



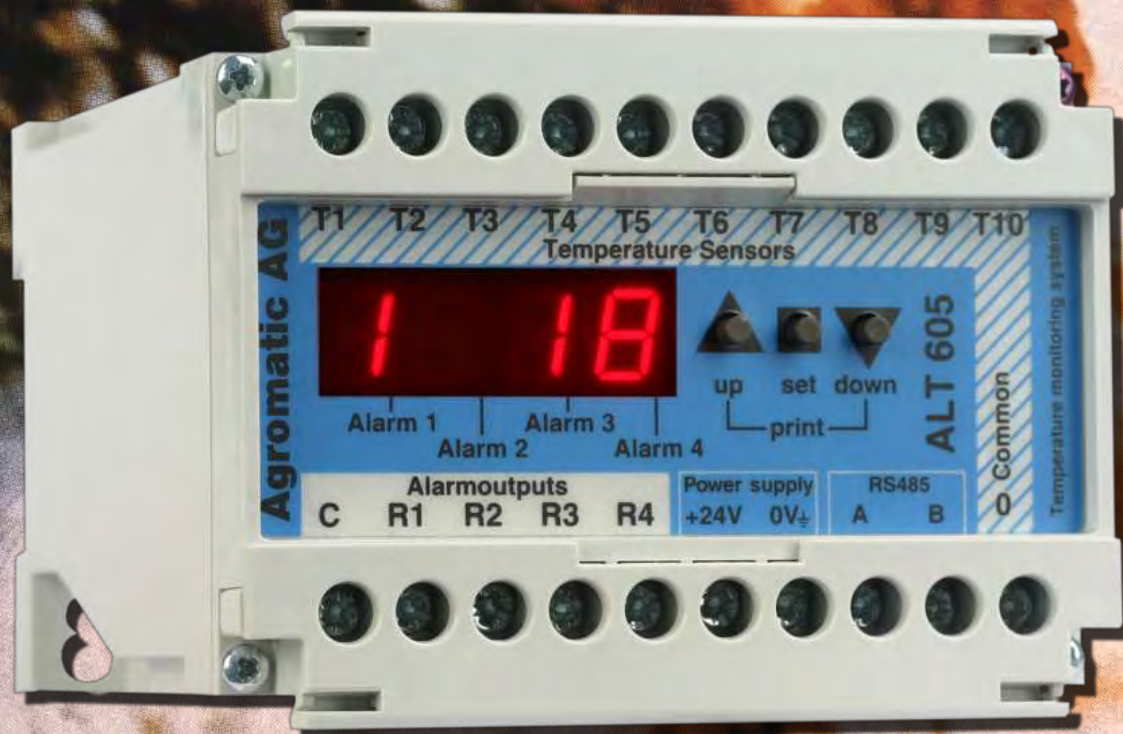
18th IAOM

**Mideast&Africa District
conference**



Muscat 08.12.-11.12.07

Explosion protection for conveyors



with units corresponding to safety category 2,3 or 4

Basis:

According to examples from BRG 104 conveyors, belt drives and general conveyors should be monitored on:

slippage, alignment and temperature increase at the bearings.

EN 1127-1 (basic principles and system engineering Ex-protection)

EN 113463-5 (constructive safety)

EN 954-1, cat.2-4 resp. SIL2 acc. to EN 61508,

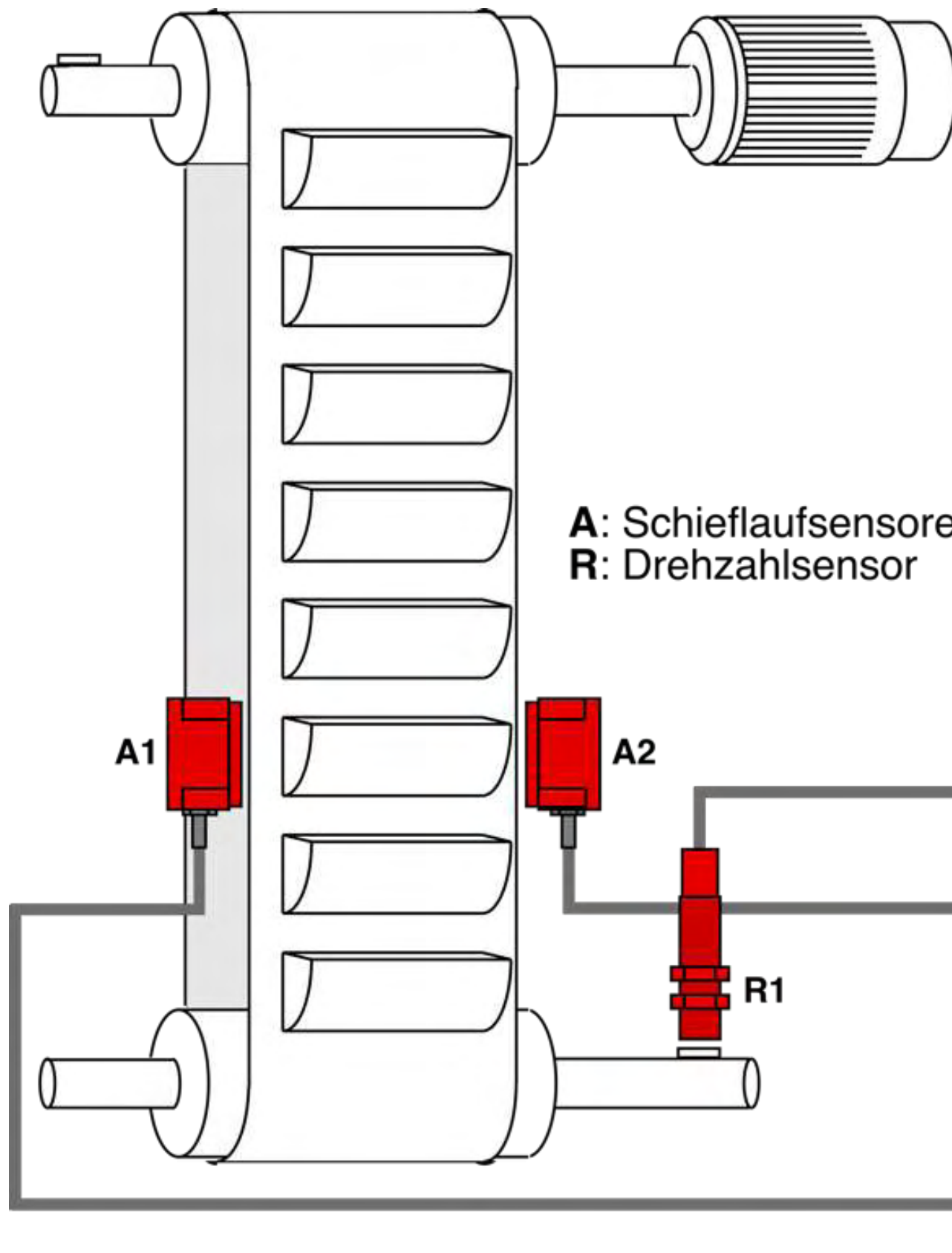
EN 13463-6 (ignition source monitoring) are taken into account in the following legal requirements.

Basis:

ATEX 94/9/EG appendix 2 paragraph 1,..5,..

**„Safety devices must function
independantly from other necessary
measuring- or control units“ ...**

**[... safety relevant switching devices must
be able to address the active element
without software control]**

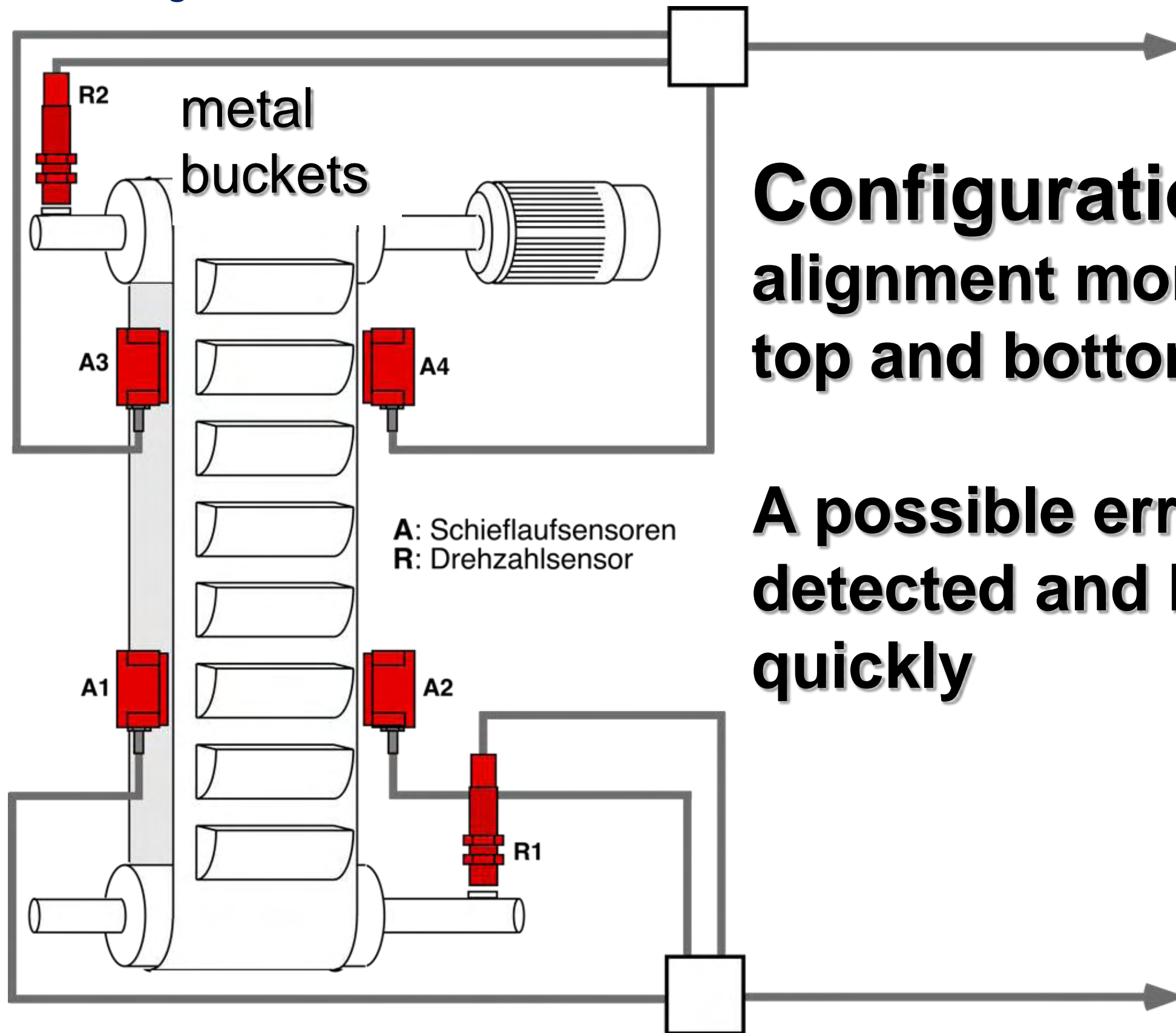


A: Schieflaufsensoren
R: Drehzahlsensor

Basic configuration:

**belt is monitored on
correct running**

**deviating roller is
monitored on slippage**



**Configuration:
alignment monitoring on
top and bottom**

**A possible error can be
detected and localized
quickly**



components:
sensors

application:
with metal
buckets

Atex
safety impact
protection



ASI Q80..
alignment sensor

Atex certified
separation glass

inductive sensor
switching
distance
10 - 60mm



ASLS2000... alignmentsensor

application:

- for plastic buckets

OPTO - MAGNETIC SWITCHING



no springs !
no contacts !

Internal, electronical rod breakage protection

AS12../18../30 speed sensor



- speed registration at shaft
(spline groove/screwhead etc)
- speed registration at spokes
- speed registration at drum

STF M8 temperature sensor



**Monitoring of bearings
integration in bearing cup**

FTF M8 temperature sensor



**Attached temperature sensor
application e.g.:
under grease nipple (bearing)
at motorhousing etc.**



components:
control unit

ALS197/...

Combined unit speed- and alignment monitoring

Monitors:

- speed
- differential speed
- 1x speed (2 sensors)
- 2x alignment (4 sensors)
- combination of speed and alignment monitoring



corresponds to safety category 2, 3 or 4



components:
control units

ALS906/... combined unit speed- and alignment monitoring

Monitors:

- speed
- differential speed
- 1x alignment (2 Sens.)
- 2x alignment (4 Sens.)
- 4x alignment (2 Elev.)
- combination speed & alignment
- single alarm
- display
- RS485 interface



corresponds to safety category 2, 3 or 4



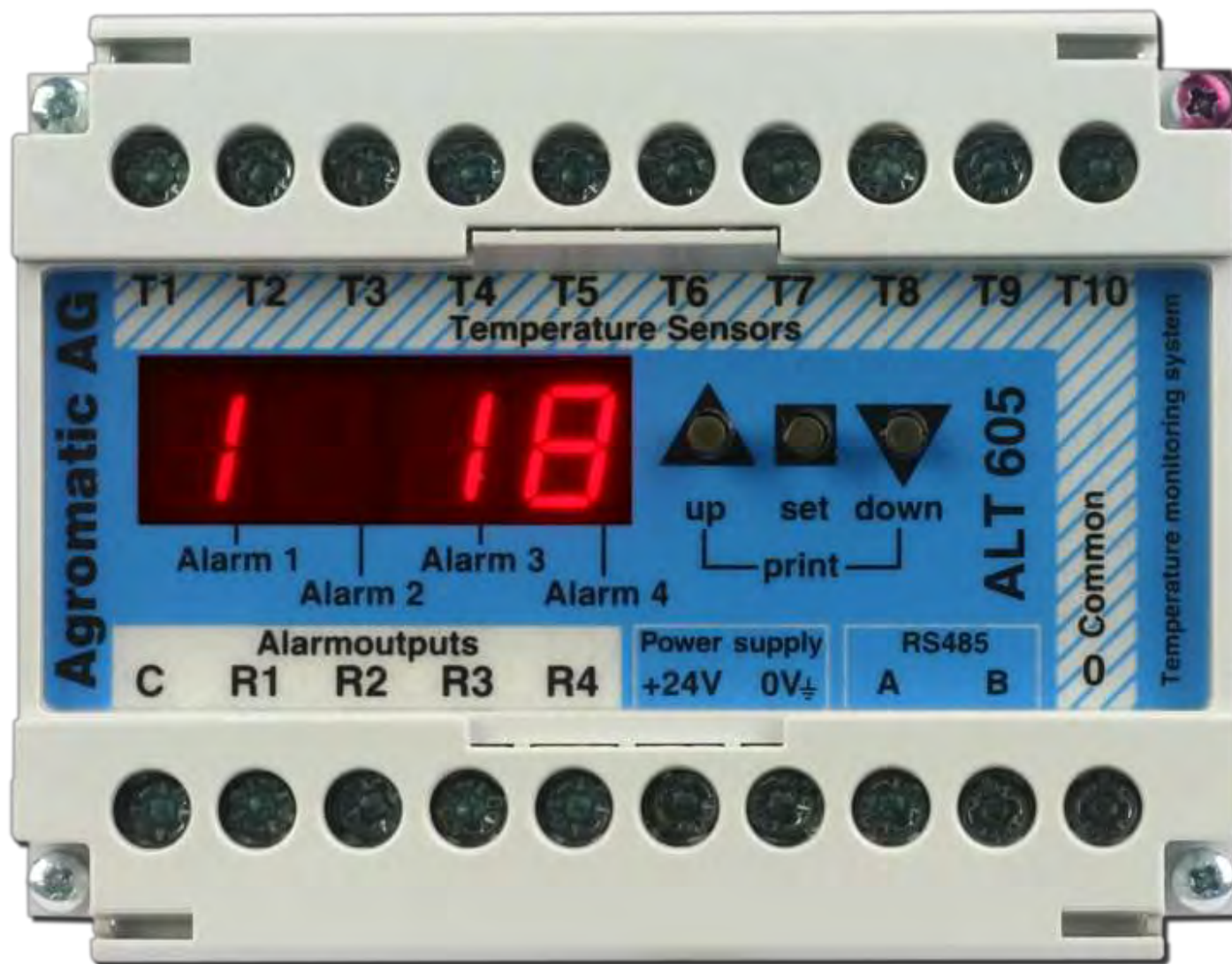
components:
control units

ALT605

limit temperature control

Application:

conveyor bearing temperature
control
small temperature monitoring
systems
engineering
safety monitoring

