METAL DETECTOR TYPE MDE-C

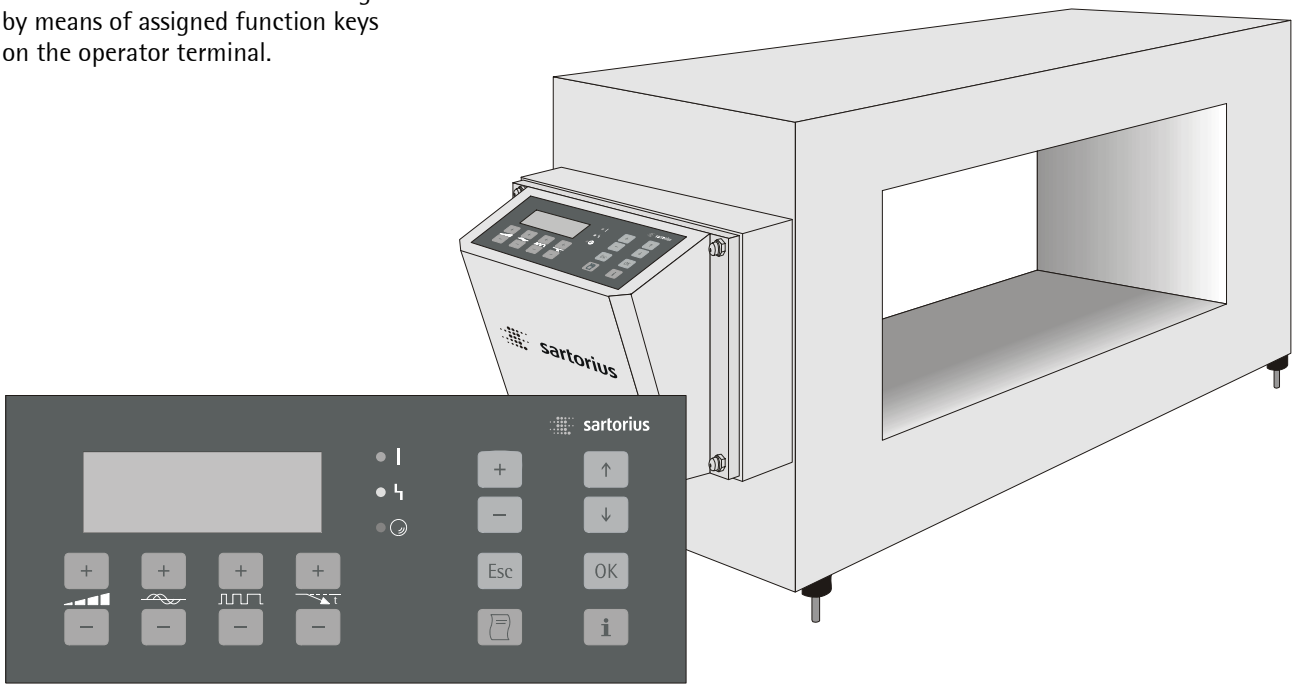
with microprocessor-controlled electronics

DEVICE DESCRIPTION

Sartorius metal detectors protect consumers from health hazards caused by metal particles, and safeguard the end product from metal contamination and processing machines from damage.

The microprocessor-controlled MDE-C metal detector has been specially designed to achieve optimal detection sensitivity under any conditions of use, and thus enables the smallest metal contaminants to be detected in products.

The metal detector is simple and easy to use because it provides
direct access to all relevant settings
by means of assigned function keys
on the operator terminal.



EVALUATION ELECTRONICS AND OPERATOR TERMINAL

When metal is detected, a relay is triggered whose potential-free two-way contact can be used for any control processes, e.g. shutting down the processing machine or conveyor belt, activating marking or rejection devices, etc..

The operator terminal is located on the housing cover and contains a 4-line, 20-character, alphanumeric, backlit LCD display, a keypad overlay with 16 keys as well as 3 LEDs.

The metal detector can be very easily set exclusively via the function keys and display.

