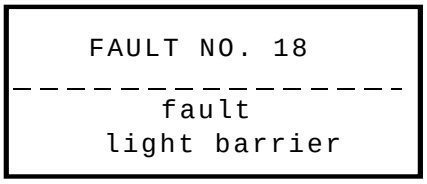
Fault No. 17:



The evaluation electronics AMD 02 also controls connected components (such as for example, transmitter, light barrier with warning output).

After confirming the fault message, you have 15 sec. to deactivate the warning input in the respective functional block.
Otherwise the above message will appear again.

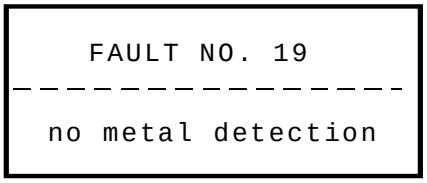
- Fault No. 18:



With an activated light-barrier control, the light barrier has to send a pulse within 3 sec.

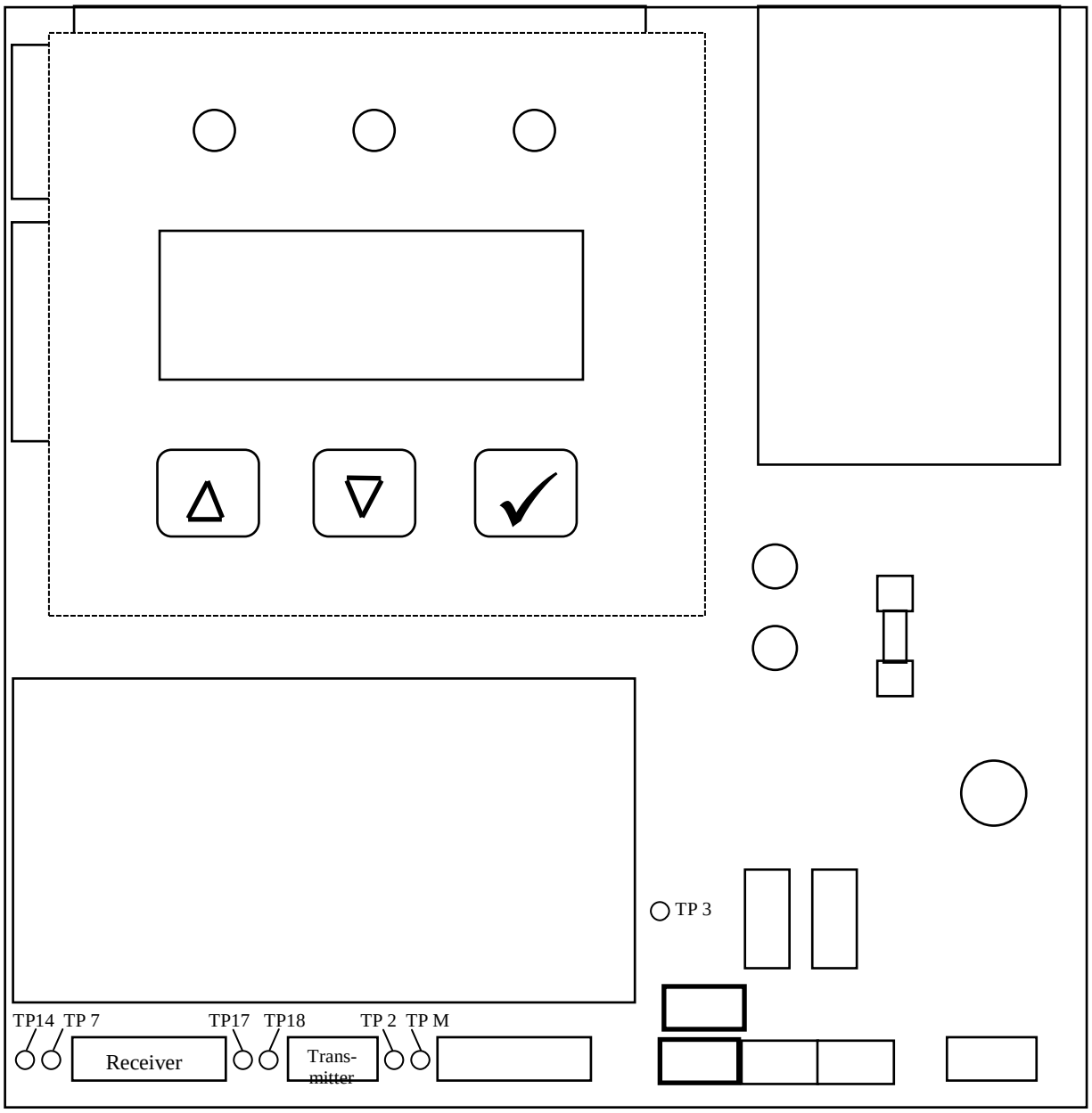
Please check the light-barrier's components for dirtiness, damage and whether the light barrier is connected. If the fault can not be cleared up, see chapter D.

- Fault No. 19:



During testing no metal is detected.

Test points AMD 2.2



Test points

If fault messages No. 6 and No. 7 appear, you can check the most important signals with an oscilloscope.

For checking the electronics, the following test points can be measured.

TPM / TP14	:	Test points to connect the ground clamps to the detector
TP2	:	**Transmitter signal:** Sinus voltage about 25 Vpp. The frequency depends on the application and can be ascertained from the responsible sales department.
TP7	:	**Receiver signal:** Sinus voltage with max. 1,2 Vpp. The ideal voltage is nearly 0 V. To test the receiver circuit move a large metal part inside the detector opening. Then you can see on the oscilloscope the change of the receiver voltage.
TP3	:	**Transmitter load:** The type of signal depends on each application but it can be up to a maximum of 2 Vpp.
TP17 / TP18	:	The test points 17 and 18 are a direct feeder on the receiver The fault message must be acknowledgeable if TP17 and TP18 are by-passed.
TP 17	:	At the test point 17, the receiver voltage applied must have a DC. voltage proportion of 300 mV, as measured at TP 7.

Who, What, How, When, Why

Our qualified staff is available for you at any time and will assist you with eliminating faults and solving problems with the metal-detector.

You can find the department responsible for you on the identification plate. One of them is on the detector head and second one inside the control box. The supplier of the unit also assist you can.

Some dates are indispensable for the further process.

- **Serial number of the device**

  e.g. 050412-CR

This is a six-digit-figure and a two-letter combination. You can find this combination on the identification plate

- **Serial number of the electronic**

  e.g. 060310-11

This is a six-digit-figure and a two-letter combination. You can find this on the transformer or beside the shroud.

- Acknowledgement numbers of the process.

- Fault description and action taken.

Extension option functional block

With functional blocks, trigger inputs of the circuit card OPTO can be optimally occupied.

Block 1 : Pulse delay with light barrier and pusher monitoring

Block 2 : Flap monitoring with one initiator and manual operating mode „rejection mechanism“

Block 3a : Pulse delay with light barrier and pusher monitoring and distance measurement

Block 3b : Curve evaluation with two light barriers

Block 4 : Pulse delay with distance measurement

Block 5 : Remote controlled product selection

Block 6 : Evaluation suppression by external trigger signal

Block 7 : Pulse delay with light barrier, push control, distance measurement and conveyor belt stand still control

Pulse delay / Pulse duration

In functional blocks 3 and 4, pulse delay can be shifted from time to cycle. In blocks 1 and 2, time is set as a standard.
Time:
In the mask „elimination parameter“, the values „metal delay“ and „metal duration“ are timed and indicated in seconds.
Clock pulse:
In the display „elimination parameter“, the values „metal delay“ and „metal duration“ are controlled by clock pulse and indicated in clock pulses. To measure the conveyor speed an external timing generator is required.

Light barrier / Edge

The light barrier in the functional blocks 1 and 3 can be selected.
If „light barrier ON“ has been selected the metal pulse is only triggered with the triggering of the light barrier. This guarantees that the metal pulse is always triggered at the same place and makes exact rejecting possible.
If the light barrier is switched on an additional light barrier monitoring can be activated. This involves that a light barrier edge is detected within 3 sec. after a metal signal. If not fault message 18 will appear.

Rejection control / Mechanics

In the functional blocks 1, 2 and 3 rejection control can be activated.
If the function of a rejection control is to be controlled, „rejection control ON“ has to be selected. When a metal pulse occurs, the function of the rejection unit is checked and, if necessary a fault message written.
Pusher, flap or product can be selected as rejection mechanics. If product has been selected, the rejected product has to be detected by a light barrier within 5 secs.

Pressure monitoring

In the functional blocks 1, 2 and 4 the overpressure switch can be activated.
It is possible to control the compressed air for the rejection mechanics by means of an overpressure switch.

Transmitter control

In addition, a transmitter control can be activated (only useful when transmitter connected) in functional blocks 3 and 4. When in operation, in the case of a metal signal, a transmitter pulse has to be detected within 0,5 sec., otherwise fault message no 14 „fault position transmitter“ appears.

Warning input

In functional blocks 1 and 3 the warning input can be activated.
If warning is signalled, the fault message no. 17 „fault warning input“ appears. After confirming this fault message, the user has 15 sec. to deactivate the warning input, otherwise another fault message appears.

Remote controlled product selection

An external product change between product 1 to 4 can be executed by means of the 4 trigger inputs of the circuit-card OPTO. If functional block 5 is activated in operating level 1 in the function product change, it is possible to choose between remote control and the products from 5 up. If remote control is selected trigger inputs are sensed and if a contract is closed for longer than 0,5 sec., the corresponding product is selected.