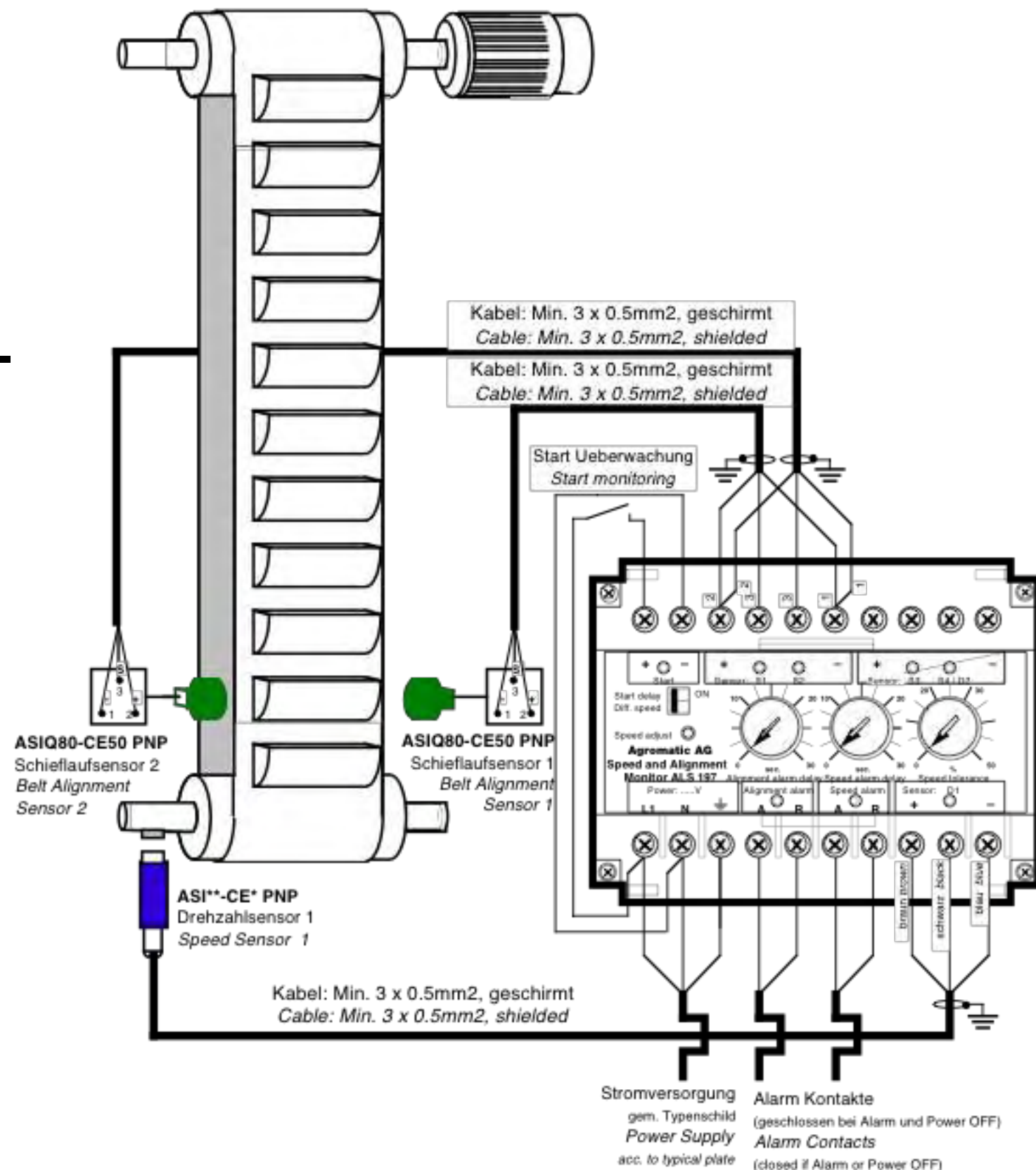


10 sensor inputs
display
4 alarm outputs
1 RS485 data output

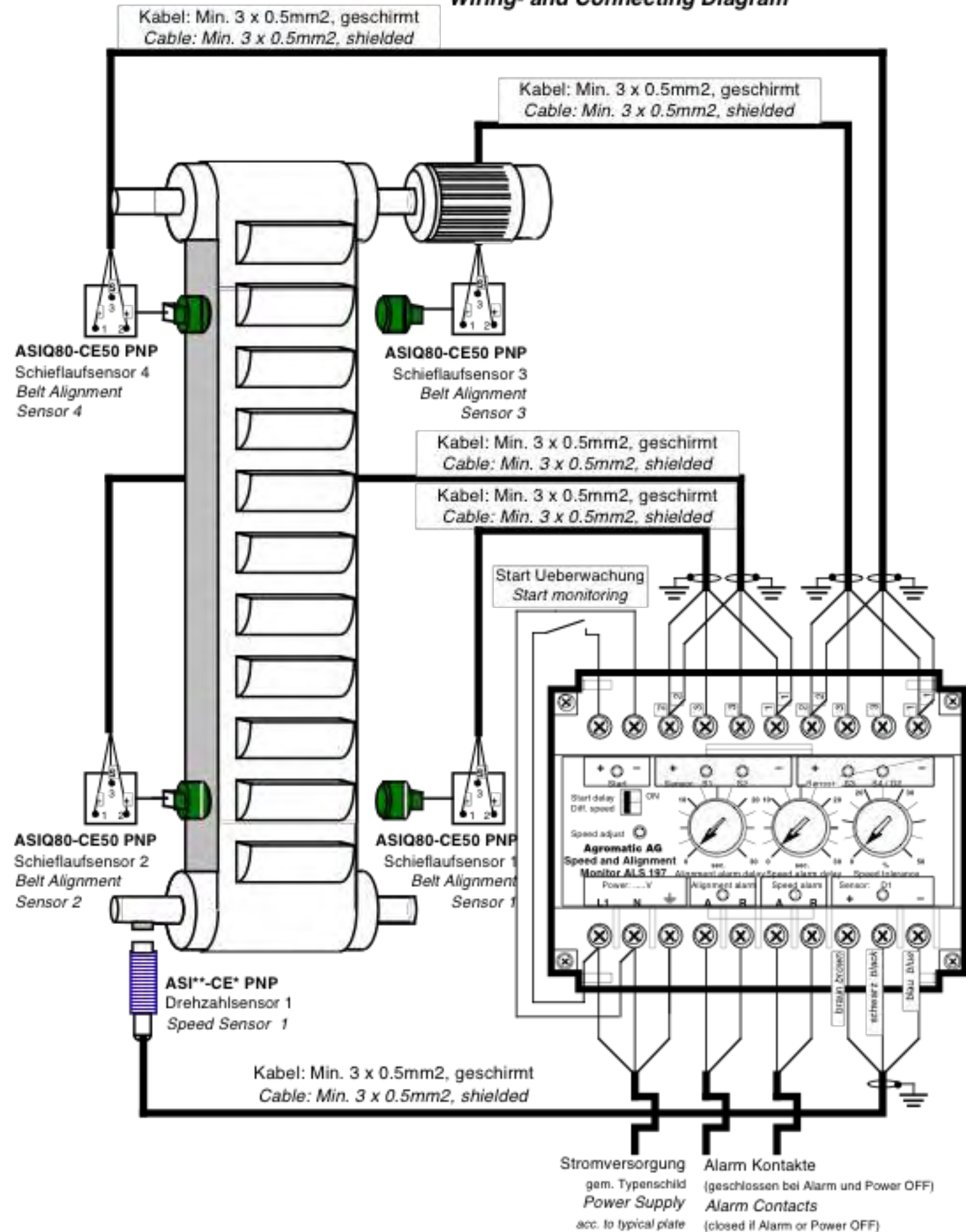
corresponds to safety category 2, 3 or 4

application:
 speed- alignmentcontrol-
 (combination)

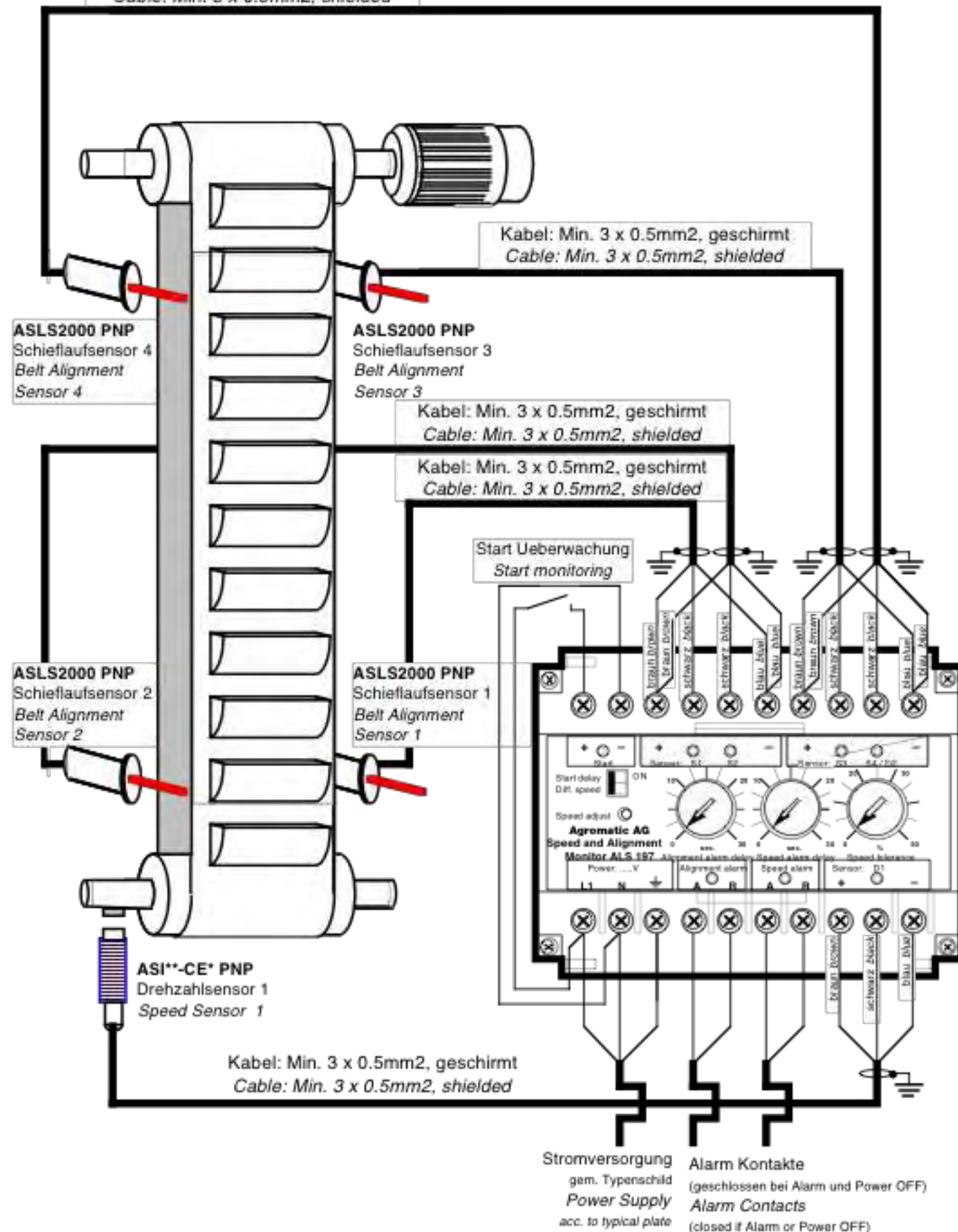
used for:
 small conveyors up to a
 transportation height of
 approx 25m