Display texts and any error information are also available in different languages.

The language can be selected as desired.

STAINLESS STEEL HOUSING

The evaluation electronics, operator terminal and search coil are integrated into a stainless steel housing (material BS 304 / AISI 304).

The search channel, which is available in different sizes (see standards table), is embedded in the housing, which is welded on all sides.

DETECTION SENSITIVITY

The detection sensitivity of the metal detector corresponds to the highest requirements of various industries. Along with magnetic metal particles, high-alloy steels as well as non-ferrous metals (copper, brass, alu, lead, etc.) are also detected.

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MEASURING PRINCIPLE

In the passive state, there is a high-frequency magnetic field in static equilibrium.
The magnetic field is altered by a metal particle present in the material to be scanned.
This change to the passive state is processed digitally by the evaluation electronics and analyzed for proof of the metal particle.

MATERIAL INFLUENCE

The measuring principle requires that magnetic properties or electrical conductivity of the material being scanned set certain limits for the highest-reachable detection sensitivity.
In cases of doubt, material sample tests in our lab produce sound information.

FUNCTION CONTROLS

Standard monitoring of the most important components of the microprocessor electronics and the compensation voltage of the search coil provide automatic function controls for the metal detector.
When there is a negative control result, the associated function monitoring relay is triggered whose potential-free two-way contact can be used for control processes such as feeder STOP, alarm or similar.
The switch status of the contact is maintained until the error is corrected.

ACKNOWLEDGING METAL SIGNAL / REJECTION TIME

When metal is detected, the "metal" relay is triggered whose potential-free two-way contacts can be used for any control processes, e.g. shutting down the processing machine or conveyor belt, activating marking or rejection devices.

AUTOMATIC ACKNOWLEDGEMENT (standard)
The automatic acknowledgement of the "metal" relay is carried out after a definable time (rejection time).

REJECTION TIME
The rejection time, release time of metal relay after metal detection, is definable (0.010 s – 99.999 s).
If more metal is detected during the rejection time, then the rejection time will be increased accordingly.

SHIFT TIME
The integrated rejection memory enables the "metal impulse" to be time shifted to the rejection location.
The shift time can be set between 10 ms to 9999 ms.

EXTERNAL ACKNOWLEDGEMENT
The "metal" relay remains triggered until the external reset key (option) is pressed.
The acknowledgement can also be carried out by a super ordinate control.

PRODUCT SETTING

Certain products have a so-called product effect because of their electrical and magnetic conductivity which will influence the detection sensitivity.
This product effect is minimized by setting the "phase" and thus enabling optimum detection sensitivity.

KEY SWITCH / OPERATING LOCK

If the metal detector is to be limited to authorized personnel only, then this access authorization can be blocked and/or released by connecting an external key switch.

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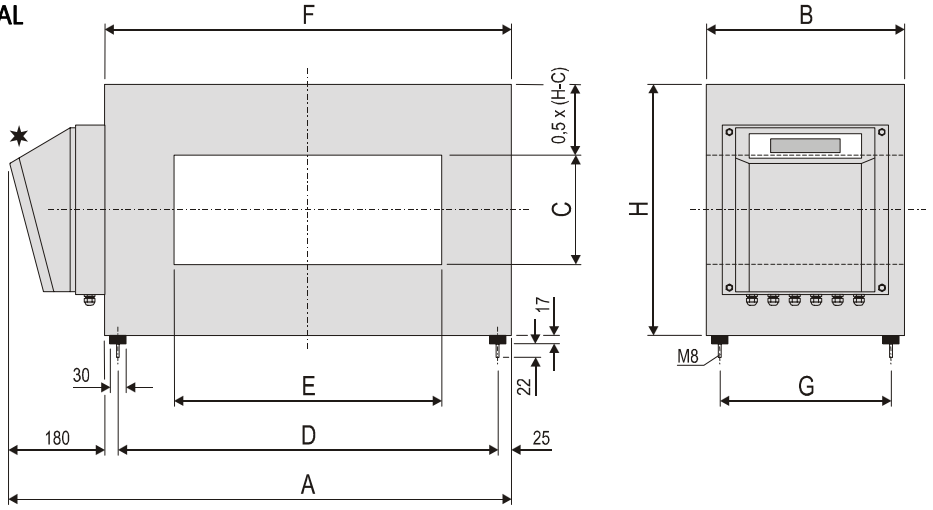
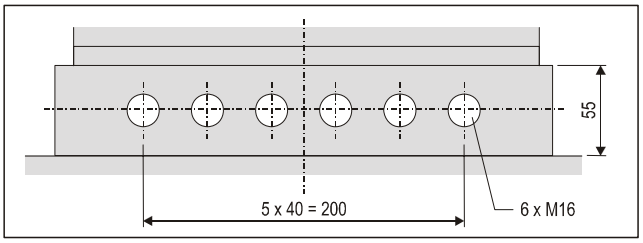
DIMENSIONAL DRAWING (✶Installation position)