Manual operating mode „rejection mechanism“

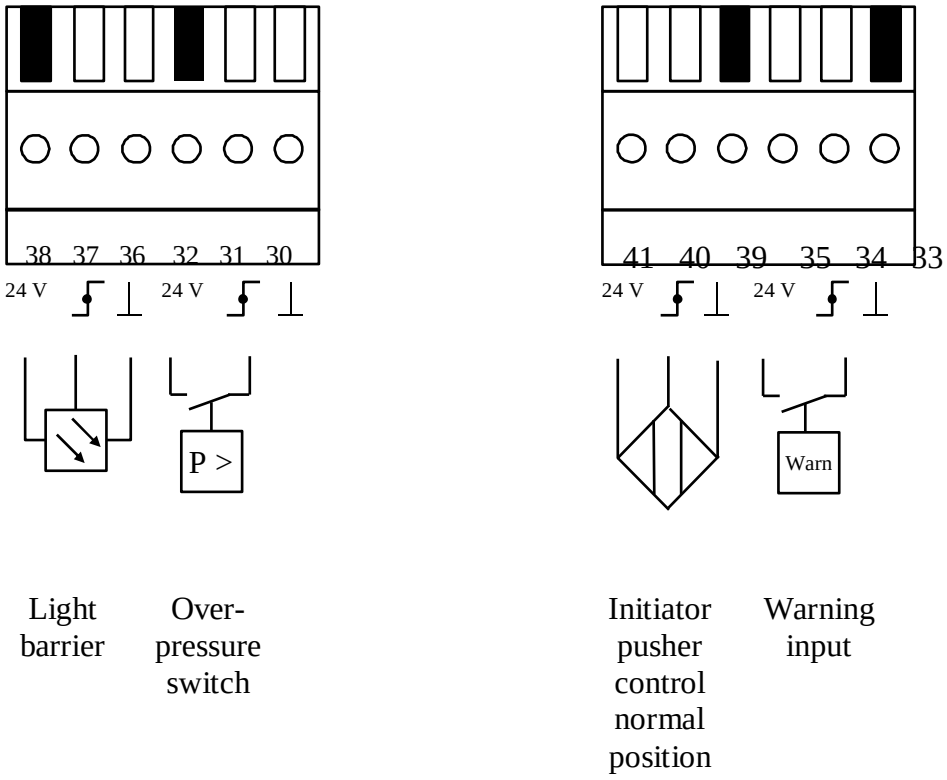
The rejection mechanism is activated by a switch without a metal event being produced. Simultaneously the detector is deactivated for this period of time (no metal parts are detected). When a printer has been connected and protocol 5 has been selected the activation and deactivation of the manual rejection-process is logged.

Terminal assignment of the functional blocks

- Functional block 1

(Attention: Connect only voltage free !**)**

Pulse delay with light barrier and pusher control



Light barrier

Over-pressure switch

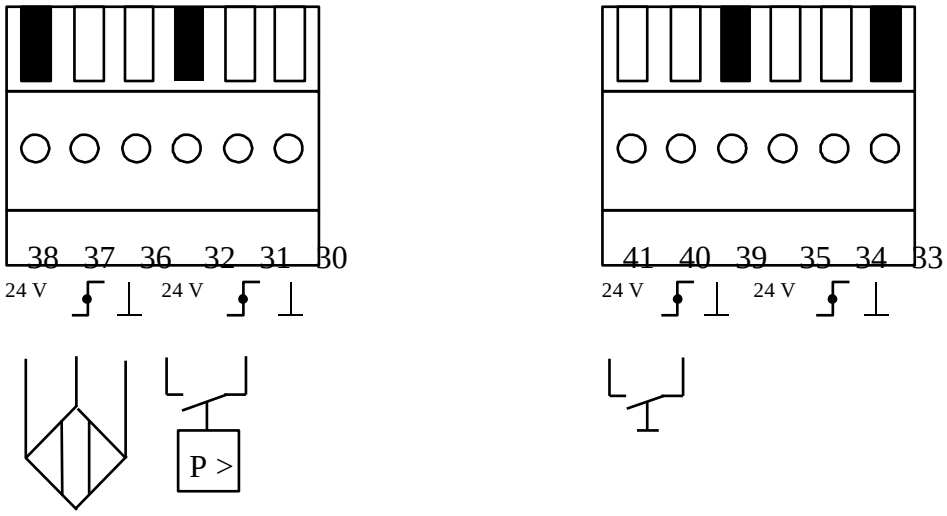
Initiator pusher control normal position

Warning input

- Functional block 2

(Attention: Connect only voltage-free !**)**

Flap control with one initiator and manual operating mode „Rejection mechanism“



Initiator flap control normal position

Over-pressure switch

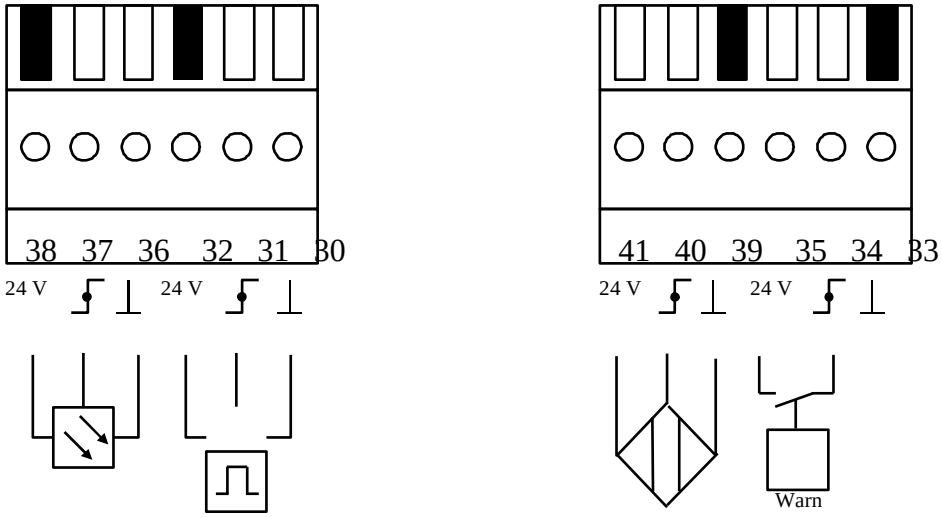
Test sensor

idle

- Functional block 3a

(Attention: Connect only voltage-free !**)**

Pule delay with light barrier, push control and distance measurement



Light barrier

Transmitter

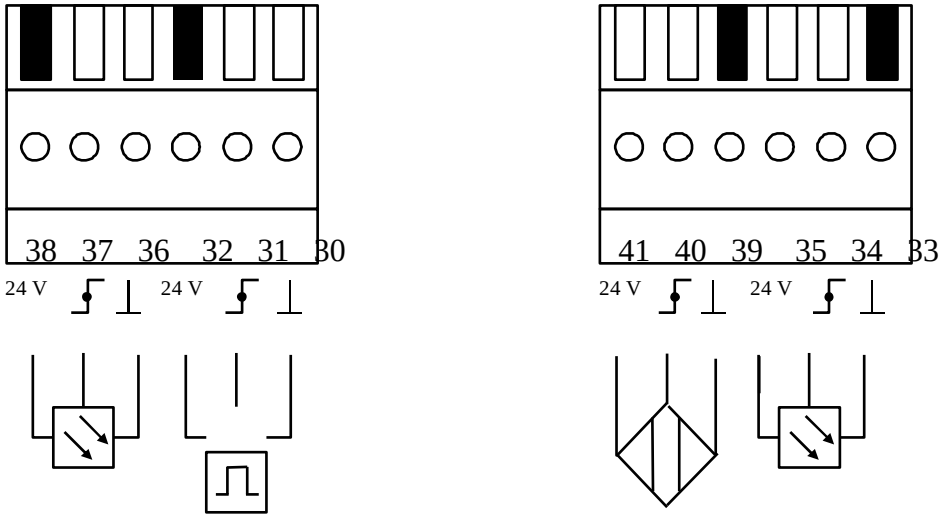
Initiator pusher control normal position

Warning input

- Functional block 3b

(Attention: Connect only voltage-free !**)**

Curve evaluation with two light barriers



Light barrier 1 (after detector)

Transmitter

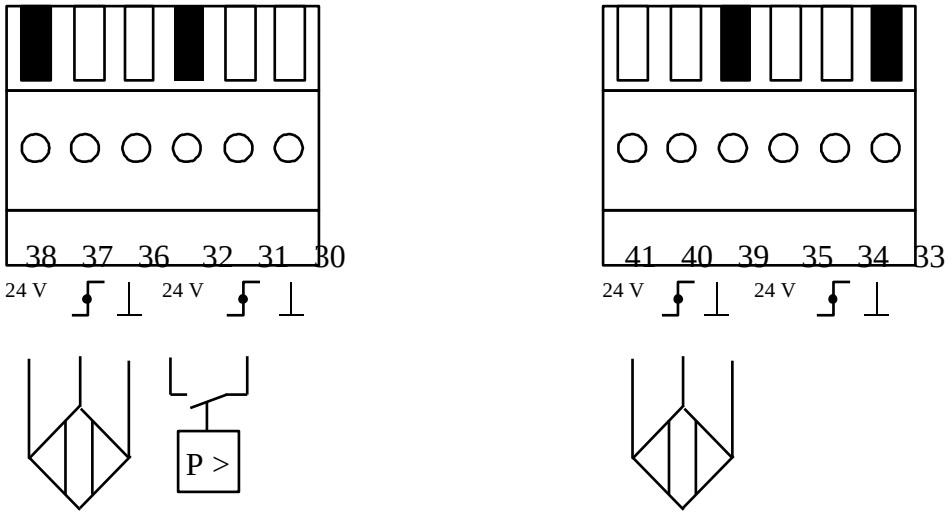
Initiator pusher control normal position

Light barrier 2 (before the detector)