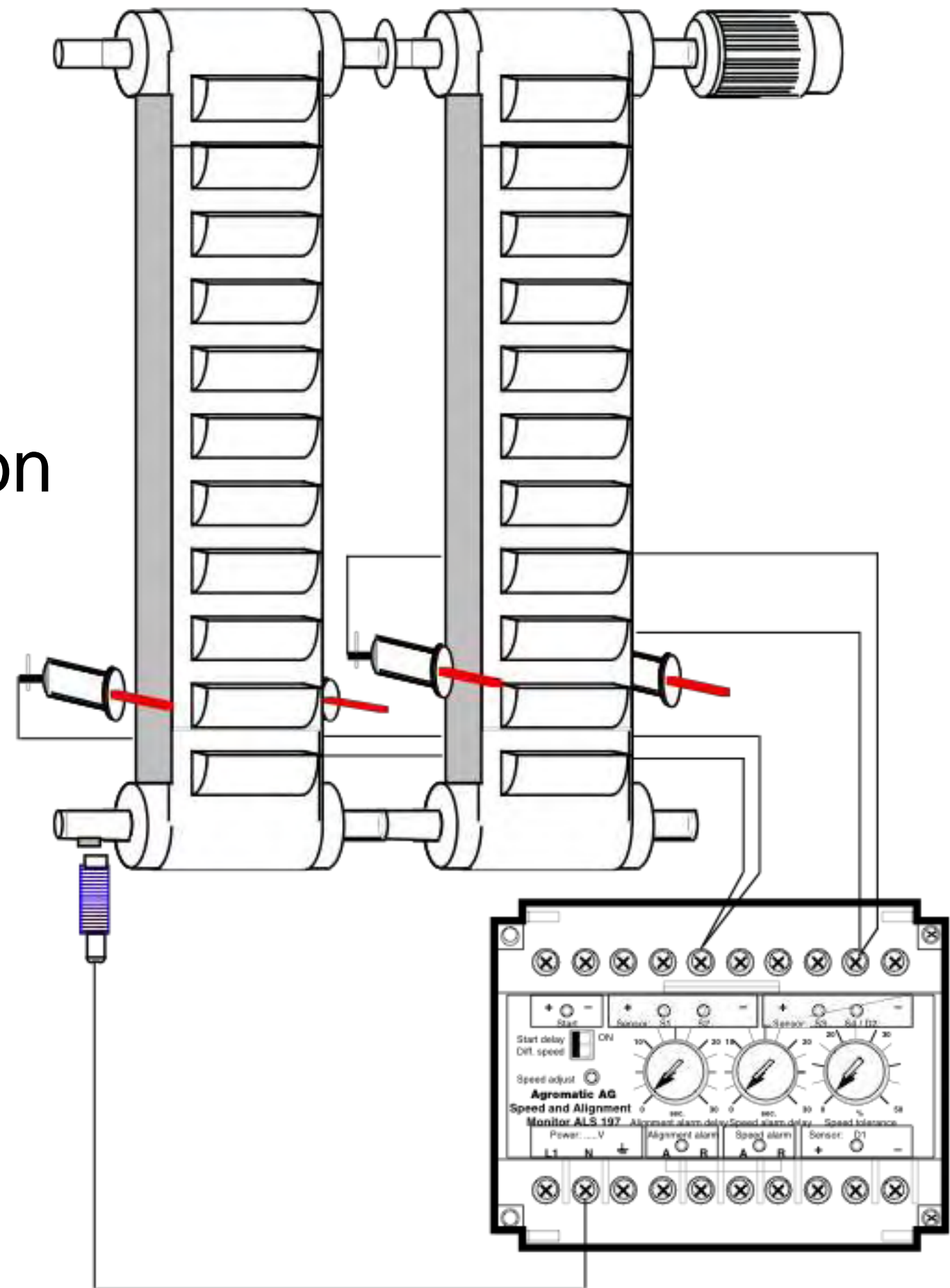
application:
 speed control
 alignment control at
 top and bottom



Kabel: Min. 3 x 0.5mm², geschirmt
 Cable: Min. 3 x 0.5mm², shielded

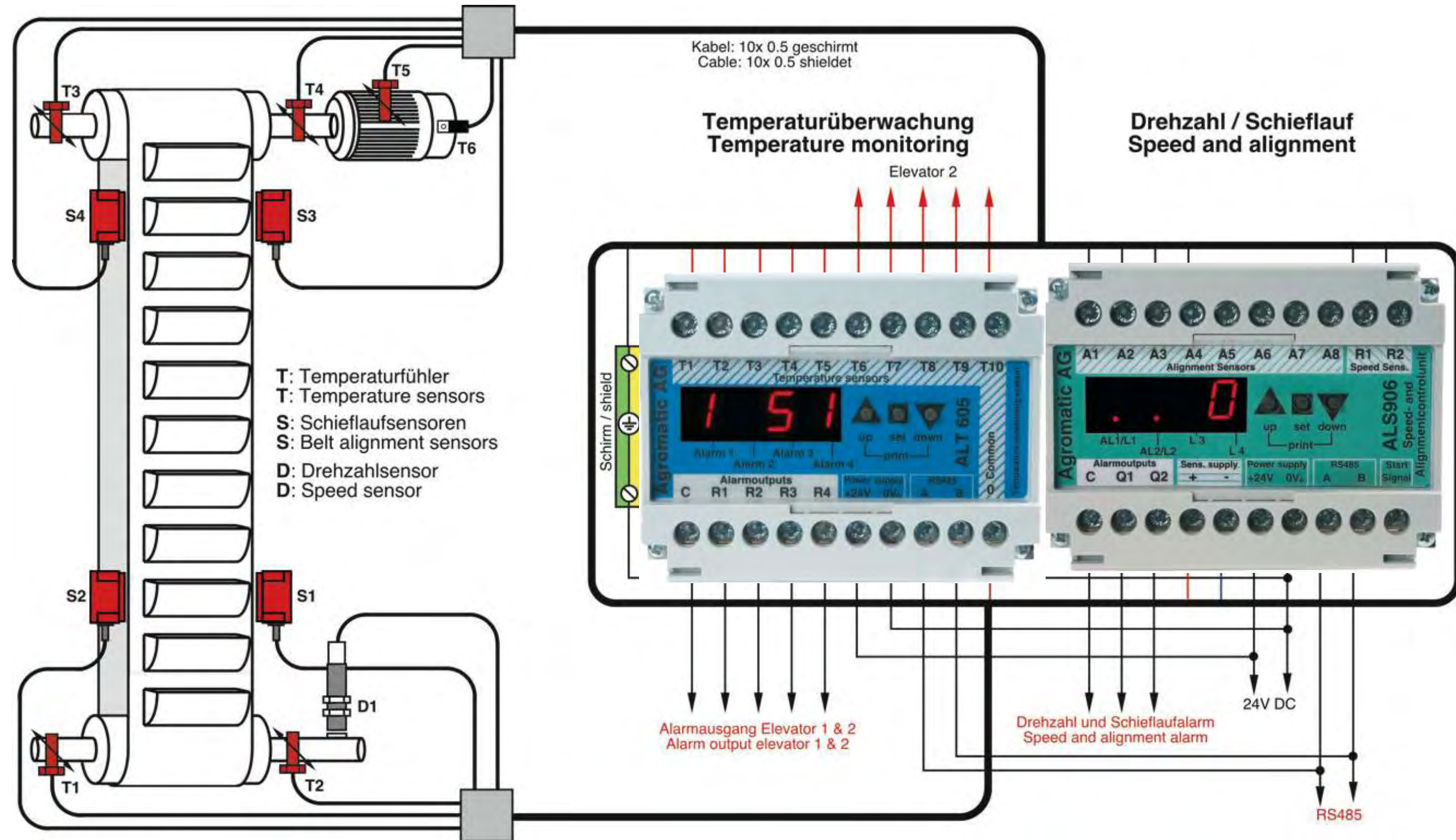


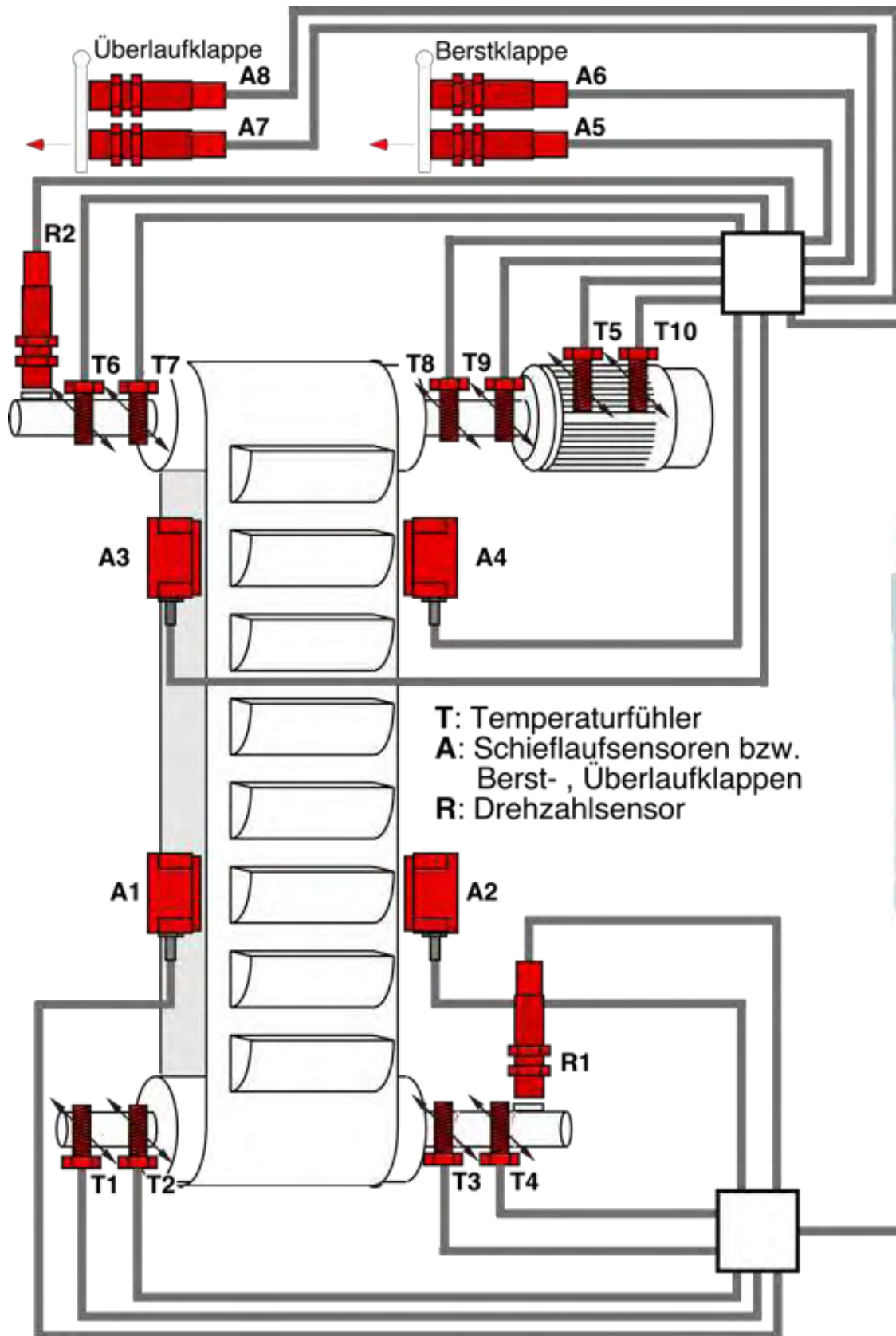
application:
twin conveyor, depending on
tie height also with
alignment control at top
8 alignment and 1 or
2 speed sensors
(permanent base shaft or
separate base shaft)