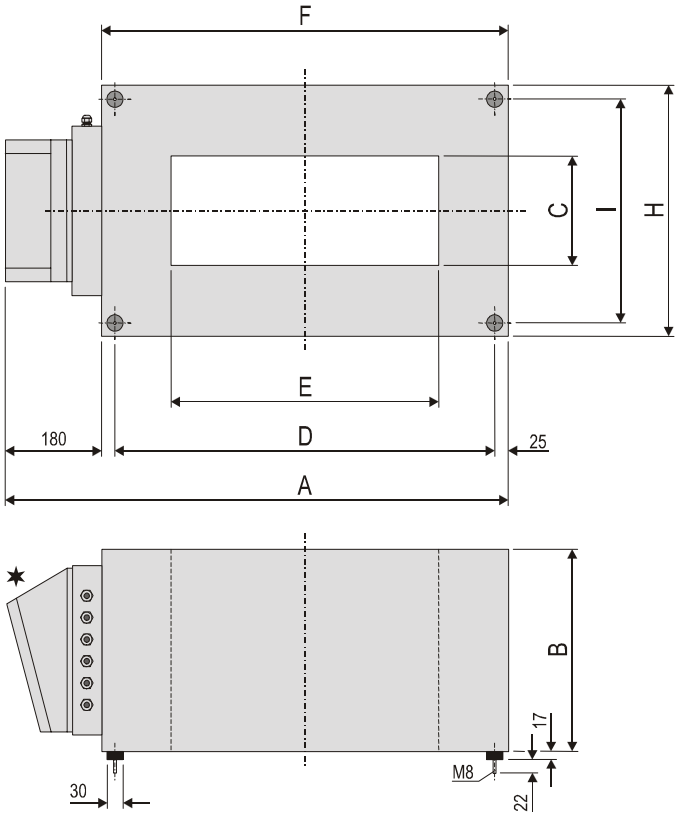
HORIZONTAL



Partial view



VERTICAL



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STANDARDS TABLE

Dimensions in mm, *weight in kg (approx.)*

MDE-C ... x ..