- Functional block 4

(Attention: Connect only voltage-free !**)**

Pulse delay with distance measurement



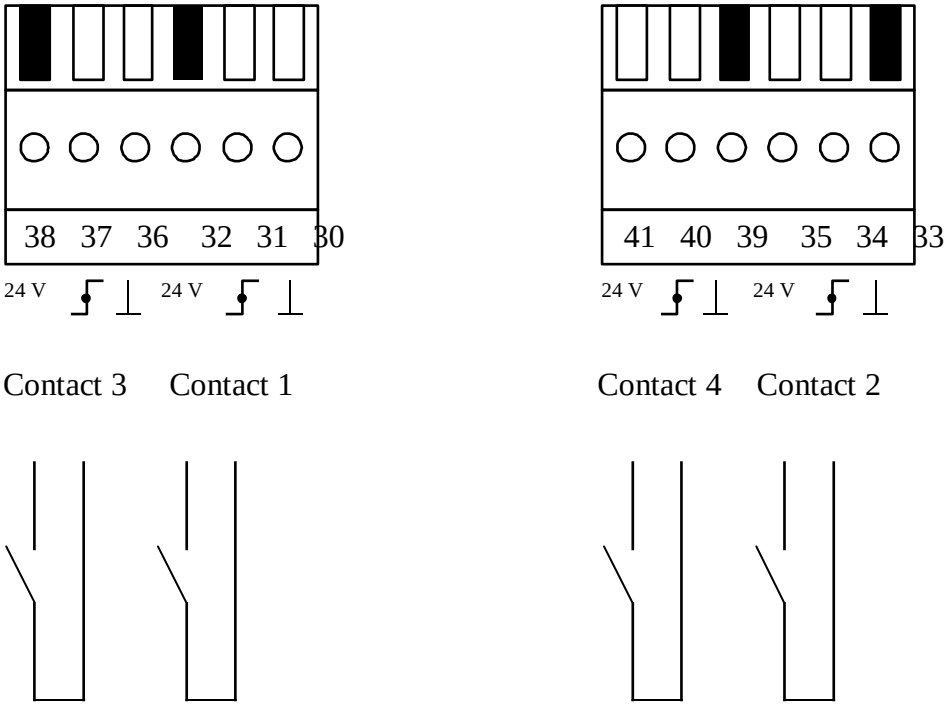
Initiator 2 Over-pressure switch

Initiator 1 idle

- Functional block 5

(Attention: Connect only voltage-free !**)**

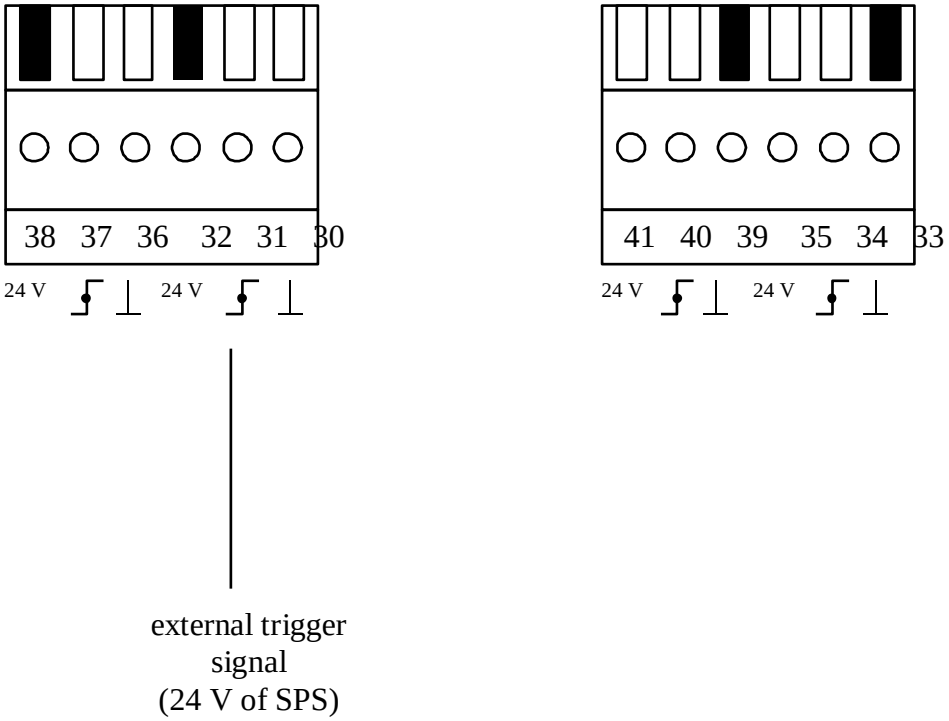
Product change by means of external contacts



- Functional block 6

(Attention: Connect only voltage-free !**)**

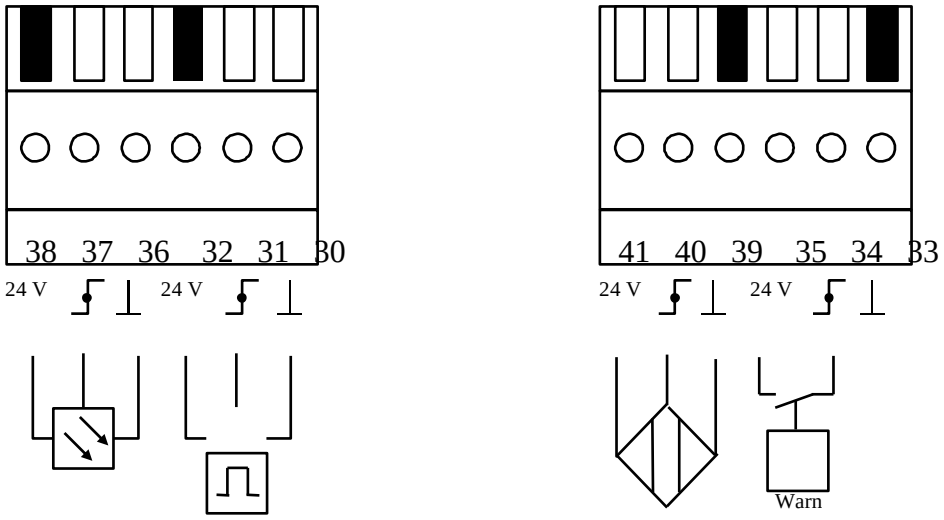
Evaluation suppression by external trigger signal



- Functional block 7

(Attention: Connect only voltage-free !**)**

Pulse delay with light barrier and pusher control and distance measurement and conveyor belt stand still control



Light barrier

Transmitter

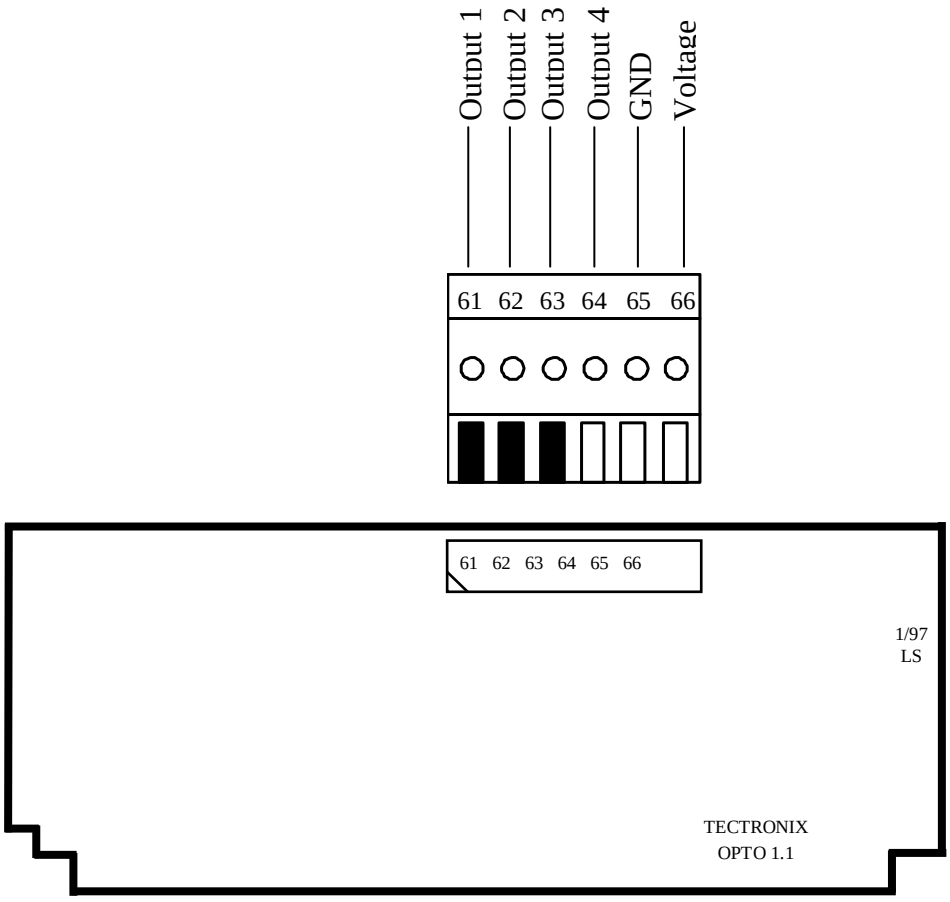
Initiator pusher control normal position

Stand still monitor

Terminal assignment of the option circuit board

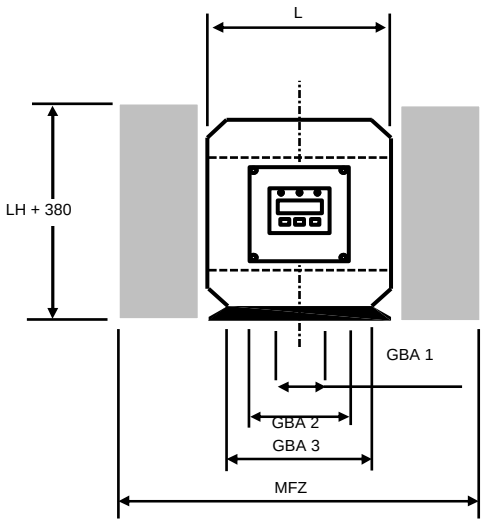
Outputs: 24 V Active output

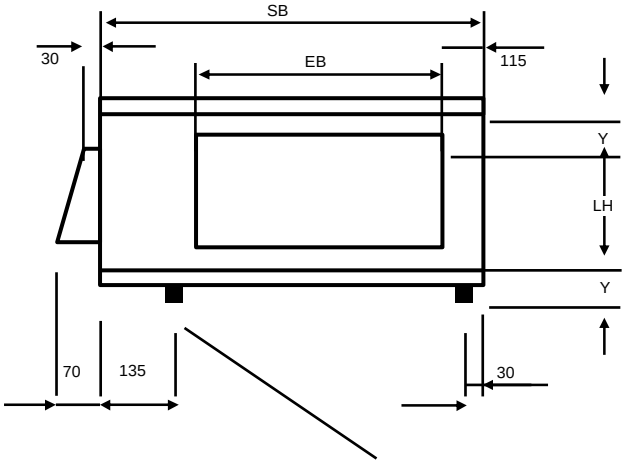
At outputs 1 – 4 and at connections 15, 17 and 18 the total load must not exceed 300 mA.