Optimal safety at conveyor:

Optimal safety at conveyor: alignment control at top and bottom, speed control, temperature monitoring of all bearings and motor





Condition for cat. 4:
twin control for all temperatures, alignment- and speed sensors with slippage control!
Fail safe output, controlled feedback, power failure control of all sensors, general functioning control of all units

Kabel 16x0.5mm² geschirmt max. 300m

Temperaturüberwachung

Limit 1 = 80°C
Limit 2 = 80°C
Limit 3 = 100°C
Limit 4 = 100°C

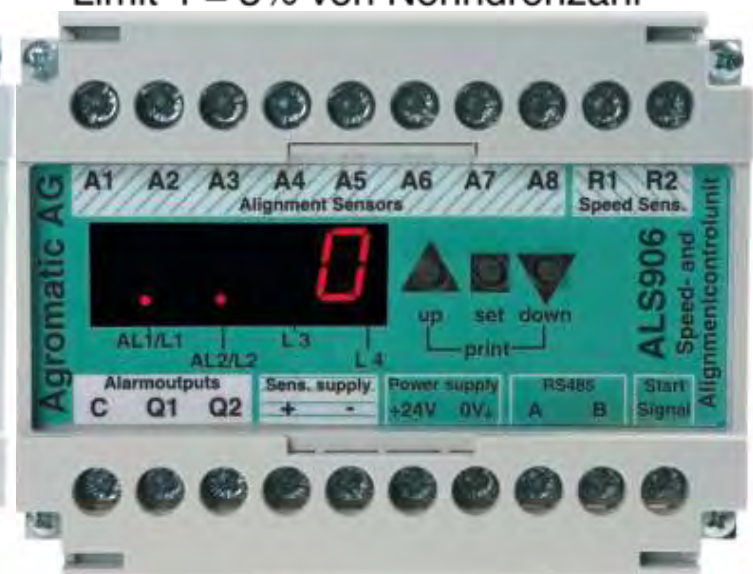


A = 5
b = 2
C = 4
d = 3
E = 1
F = 1

Kabel 10x0.5mm² geschirmt max. 300m

Drehzahl- Schiefelaufüberwachung

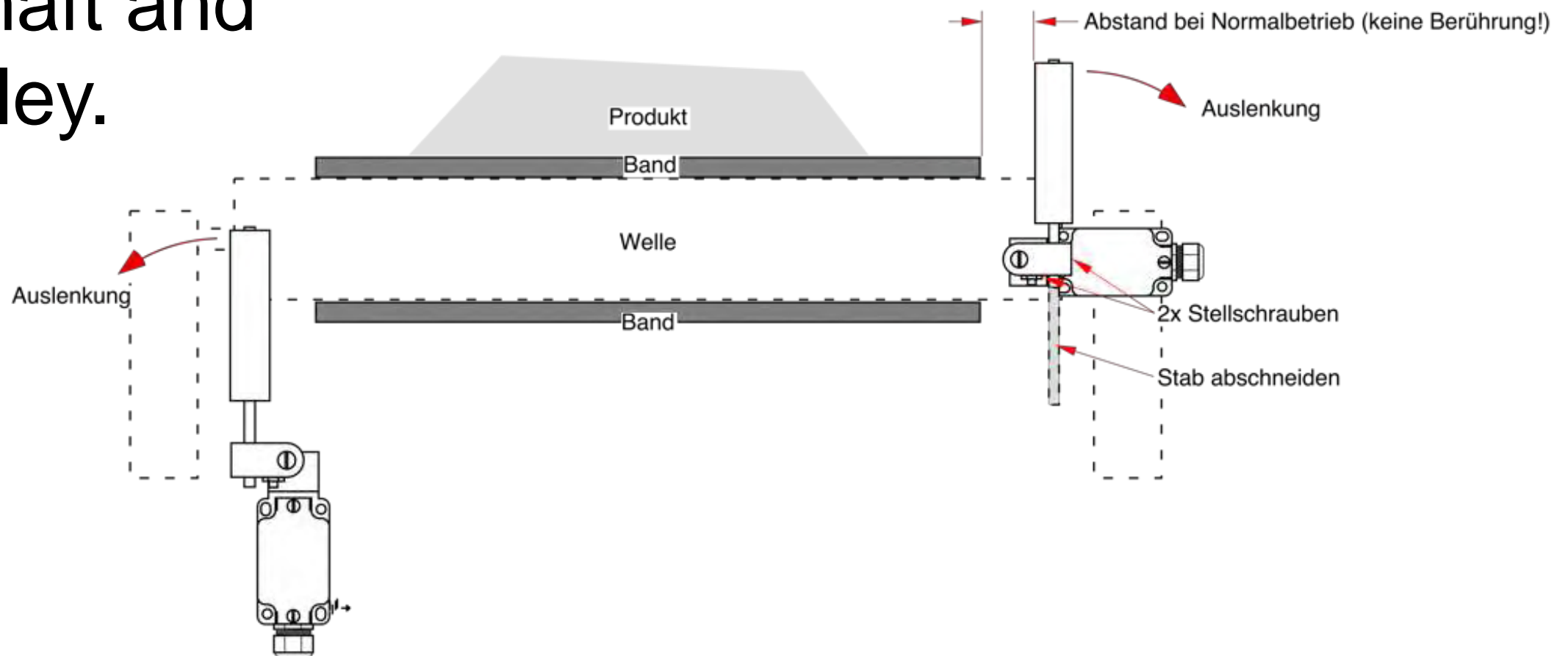
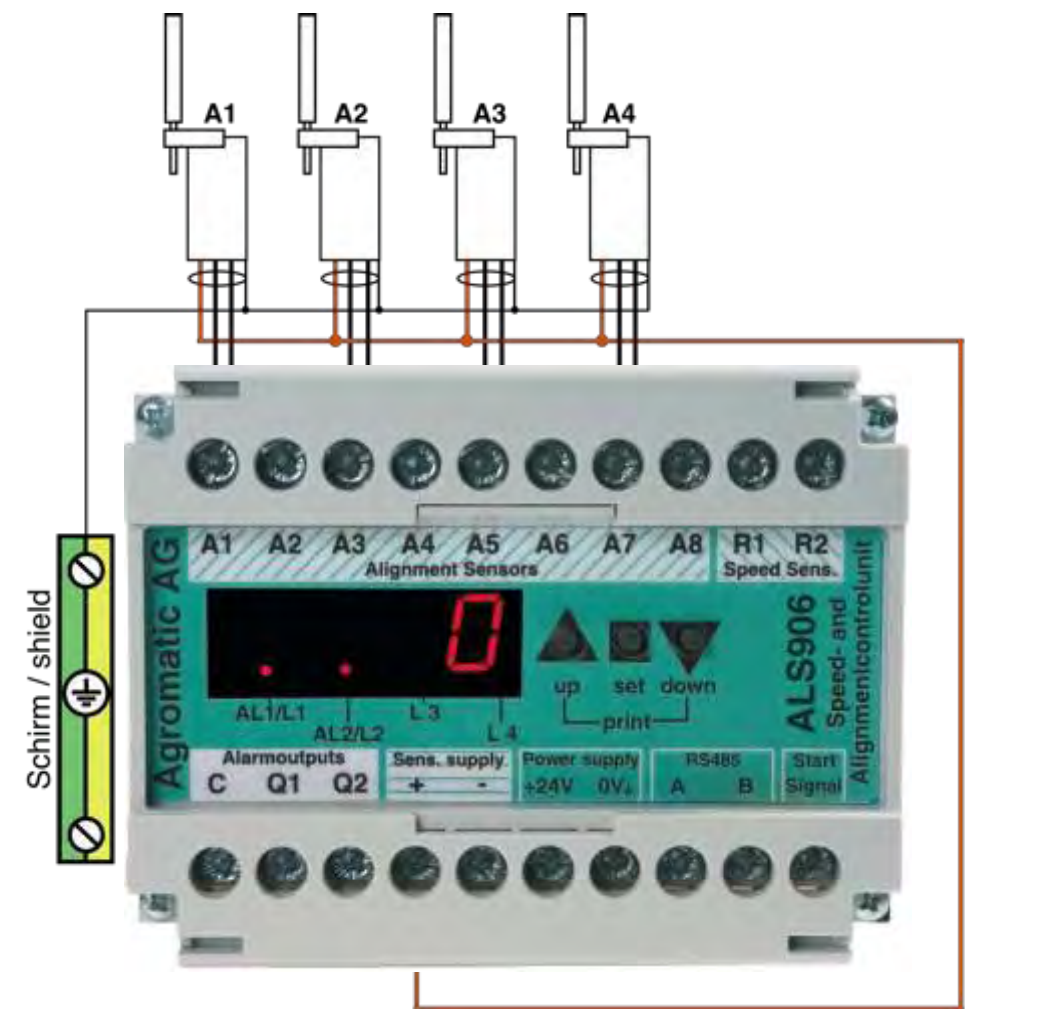
Limit 1 = 10
Limit 2 = 10
Limit 3 = Nenndrehzahl -10%
Limit 4 = 3% von Nenndrehzahl