... x .. ←	3	4,5	6	7,5	9	12,5	15	17,5	20	22,5	25	27,5	30	35	40	50	60			
↑ E \ C	30	45	60	75	90	125	150	175	200	225	250	275	300	350	400	500	600	A	D	F
7,5	75	*20*	*25*	*25*	*30*													515	285	335
12,5	125	*25*	*30*	*30*	*35*	*40*	*40*											565	335	385
17,5	175	*35*	*35*	*40*	*40*	*45*	*45*	*50*	*55*									615	385	435
22,5	225	*35*	*40*	*45*	*45*	*45*	*50*	*55*	*60*	*65*	*70*							665	435	485
25	250	*40*	*45*	*45*	*50*	*50*	*50*	*60*	*65*	*70*	*75*	*80*						690	460	510
27,5	275	*45*	*45*	*50*	*50*	*50*	*55*	*60*	*65*	*70*	*75*	*80*	*85*					715	485	535
35	350	*50*	*50*	*55*	*55*	*55*	*60*	*65*	*70*	*75*	*80*	*85*	*90*	*90*	*100*			790	560	610
40	400	*55*	*55*	*60*	*60*	*60*	*65*	*70*	*75*	*80*	*85*	*90*	*95*	*95*	*105*	*115*		840	610	660
50	500	*60*	*65*	*65*	*70*	*70*	*75*	*80*	*85*	*90*	*95*	*100*	*105*	*105*	*115*	*125*	*145*	940	710	760
60	600	*70*	*75*	*75*	*80*	*80*	*85*	*90*	*95*	*100*	*105*	*110*	*115*	*115*	*125*	*135*	*155*	*170*	1040	810	860
70	700	*80*	*85*	*85*	*90*	*90*	*95*	*100*	*100*	*105*	*110*	*115*	*120*	*120*	*130*	*140*	*160*	*180*	1140	910	960
80	800	*90*	*90*	*95*	*95*	*95*	*100*	*105*	*110*	*115*	*120*	*125*	*130*	*130*	*140*	*150*	*170*	*190*	1240	1010	1060
90	900	*95*	*100*	*100*	*105*	*105*	*105*	*110*	*120*	*125*	*130*	*135*	*140*	*140*	*150*	*160*	*180*	*200*	1340	1110	1160
115	1150	*115*	*120*	*120*	*125*	*130*	*130*	*135*	*140*	*145*	*150*	*155*	*160*	*160*	*170*	*180*	*200*	*220*	1590	1360	1410
135	1350	*135*	*140*	*140*	*145*	*145*	*150*	*155*	*160*	*165*	*170*	*175*	*180*	*180*	*190*	*200*	*220*	*240*	1790	1560	1610
150	1500	*150*	*150*	*155*	*155*	*160*	*160*	*165*	*170*	*175*	*180*	*185*	*190*	*190*	*200*	*210*	*230*	*250*	1940	1710	1760
170	1700	*165*	*170*	*170*	*175*	*175*	*180*	*185*	*190*	*195*	*200*	*205*	*210*	*210*	*220*	*230*	*250*	*270*	2240	1910	1960
195	1950	*185*	*190*	*190*	*195*	*200*	*200*	*205*	*210*	*215*	*220*	*225*	*230*	*230*	*240*	*250*	*270*	*290*	2390	2160	2210
220	2200	*210*	*215*	*215*	*220*	*220*	*225*	*230*	*235*	*240*	*245*	*245*	*250*	*250*	*260*	*270*	*290*	*310*	2640	2410	2460
250	2500	*235*	*235*	*240*	*240*	*240*	*245*	*250*	*260*	*265*	*270*	*275*	*280*	*280*	*285*	*295*	*315*	*335*	2940	2710	2760
275	2750	*255*	*260*	*260*	*265*	*265*	*270*	*275*	*280*	*285*	*290*	*295*	*300*	*300*	*310*	*320*	*340*	*360*	3190	2960	3010
B	320								370		395		420	440	460	520	580			
G	270								320		345		370	390	410	470	530			
H	320			335	350	385	410	435	460	485	510	535	560	610	660	760	860			
I	270			285	300	335	360	385	410	435	460	485	510	560	610	710	810			

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SELECTION GUIDELINES

APERTURE WIDTH

The aperture width of the metal detector conforms to the width of the conveyor belt (plus allowance for belt excursion).
The gradation for the aperture width is listed in dimension "E" from the standards table.

APERTURE HEIGHT

First and foremost, detection sensitivity depends on the aperture height (internal height),
which results from the largest occurring product height plus the height of the conveyor medium and a safety distance.
The lowest required height should be selected (feeding only the carrying run through the search channel).
The gradation for the aperture height is listed in dimension "C" from the standards table.

TYPE DESIGNATION

The aperture width (= search width) and aperture height in cm are listed in the type designation.

Example: Type MDE-C 70 x 30 aperture width = 700 mm,
aperture height = 300 mm.