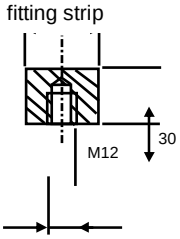


Index Dimensions

- (Metron 02 C)







thread reach max. = 26 mm

Material: PE

MFZ (non moving metal) = L + LH [1)]
MFZ (moving metal) = L + 2,5 x LH [1)]

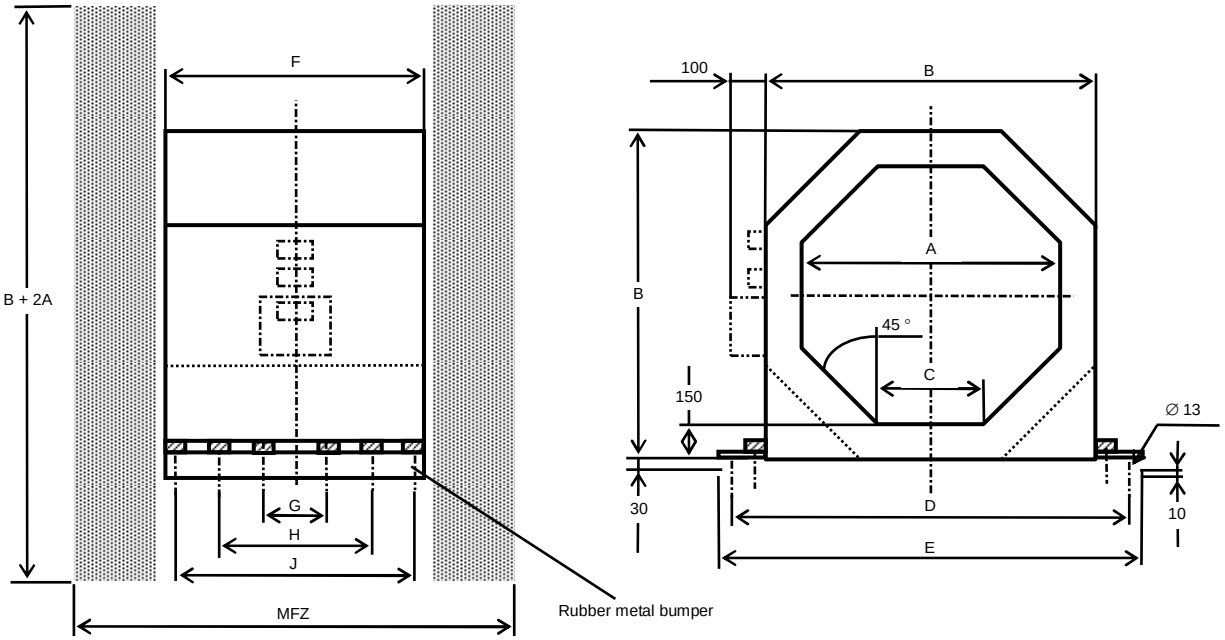
[1)] *The metal detector has to be positioned centrically within the „metal-free-zone". The calculated values can be used for orientation (minimum values can of course be exceeded!) but must be confirmed by us for the respective project.*

SB (DETECTOR WIDTH) = EB + 335
EB (SENSITIVE BREADTH)

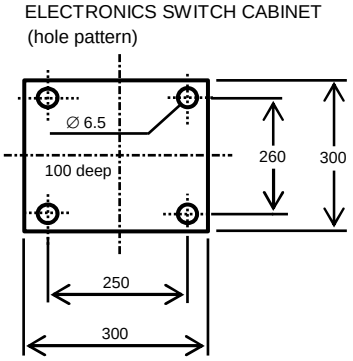
LH APERTURE HEIGHT	L DETECTOR LENGTH	Y TOP / BOTTOM THICKNESS	GBA 1	GBA 2	GBA 3	A NUMBER OF THREADED BORE HOLES FOR EACH DETECTOR
			DISTANCE BETWEEN THREADED BORE HOLES			
to 80	250	150	160			4
to 110	250	130	160			4
to 140	250	115	160			4
to 200	250	115	160			4
to 250	300	115	210			6
to 300	400	115	270			6
to 350	450	115	320			6
to 400	500	115	220	370		10
to 450	550	115	240	420		10
to 500	600	115	280	470		10
to 600	650	115	280	520		10
to 700	700	115	220	410	570	12
to 800	750	115	220	460	620	12
to 900	800	115	220	490	670	12
to 1000	850	115	220	520	720	12
> 1000	900	115	220	540	770	12

Dimensions in mm

- (Metron 02 CO)



The electronics switch cabinet is mounted on the detector coil

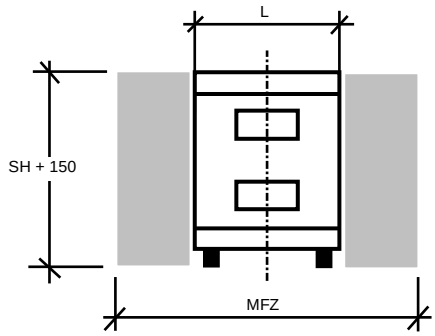


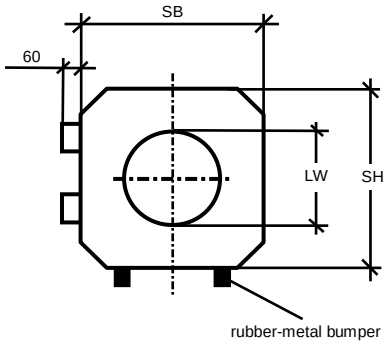
A ^ = Type

A	B	C	D	E	F	G	H	J	MFZ
900	1200	372	1360	1400	800	150	450	750	3600
1000	1300	414	1460	1500	900	170	510	850	3900
1100	1400	455	1560	1600	900	170	510	850	4200
1200	1500	497	1660	1700	900	170	510	850	4500
1300	1600	538	1760	1800	1000	190	570	950	4800
1400	1700	580	1860	1900	1000	190	570	950	5100

Dimensions in mm

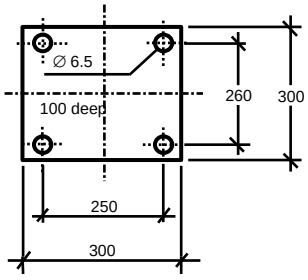
- (Metron 02 CR)





ELECTRONICS SWITCH CABINET

(hole pattern)



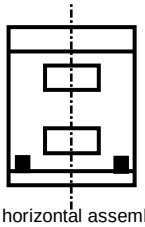
MFZ (non moving metal) = L + LW [1)]
MFZ (moving metal) = L + 2 x LW [1)]

[1)] *The metal detector has to be positioned centrically within the „metal-free-zone". The calculated values can be used for orientation (minimum values can of course be exceeded) but must be confirmed by us for the respective project.*

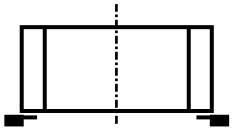
Within extremely restricted assembling conditions, for example an assembly between multiple-head scale and filling and sealing machine, search coils made to specification are available upon request.

LW = Type CLEAR WIDTH	SB = SH DETECTOR HEIGHT = DETECTOR WIDTH	L DETECTOR LENGTH
35	150	125
45	150	125
55	150	125
70	150	125
85	200	150
100	200	150
115	250	150
130	250	150
150	250	200
170	300	200
210	350	250
235	400	300
265	450	300
300	500	350
335	550	400
380	600	450
430	650	500
470	700	500
525	750	600
600	850	700

Dimensions in mm



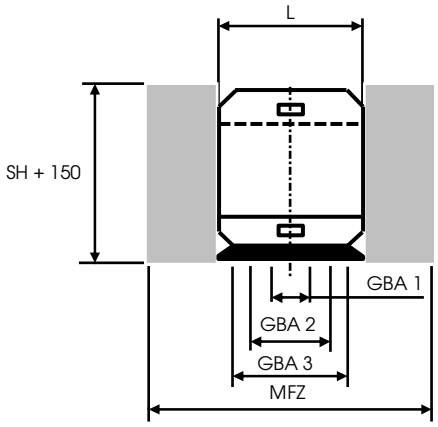
horizontal assembly

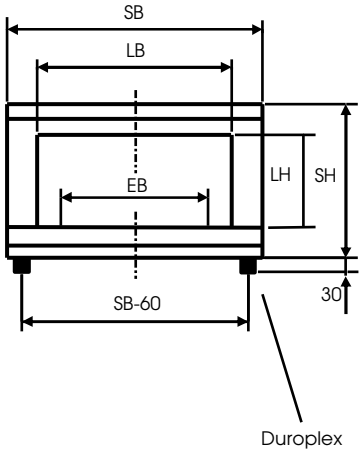


vertical assembly

The mounting of the coil depends on the application and is located according to each project.After checking all details, individual mesurement sheets are available upon request legt.

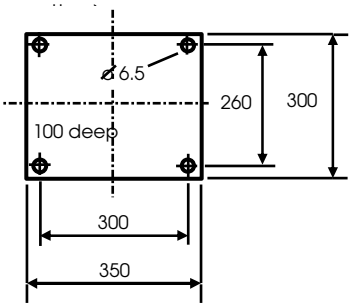
- (Metron 02 D)

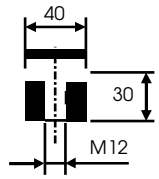




Duroplex

ELECTRONICS SWITCH CABINET
(hole





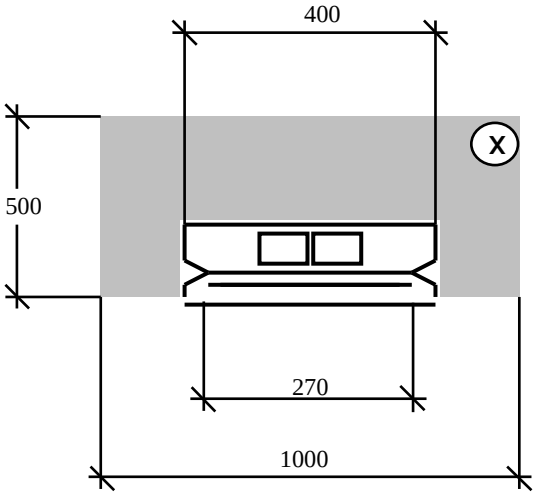
thread reach max. = 26 mm

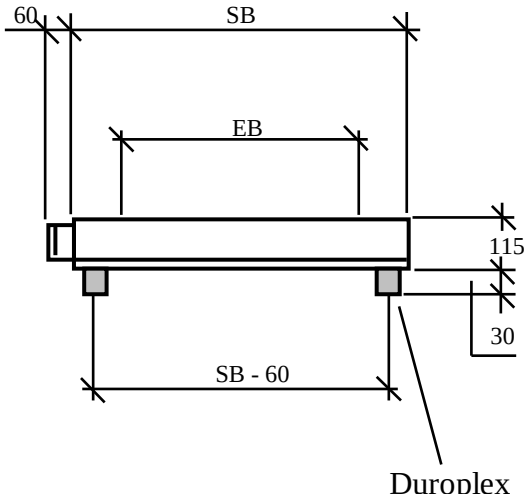
SB (DETECTOR WIDTH) = LB + 200 mm
SH (DETECTOR HEIGHT) = LH + 230 mm
EB (SENSITIVE BREADTH)

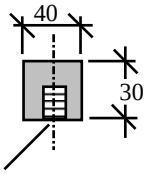
LH Aperture height (mm)	LB Aperture width (mm)	L Detector length (mm)	GBA 1	GBA 2	GBA 3 Distance between threaded bore holes (mm)	A Amount of threaded bore holes per detector (mm)	MFZ Metal free zone non moving metal (mm)
to 200	EB + 220	400	270			6	1000
to 300	EB + 220	500	220	370		10	1100
to 400	EB + 240	600	280	470		10	1300
to 500	EB + 240	700	220	410	570	12	1400
to 600	EB + 240	750	220	460	620	12	1500
to 700	EB + 280	800	220	490	670	12	1600
to 800	EB + 280	850	220	520	720	12	1700
to 900	EB + 280	900	220	540	770	12	1800
to 1000	EB + 280	900	220	540	770	12	1800
> 1000	EB + 300	1000	220	590	870	14	on inquiry