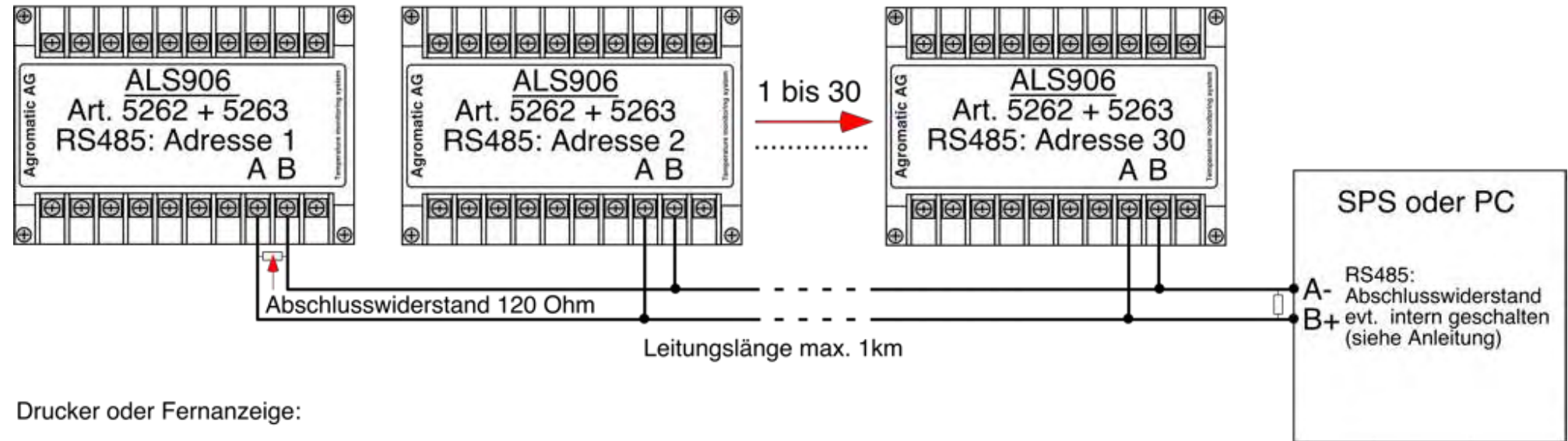
A = 15
b = 0
C = 4
d = 4
E = 2
F = 1
G = 1
H = 4
J = 1

Conveying belt :

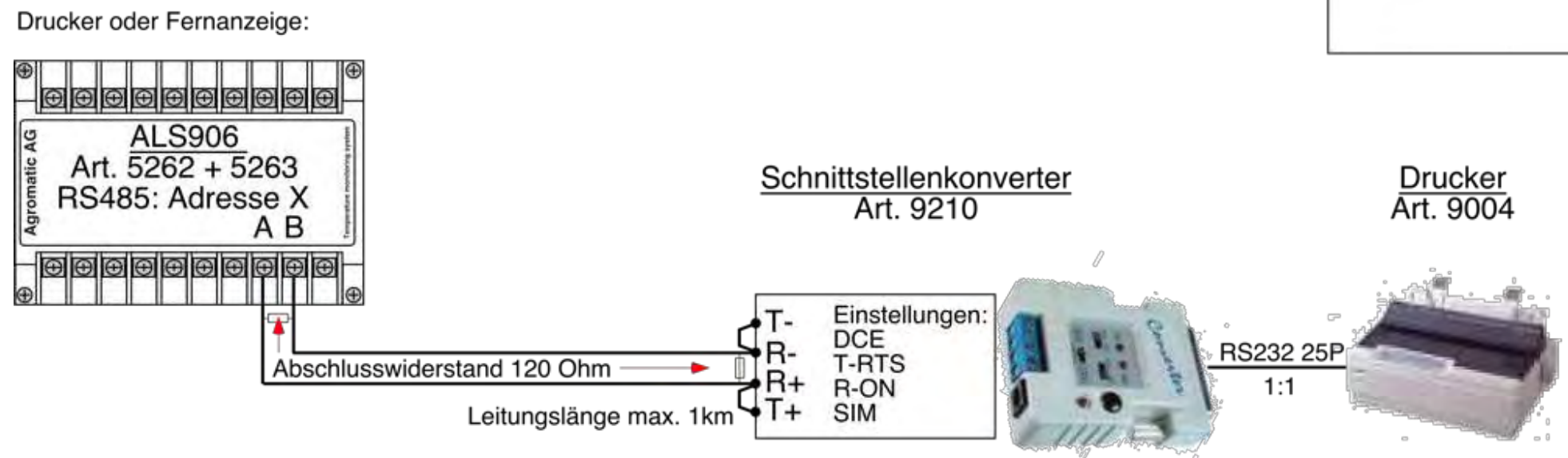
same unit, instead of alignment sensors belt control switch.
Additional speed monitoring at driveshaft and guide pulley.



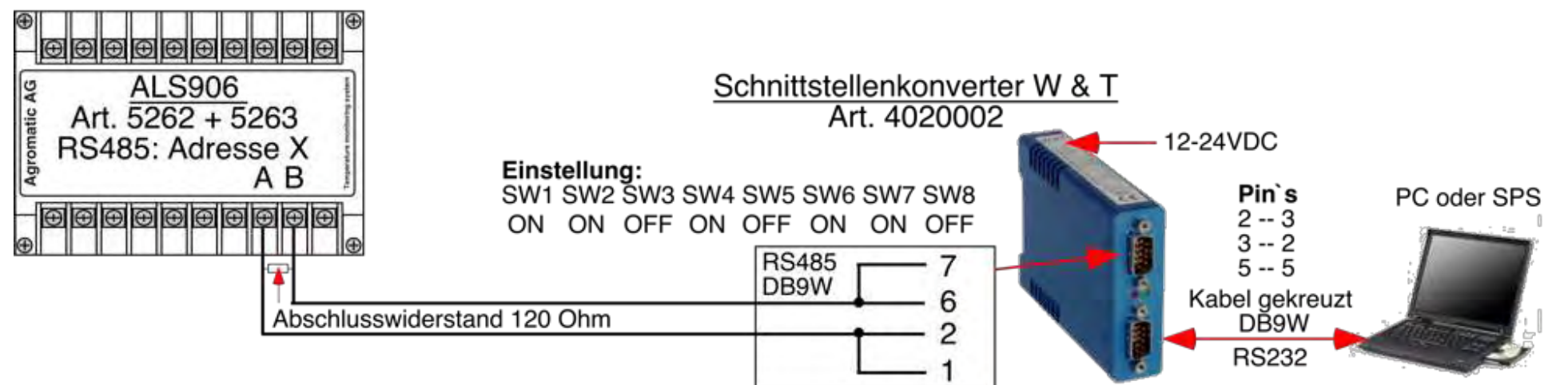
interface RS 485



printer- connection



profibus connection



Conveyors are the most dangerous machines in mills and feed mills.

Nearly 70% of all accidents with human injury are caused by conveyors.

We committed ourselves to the safety of your staff.

Their safety is your responsibility!

**Application / units / information -
contact us at the Agromatic stand**

spark detection and extinguishment





**high danger in hammer mills
(product outlet and
aspiration)
after presses and chillers as
well as conveyor inlets**



Agromatic AG

standardsensors

construction:
sensors

daylightsensor



high temperature-
sensor

Standardsensor

application:

in conveying tubes, pneumatic
etc. for products up to 60°C

(Infraredsensor)

easy mounting



Daylightsensor

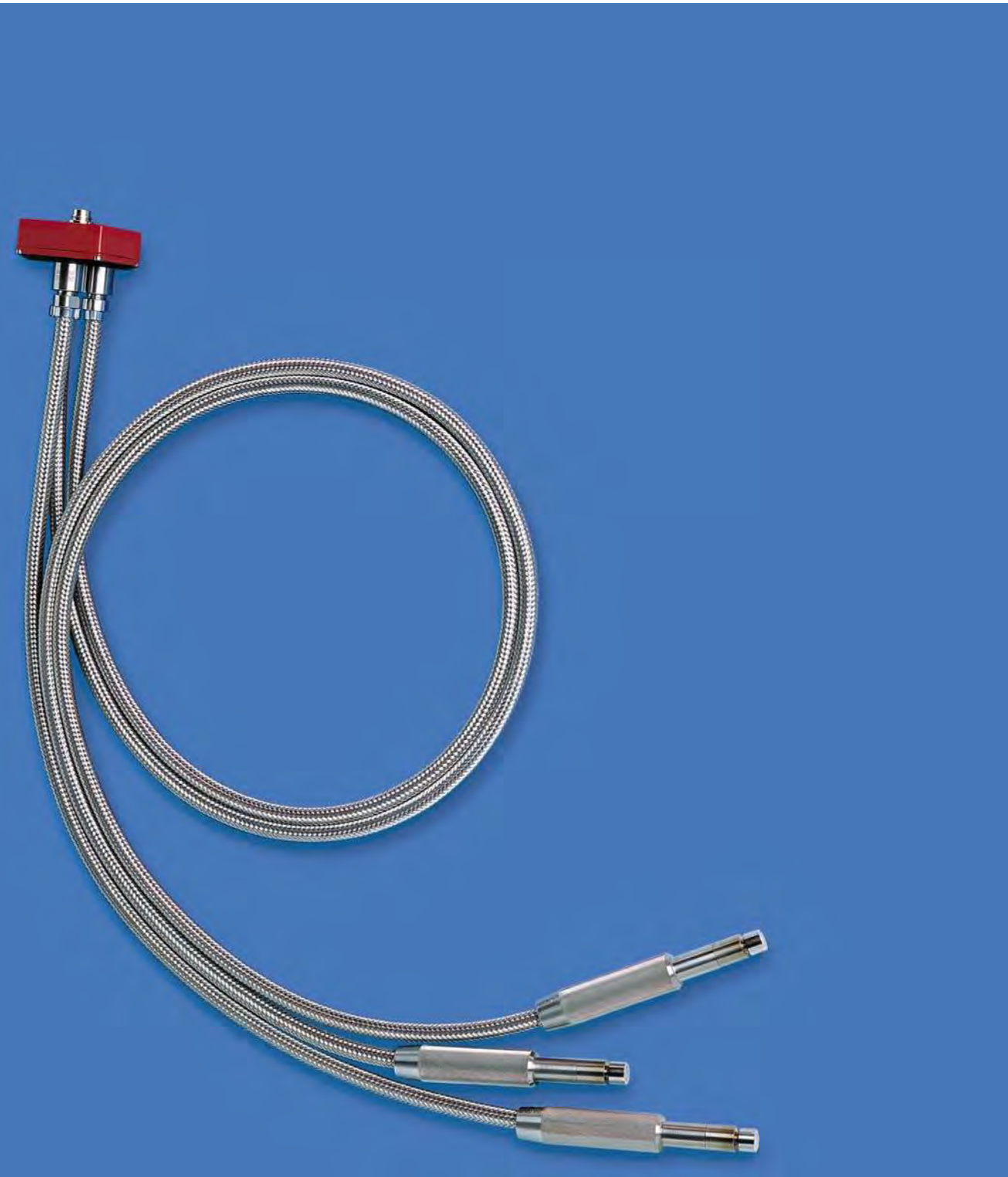
Application:
in lower surge hopper,
where incidence of
daylight occur