SHOCK MOUNTS

The metal detector comes with four factory-installed shock mounts to lessen the effect of belt structure vibrations on the metal detector and to isolate the metal detector electrically from the belt structure.
The metal detector is attached to a separate console or to the belt frame using the shock mounts.
The distance between the shock mounts is listed in the standards table (dimensions "D" and "G").

SPECIAL DESIGNS

Metal detectors are available with air cooling systems for product temperatures
that raise the search channel temperature to over + 45° C.
This decreases the aperture width and height by approx. 20 mm (see standards table dimension "E" and "C").

TECHNICAL DATA

Power supply	85 V ... 264 V; 47 ... 440 Hz
Power consumption	approx. 40 VA, not including downstream additional devices
Relays	"Metal" (2 potential-free switches (deenergize to trip principle)) "Operational monitoring - Error" (1 potential-free switch (deenergize to trip principle)).
"Metal signal"	
- Shift time	T1: 0.010 s ... 9.999 s
- Rejection duration	T2: 00.000 s ... 99.999 s
Product speed	2 cm/s ... 20 m/s
Product temperature	- 30° C ... + 45° C
Ambient temperature	- 10° C ... + 45° C
Housing	Stainless steel, material BS 304 / AISI 304
Protection class	IP 65 (NEMA 4X)
Weight	see standards table

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INSTALLATION

The metal detector can be installed on conveyor belts, chutes, channels, pipes and discharge chute systems.
See also "Installation instructions for search coils, BA-2000."

EFFECTS ON THE SEARCH COIL FIELD

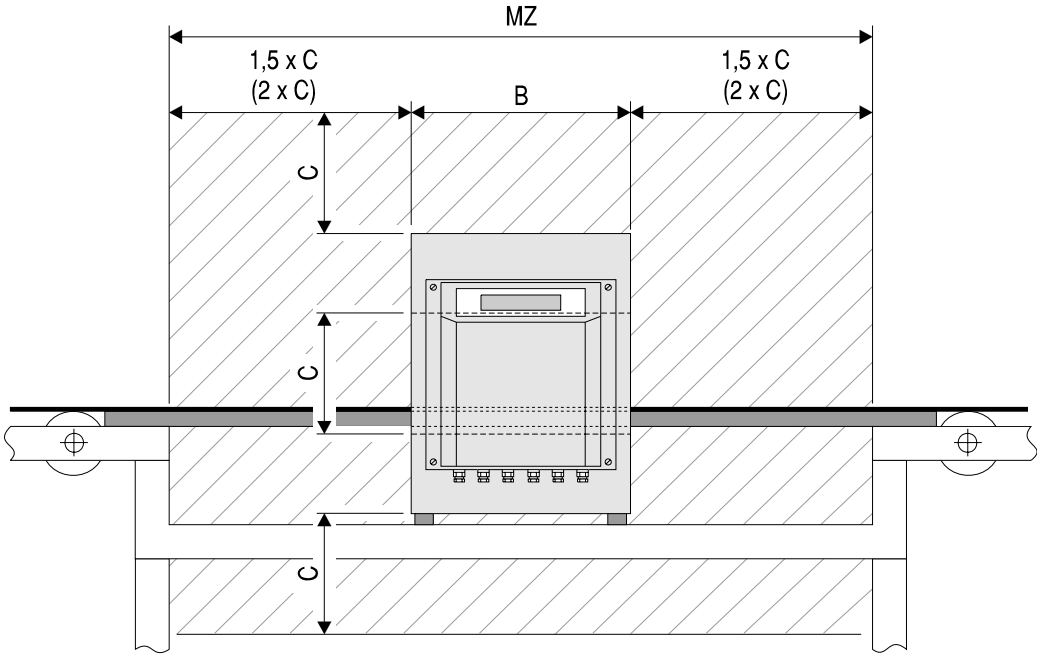
Vibrating or moving metal parts, electric motors, their drives and supply lines should not be located near the metal detector since they may have an adverse effect on detection sensitivity.
See also "Installation instructions for search coils, BA-2000."