LH < 350mm – Detector and Electronic's
LH > 350mm – Electronic's mounted on detector
(Separately available upon request)

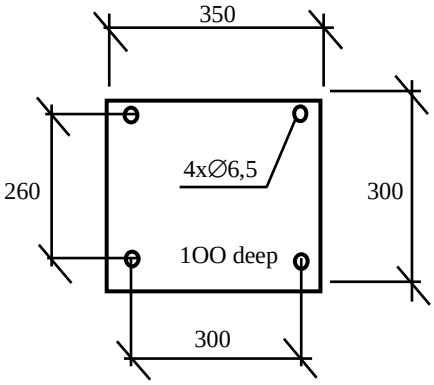
- (Metron 02 S)







X Metal free zone



ELECTRONICS SWITCH CABINET
(hole pattern)

GBA means distance between threaded bore holes (6 on each
Unit of measurement = mm

EB	SB	L	SH
(Sensitive breadth) ab 200 EB > 1000 - Confer with manufacturer	(Detector breadth) = EB + 200	(Detector length) = 400	(Detector height) = 115

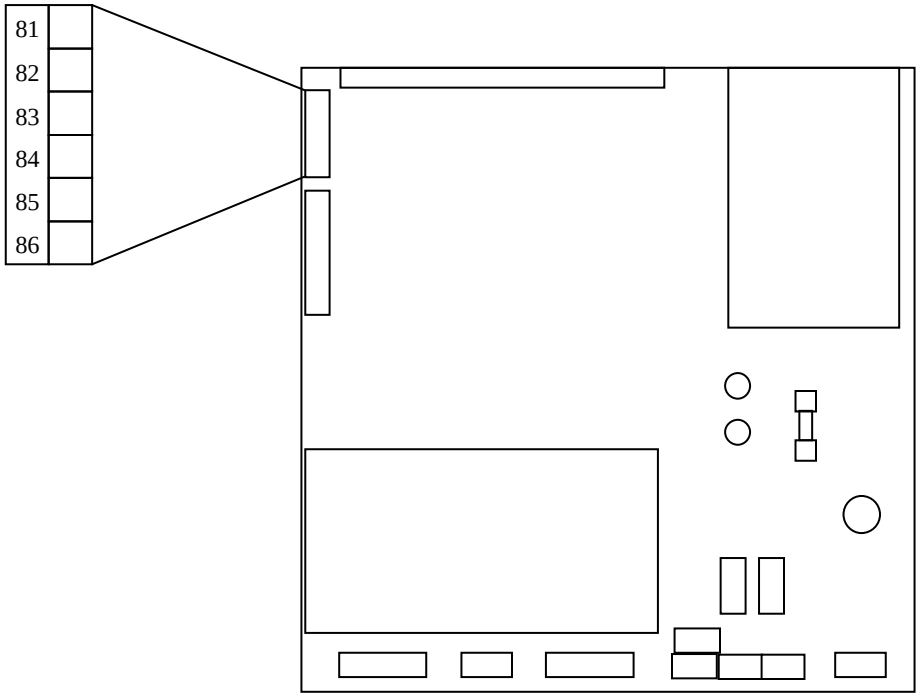
Wiring of the intersecting point

Depending on the customer's request, the intersecting point RS 232, RS 422, RS 485 is activated on the electronic board.

However, there is only one type of intersecting point possible.

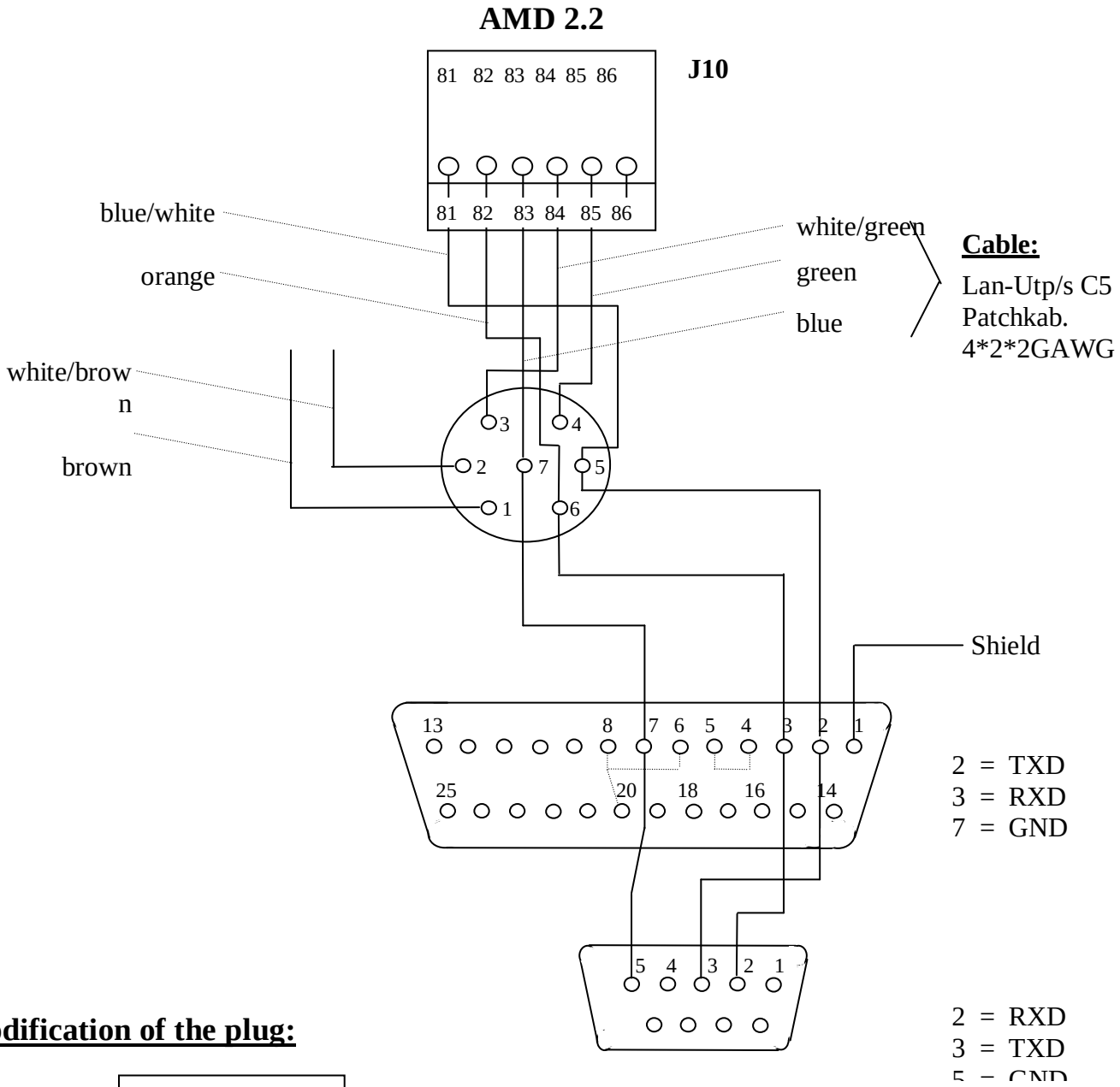
If no intersecting point is given with the order, RS 232 will be activated as standard.

Intersecting point :

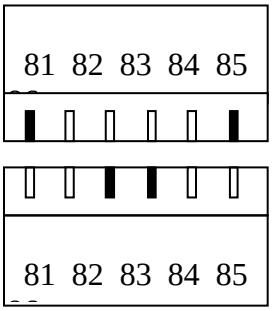


- AMD 02 with COM-Intersecting point RS 232 :

Wiring:

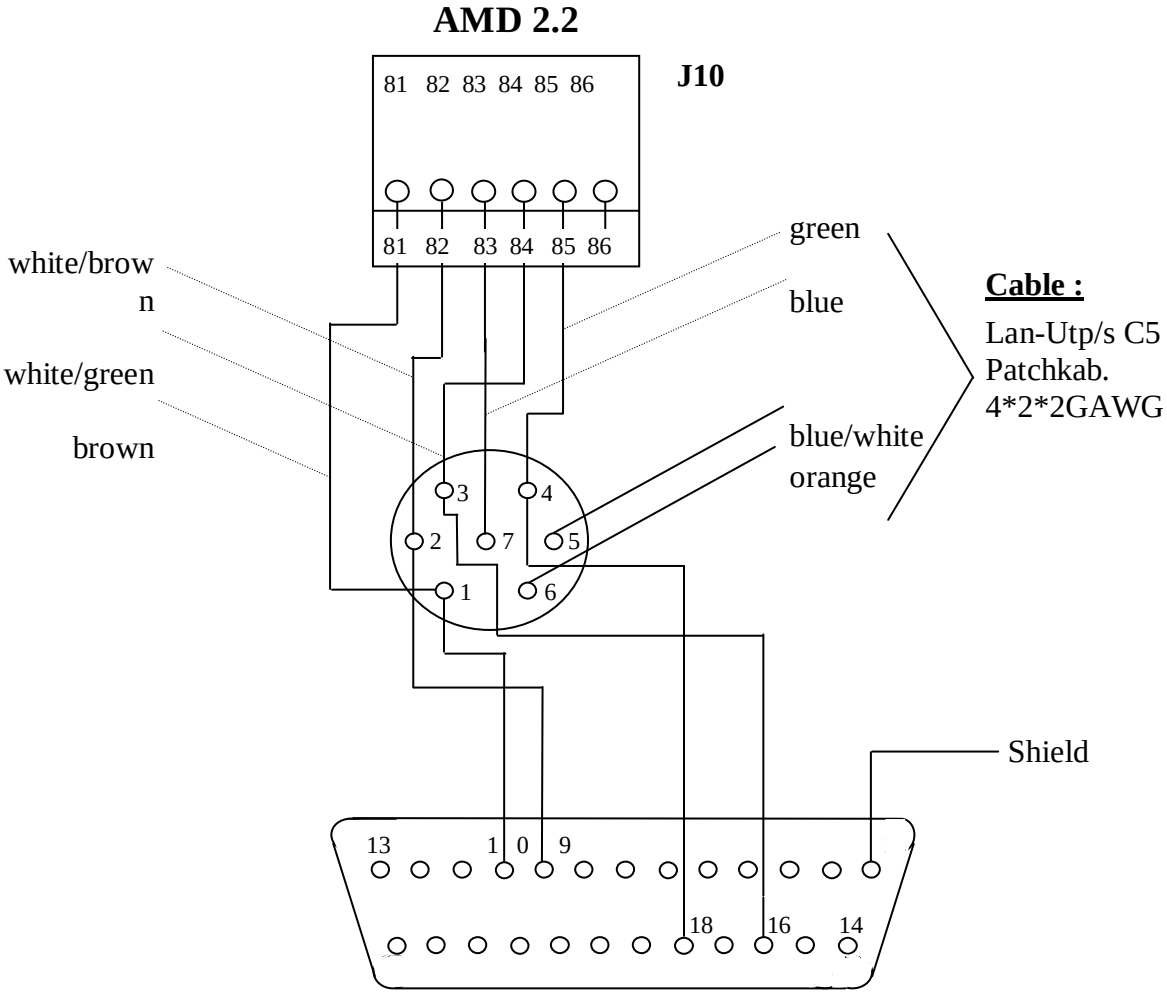


Codification of the plug:

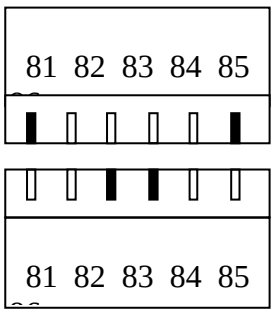


- AMD 02 with COM-Intersecting point RS 422 :

Wiring:

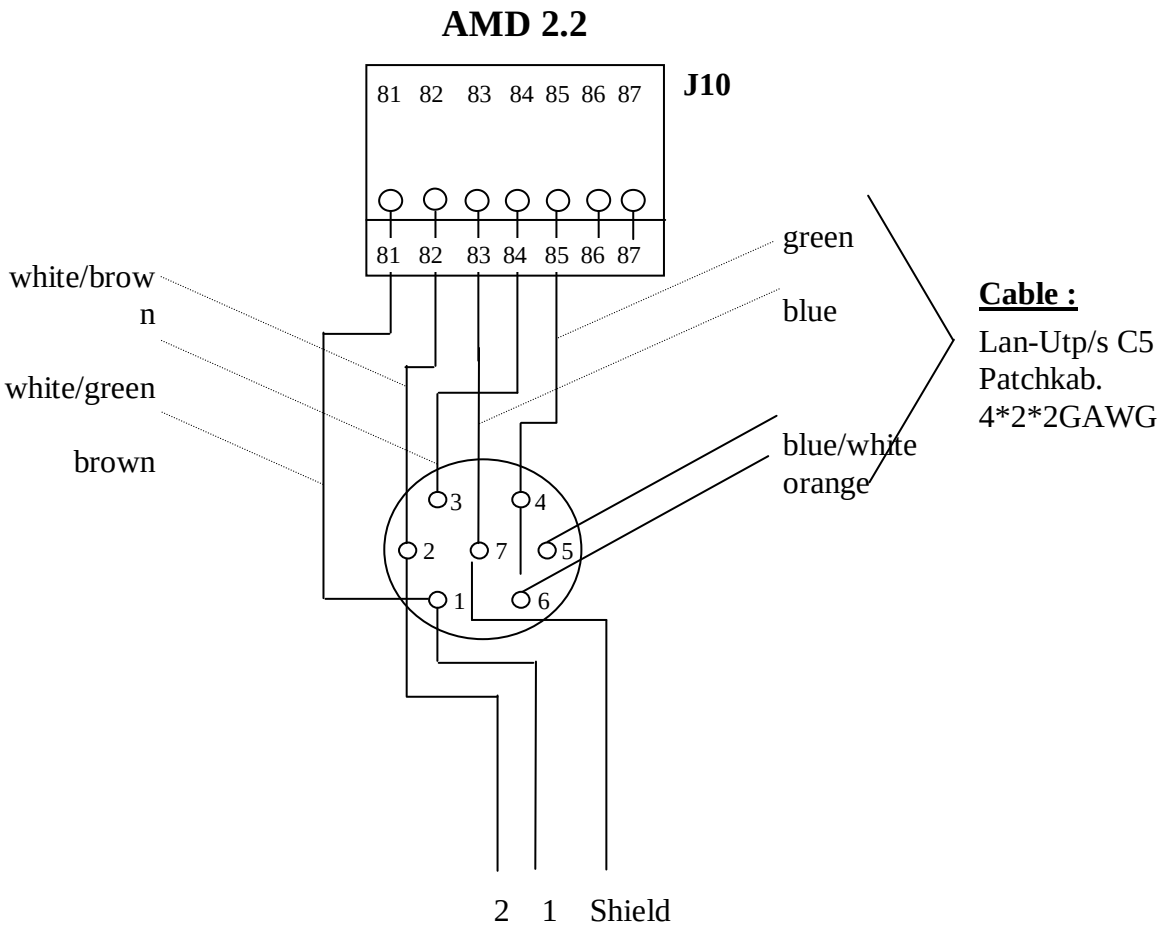


Codification of the plug:

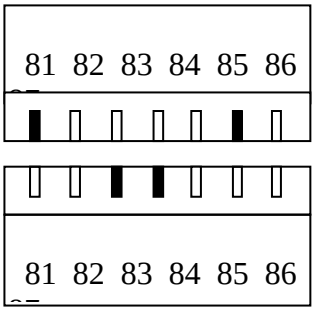


- AMD 02 with COM-Intersecting point RS 485 :

Wiring:



Codification of the plug:



Code numbers

Please keep this code numbers safe and do not pass them on to unauthorized individuals !!!

Operating level 1: 2484

Operating level 2: 2314

Operating level 3: 1072

Operating level 4: 1575

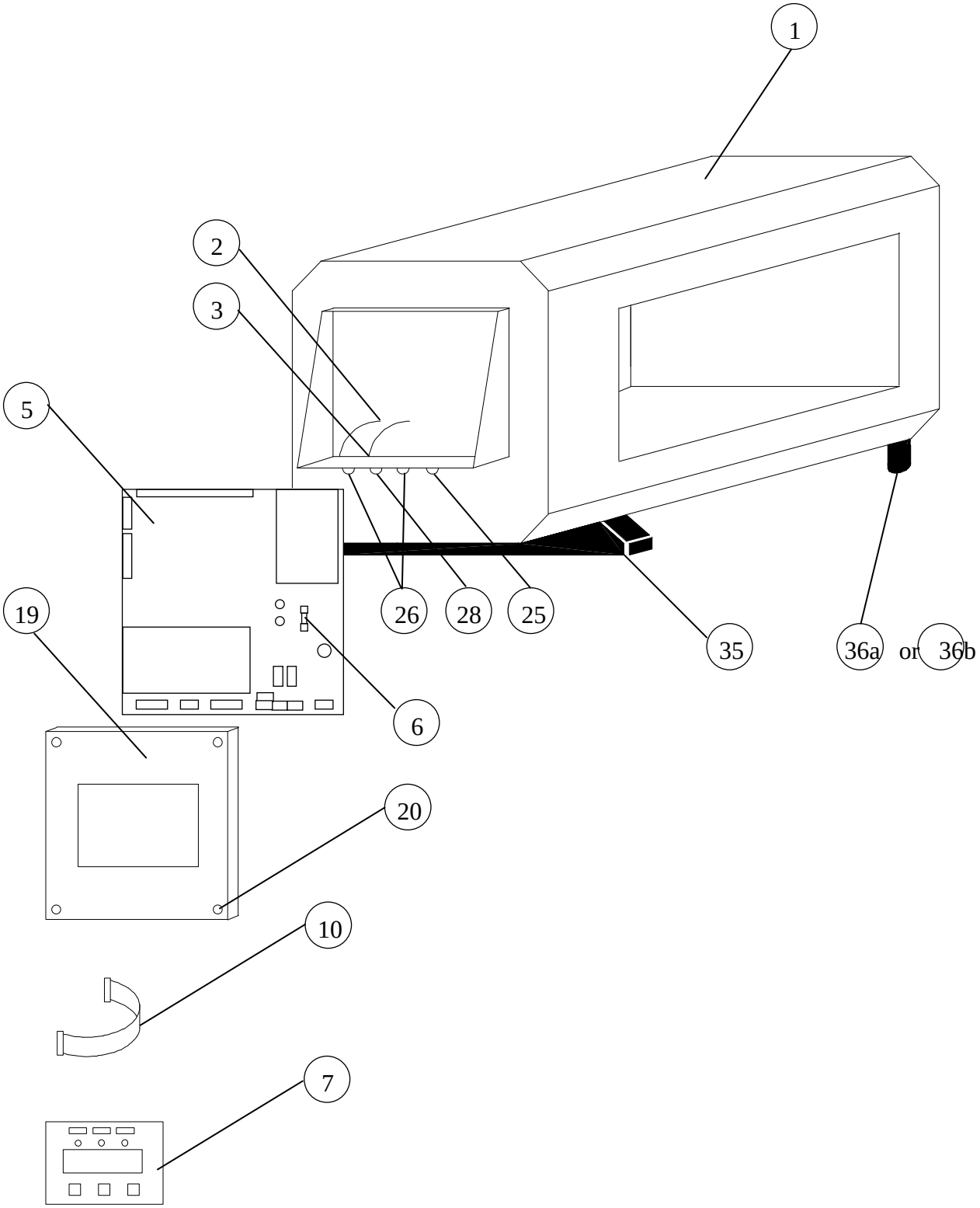
Operating level 4:1575

1. **Display Sig voltage**
2. **Noise measurement**
3. **Code Set**
4. **Clear cycle**
5. **Tracing factor**
6. **Operation mode**
7. **Default phase**
8. **Output Activation**
9. **Characterization items**
10. **Operation block**
11. **Freq select**
12. **Working parameters**
13. **Communication**
14. **Signal parameter**
15. **Peripherals**
16. **Copy product data**
17. **Diagnosis Function**
18. **Fact alignment save**
19. **Memory test**
20. **General reset**