for products up to 60°C

easy mounting



High temperature sensor with separate optical sensors and easy mounting

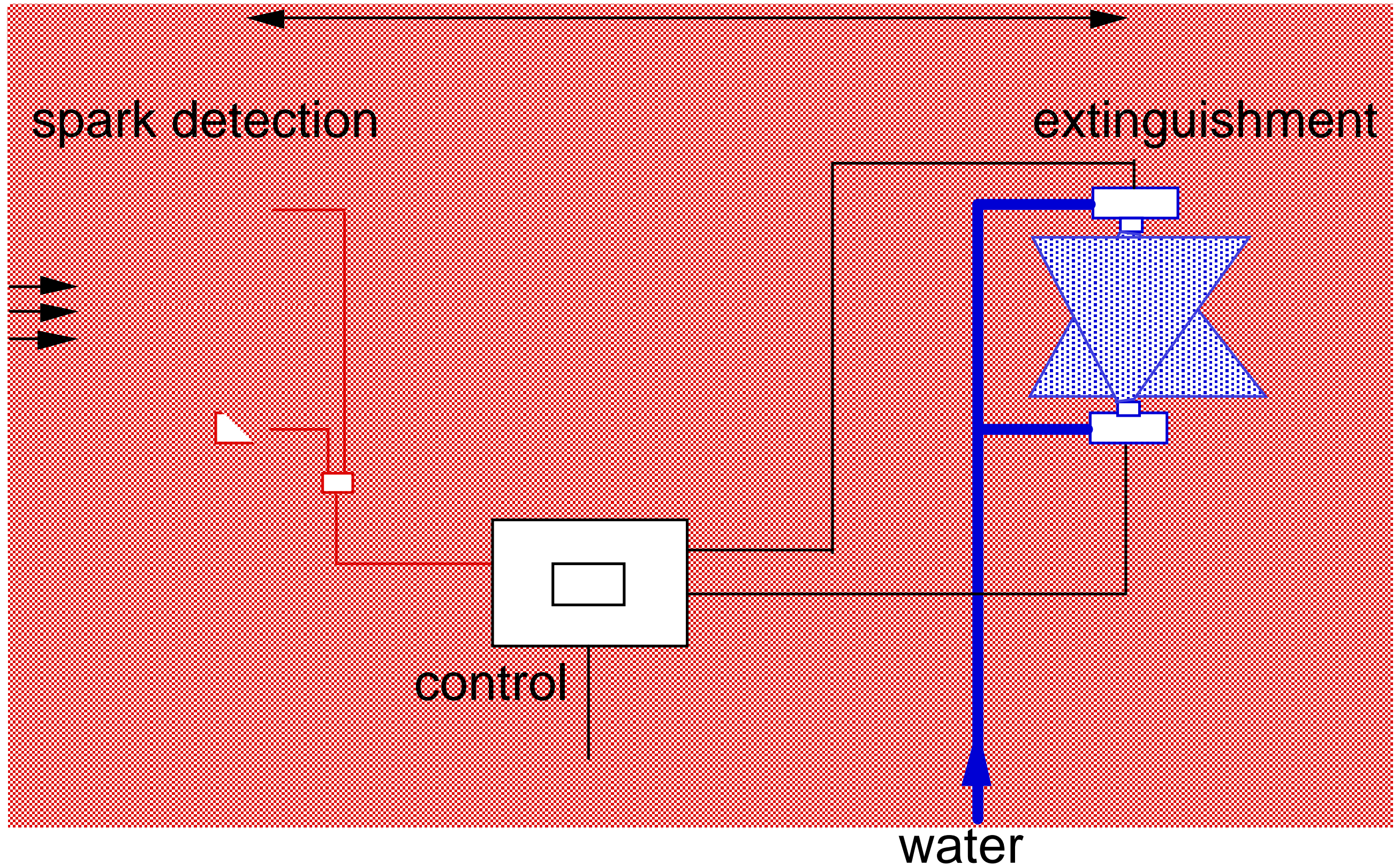




The central control of 2 to 100 sensors depending on versions with integrated emergency power supply, extinguishment control and alarming