METAL-FREE ZONE

The "metal-free zone" should be as large as possible.
As a rule of thumb, the following is valid for the smallest required "metal-free zone" in the flow direction (dimension drawing, see fig. "Installation recommendation"):

for stainless steel equipment: = (aperture height C x 3) + cabinet width B,
for steel equipment: = (aperture height C x 4) + cabinet width B.

Installation recommendation



In addition, a "metal-free zone" should also be maintained corresponding to the aperture height (C) left and right as well as above and below the metal detector.
Not included in this are the belt structure (not the cross connections within this structure) and any included search coil console.
If the "metal-free zone" cannot be maintained at the site of installation due to space conditions, you must take into account a loss in sensitivity.

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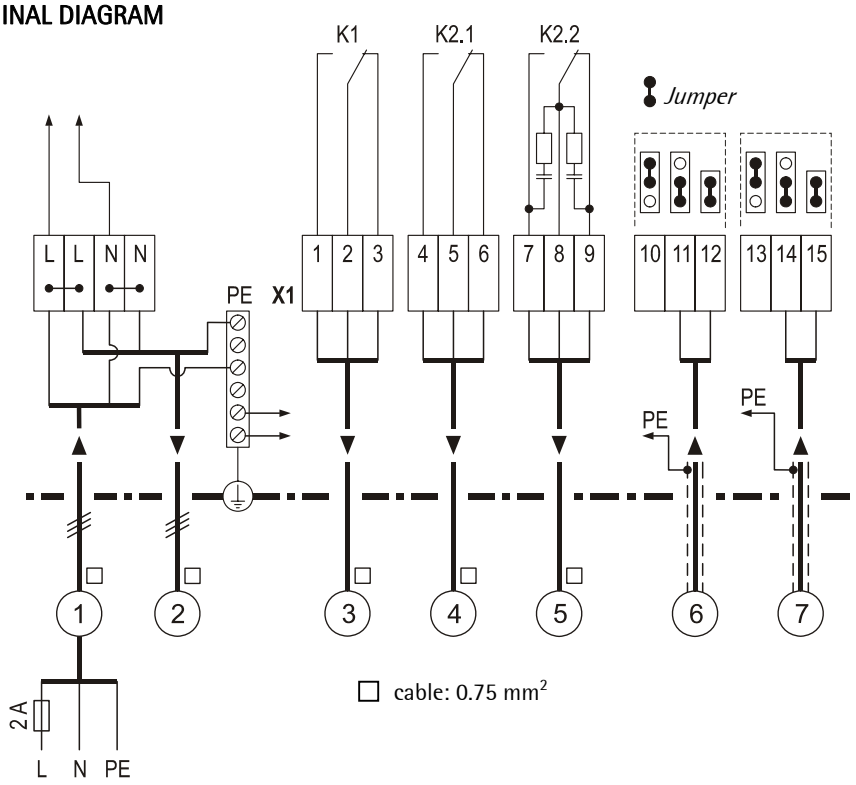
STANDARD TERMINAL DIAGRAM



(1) Power supply — 85 ... 264 V; 47 ... 440 Hz

(2) Power supply — for downstream components (buzzers, lamps or rejectors, etc.).

(3) "Error" relay — 1 potential-free switch (K1),
deenergize to trip principle: 2 - 3 close when error is detected.

(4) "Metal" relay — 1 potential-free switch (K2.1),
deenergize to trip principle: 5 - 6 close when metal is detected.

(5) "Metal" relay — 1 potential-free switch (K2.2 with spark discharge circuit),
deenergize to trip principle: 8 - 9 close when metal is detected.

(6) External key switch (option), operating lock for opened contact.

(7) External key reset key (option), contact (metal signal remains until reset)

Contact load of relays:

a) as potential switch — $U_{min} \geq 5$ V, $I_{min} \geq 1$ mA – with intact gold flashing
(without previous use as circuit breaker !)

b) as circuit breaker — P_{AC} 500 VA, P_{DC} 50 W } $U_{max} = 250$ V, $I_{max} = 3$ A

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