Index of spare part drawings

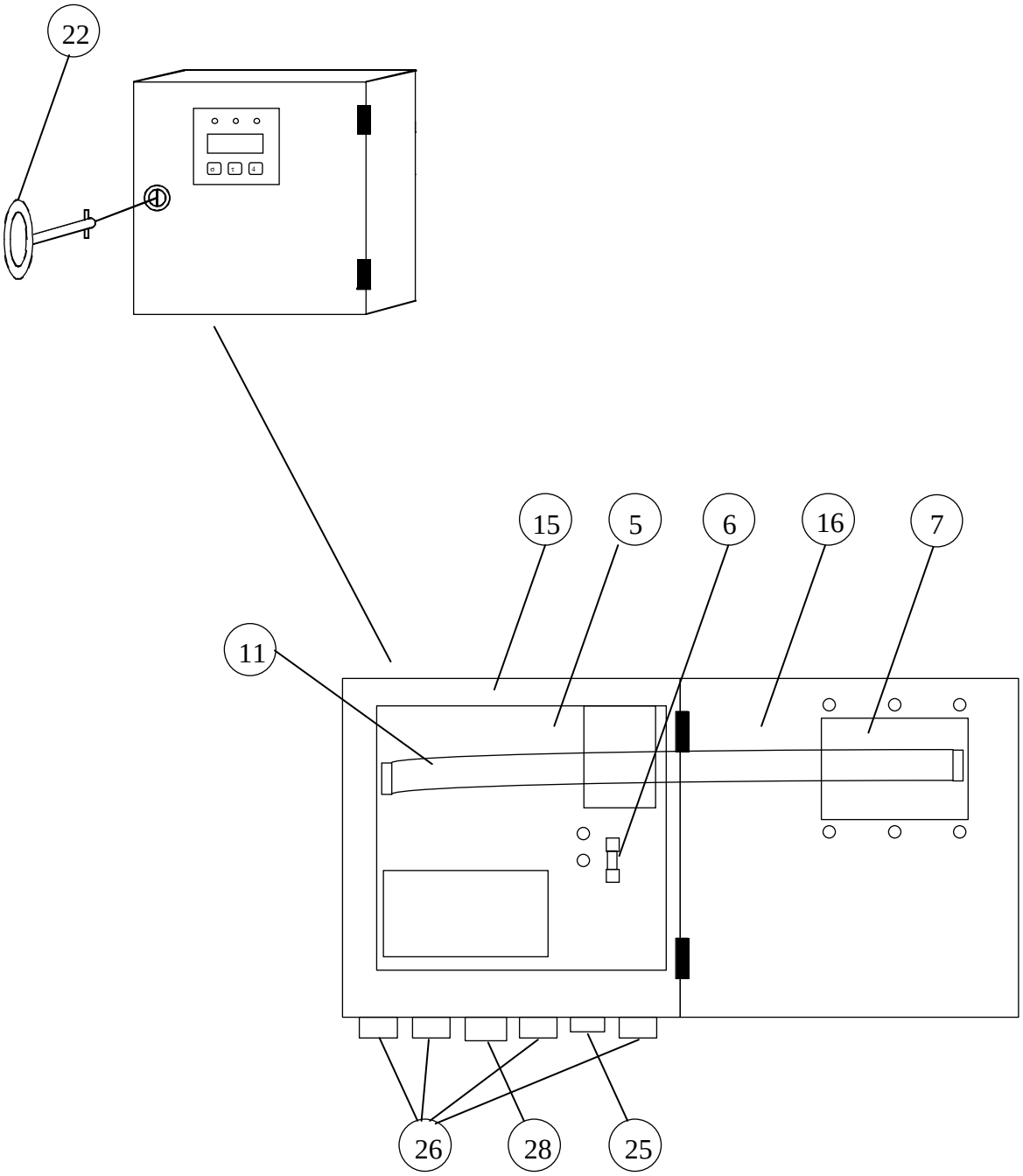
(Control unit integral)

- C-Coil



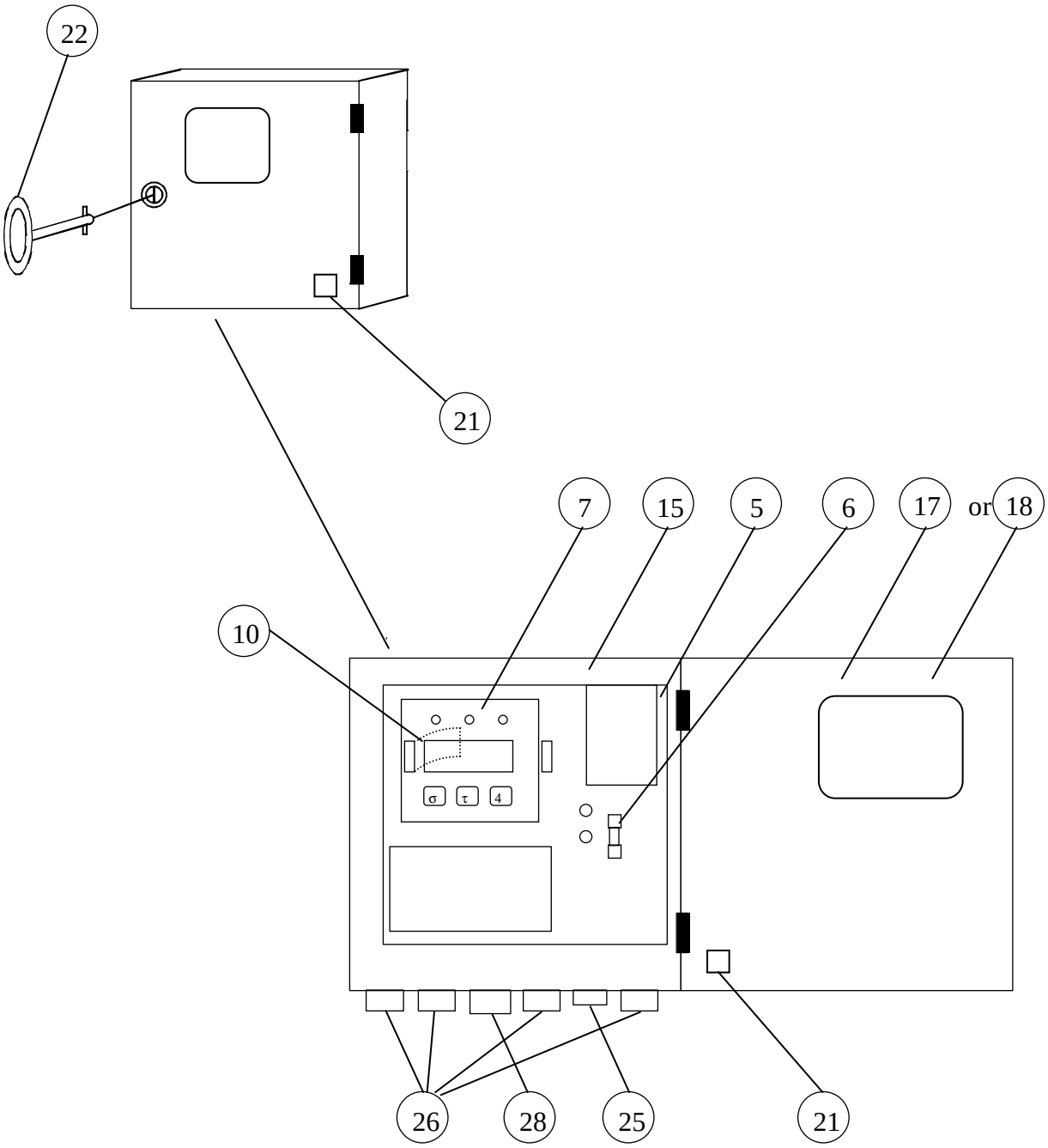
(Control unit remote)

- Display in the lid



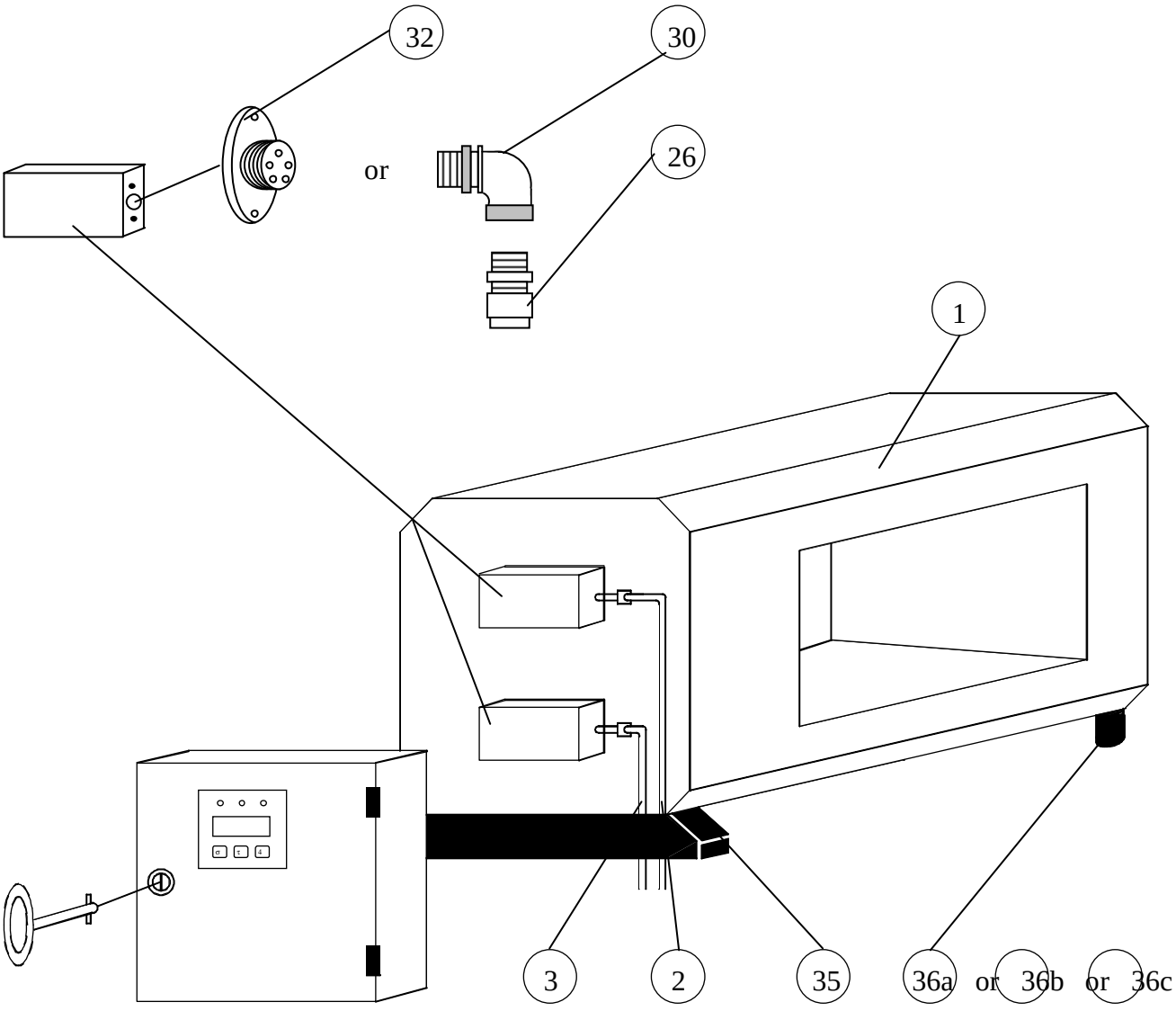
(Control unit remote)