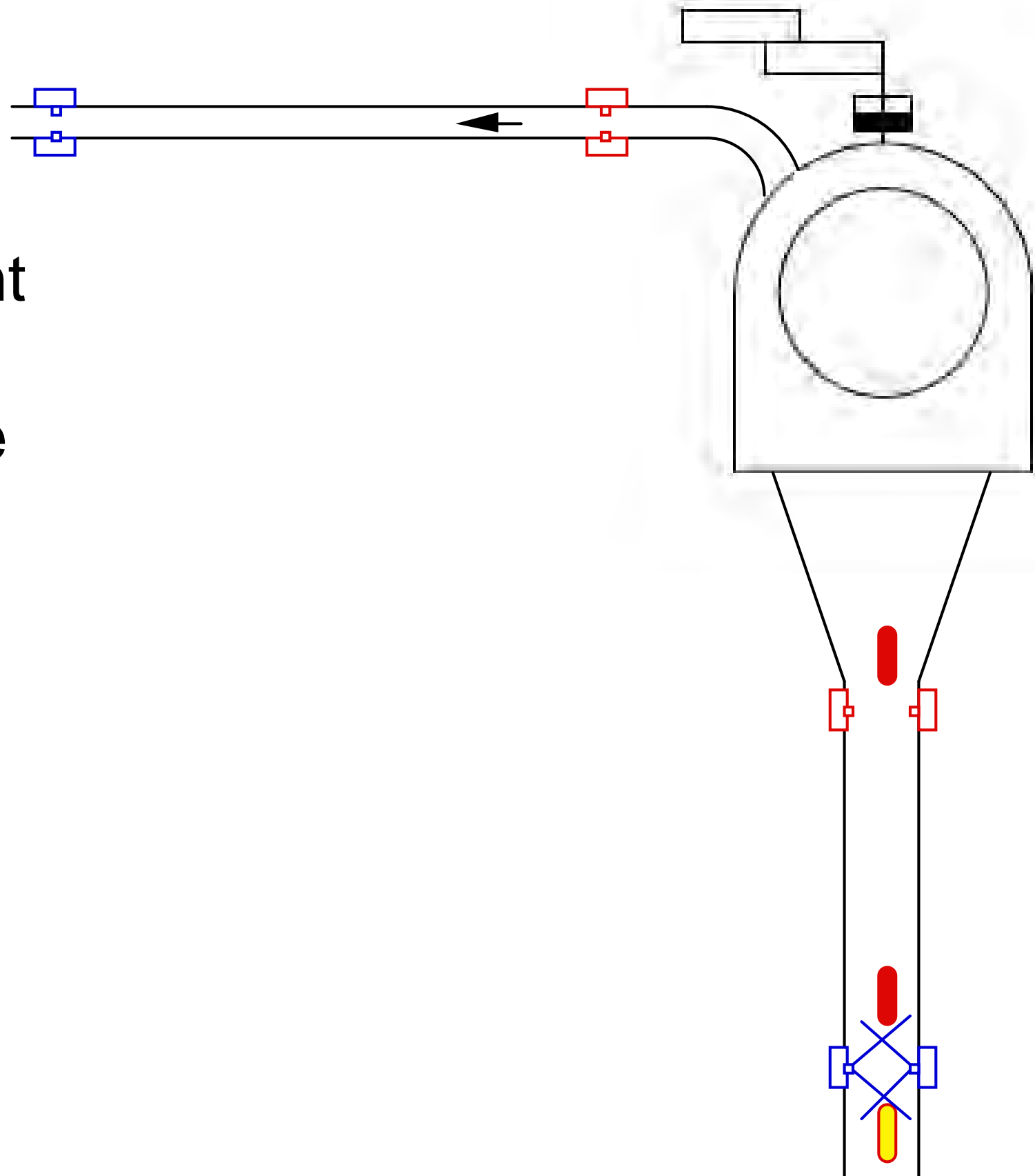


time X = material flow velocity + 1msec



Principle

hammermill
with extinguishment
in aspirationline
and in materialtube





Agromatic AG

Principle monitoring press

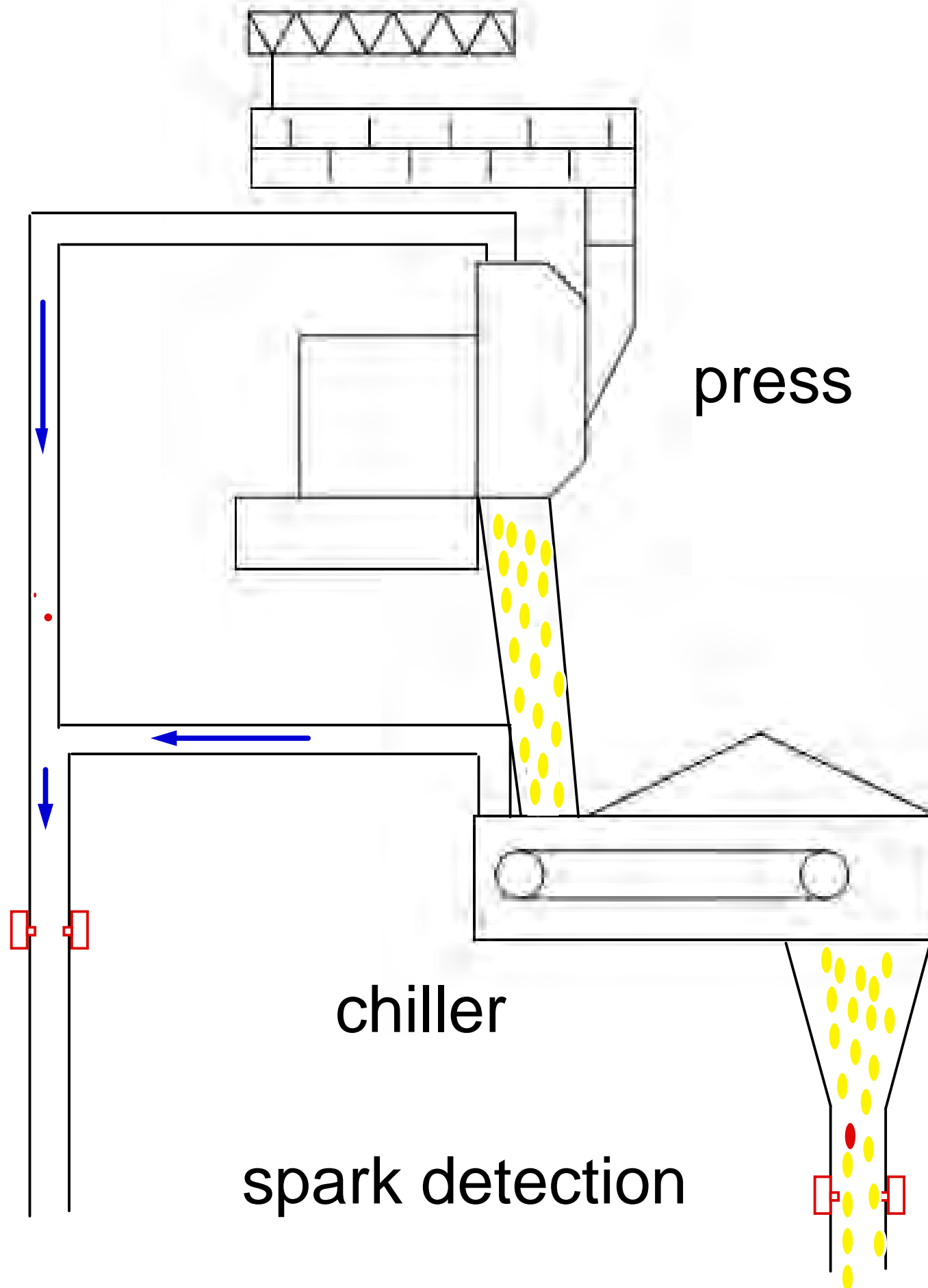
aspiration

press

spark detection

chiller

spark detection

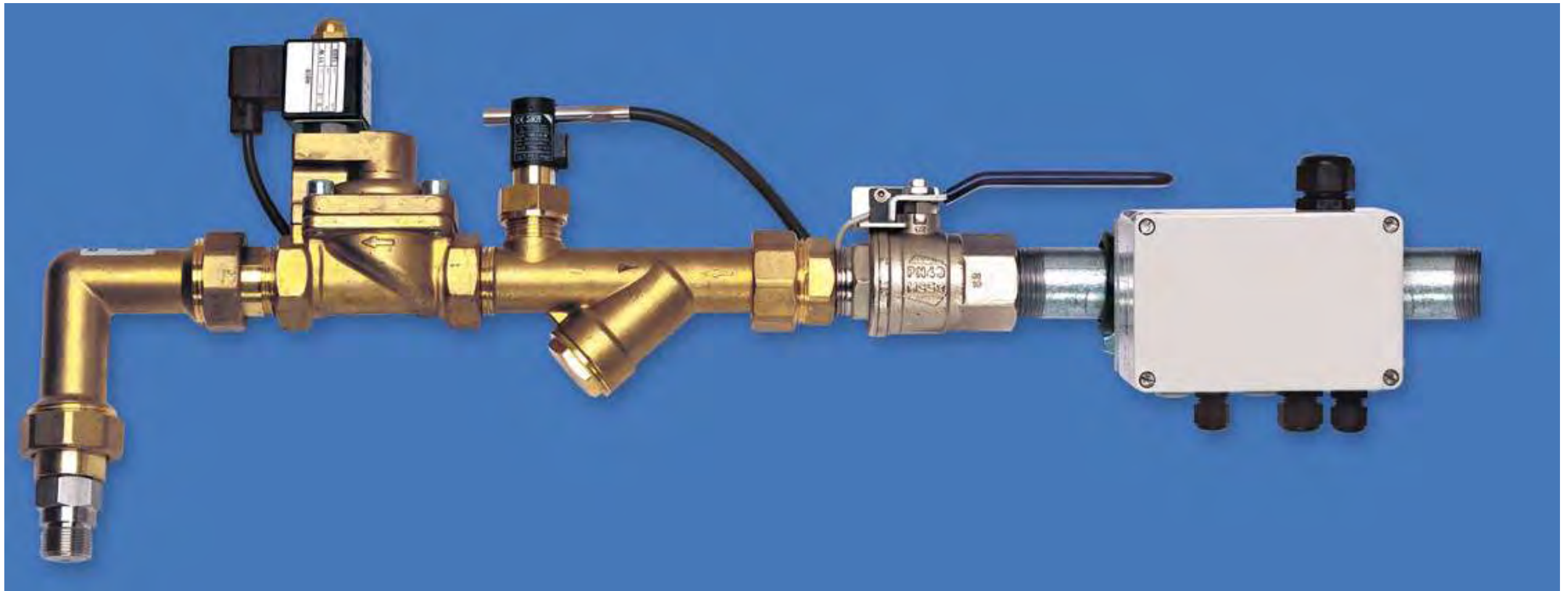


The extinguishing device

valve

filter

electronic

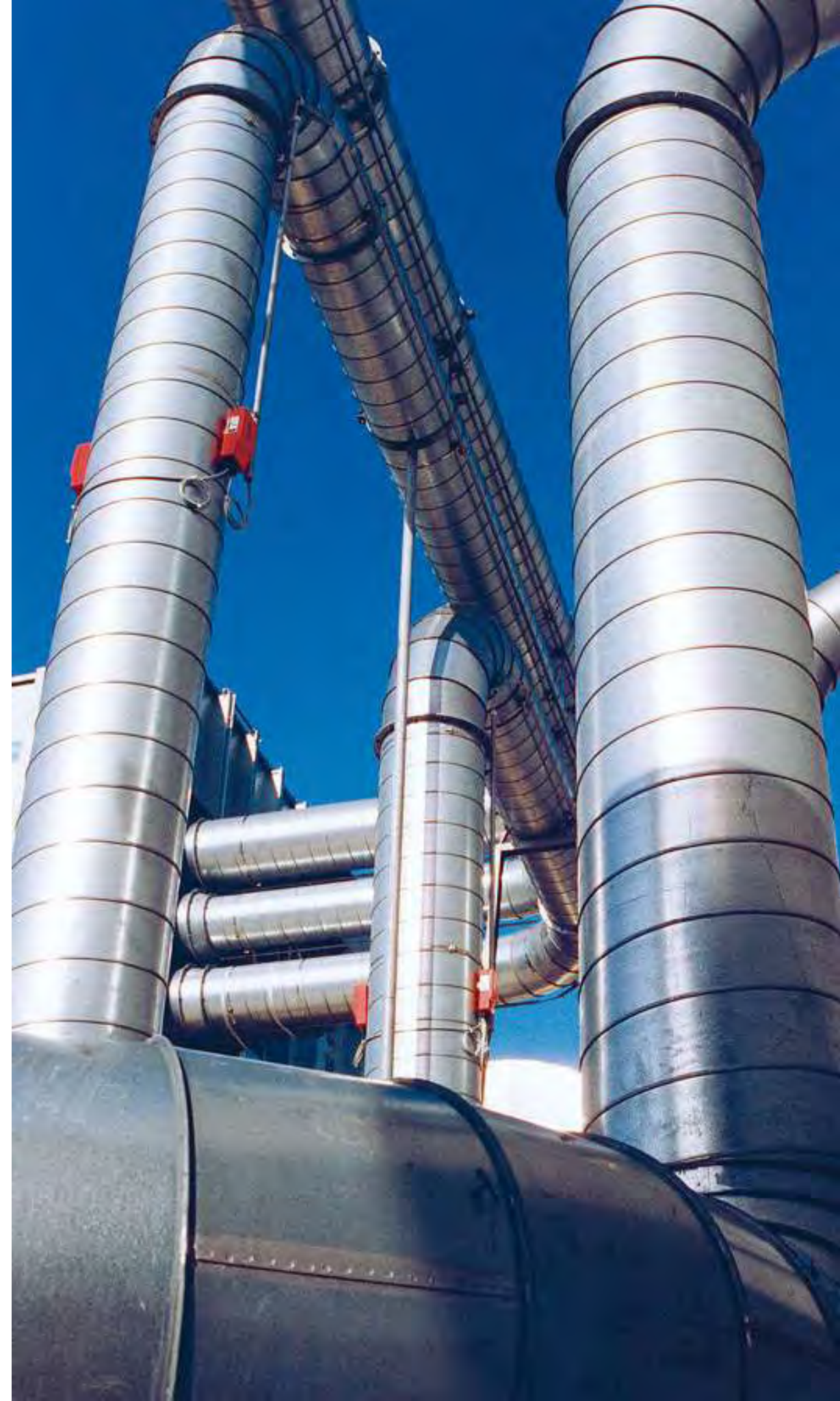


nozzle

flow control

watertap
with feedback
signal

Implementation in wood processing



**The following short video shows how quick the system works:
an ignition spark is detected and the explosion is immediately repressed.
There is not detonation, the person would not be effected.**

(Note: the shower of the doll only shows how quick the water fog works)

Zur Anzeige wird der QuickTime™
Dekompressor „YUV420 codec“
benötigt.

pressure increasing units



shut-off gates



**Measuring/- control/- monitoring units and laboratory
equipment of today
with technology of tomorrow!**