- Display on the electronic board



(Control unit remote)

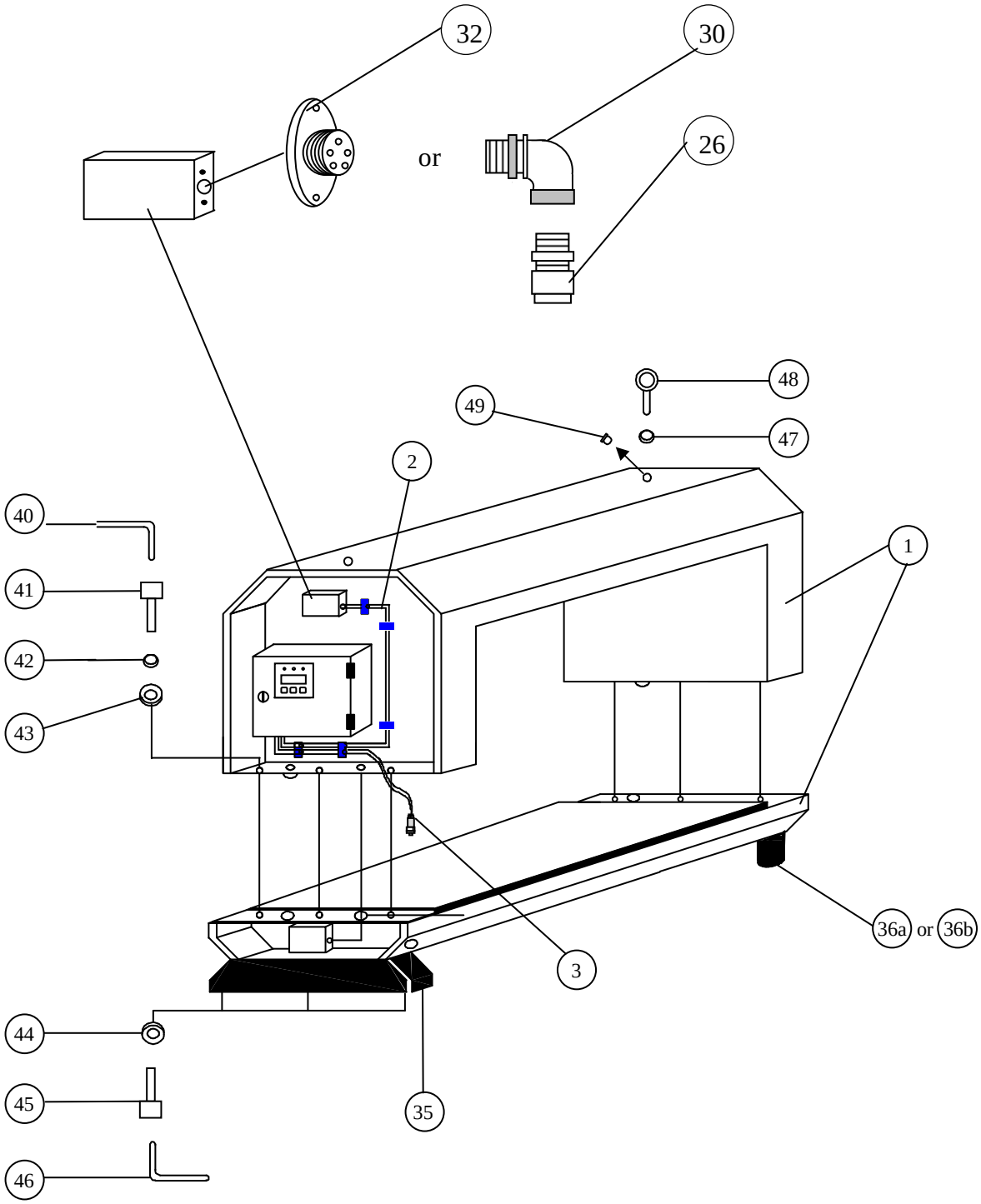
- C-Coil / CR-Coil / CO-Coil



(Control unit remote)

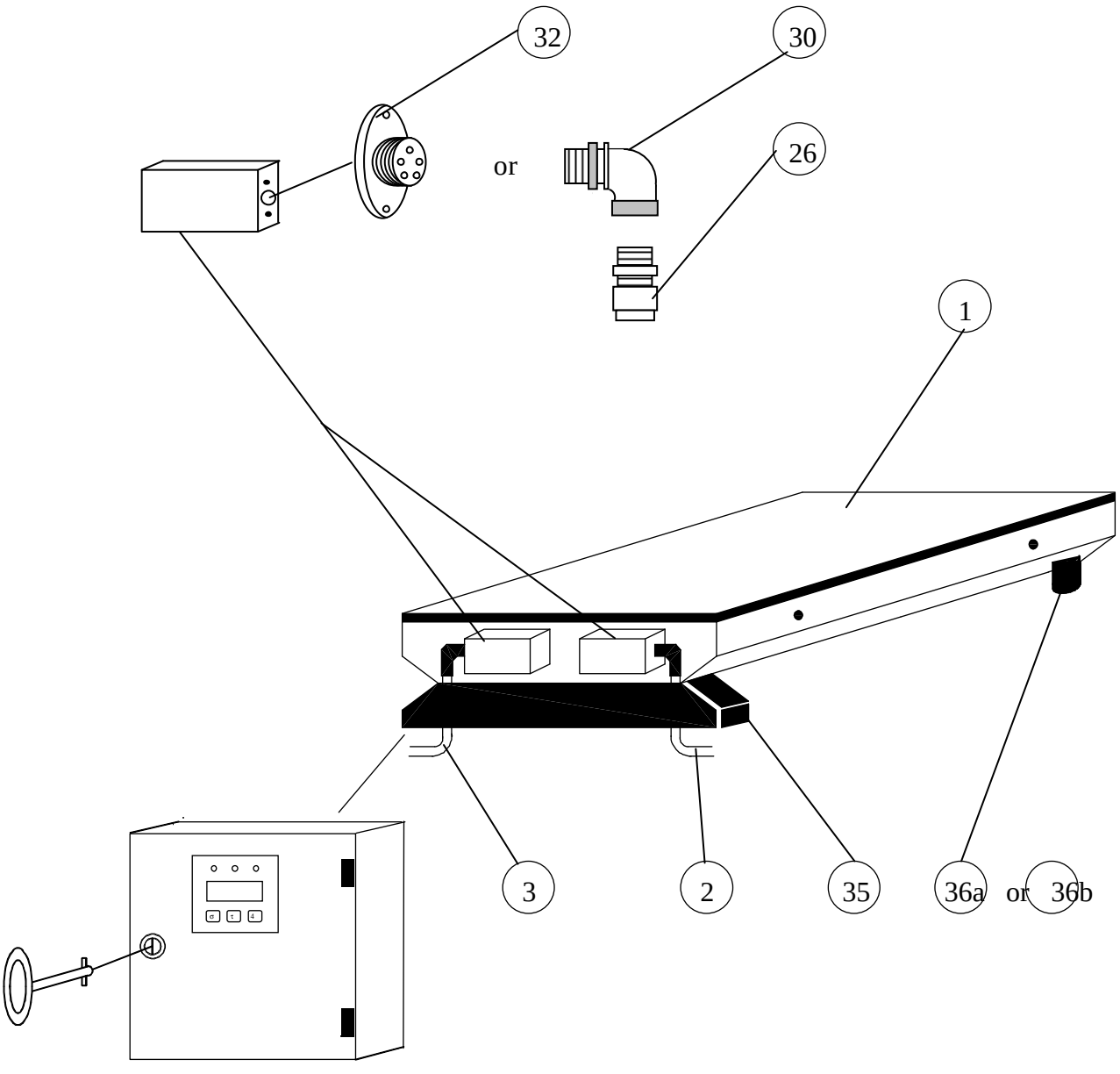
- D-Coil

E1/5



(Control unit remote)

- S-Coil, SL-Coil, SU-Coil



*** When spare parts are requested, please state serial number, acknowledgement number and detector type!!!**

Item.	Description	Part-No.	Note
1	Metal sensor	*	Me
2	Transmitter connecting cable	*	Me
3	Receiving connecting cable	*	Me
4			
5	Electronic evaluation kit	*	Me
6	Spare fuse 2 A	200240	Me
7	Display AMD 02	*	Me
8			
9			
10	Flanged plug (L = 200 mm)	500044	Me
11	Flanged plug (L = 470 mm)	500046	Me
12			
13			
14			
15	Case bottom	*	Me
16	Cover (with display)	*	Me
17	Cover (with window)	*	Me
18	Cover (without window)	*	Me
19	Case lid, design 4	*	Me
20	Screw with sleeve	300198	Me
21	Reset, complete	500024	Me
22	two-way key (form B - 3mm)	300152	Me
23			
24			
25	Screwed cable gland PG 9	300035	Me
26	Screwed cable gland PG 11	300036	Me

Item	Description	Part-No.	Note
27	Screwed cable gland PG 13,5	300039	Me
28	Screwed cable gland PG 16	300040	Me
29			
30	Threaded elbow joint PG 11	300163	Me
31			
32	Flange socket (7-channel)	200163	Me
33			
34			
35	Detector fixing	*	Me
36 a	Rubber metal ∅ 25	300044	Me
36 b	Rubber metal ∅ 40	300164	Me
36 c	Rubber metal ∅ 50	300208	Me
37			
38			
39			
40	Alan key, 8 mm	300060	Me
41	Screw M 10 x 30	300088	Me
42	Split washer M 10	300102	Me
43	Base disc $\varnothing_i$ = 11	300114	Me
44	Split washer M 12	300101	Me
45	Screw M 12 x 30	300052	Me
46	Alan key, 10 mm	300059	Me
47	Base disc (PA) $\varnothing_i$ = 13	300057	Me
48	Ring eye M 12	300058	Me
49	Plug	300041	Me
50			

*** When spare parts are requested, please state serial number, acknowledgement number and detector type!!!**

Available accessories

⇒ 790003
Record printer EPSON LX 300 with serial interface RS 232
(max. 100 m connecting cable). Print format: A4, vertical.

⇒ 790004
Record printer EPSON LQ 570 with serial interface RS 422
(max. 1200 m connecting cable). Print format: A4, vertical.

⇒ 500028
Printer cable compatible for the record printer (Pos. 05 or 06) with plugs on both sides.
Standard length: 2 m (further lengths are available on request from our sales department).